

**National Report of Greece
to the International Union of Geodesy and
Geophysics 1999-2002**

Contributions in

**Geodesy
Geomagnetism and Aeronomy
Hydrological Sciences
Atmospheric Sciences
Physical Sciences of the Ocean
Seismology and Physics of the Earth's Interior
Volcanology and Chemistry of the Earth's Interior**

**Prepared on the occasion
XXIII General Assembly of the
International Union of Geodesy and Geophysics (IUGG)
in Sapporo, Japan, June 30 – July 11, 2003**

Athens 2003

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Foreword

This report was prepared under the direction of the *Hellenic National Committee for Geodesy and Geophysics*, the IUGG adhering organization for Greece, on the occasion of the XXIII General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Sapporo, Japan, June 30 – July 11, 2003.

The aim of the report is to communicate to both the Hellenic and international scientific communities the progress that has been achieved in Geodesy and Geophysics in Greece for the period 1999 to 2002 inclusive. The reported activities are presented in seven sections – one for each of the seven major scientific disciplines as represented by the respective Associations of IUGG. For each scientific area the contributions of each of the government and educational institutions involved in the respective activities is reported.

Each section is titled with the name of the corresponding society and was compiled by, or under the direction of, a member of the HNC/IUGG affiliated with that society. In the interest of compiling and disseminating this report in a timely fashion, no attempt has been made to edit or harmonize the styles of the different sections.

The Hellenic National Committee for Geodesy and Geophysics has decided that the full text of this report, including the extensive lists of publications, become available and in electronic form. The full National Report may be obtained via the Internet in Adobe® Portable Document Format (PDF), by retrieving the file with the following universal resource locator (URL):

http://www.survey.ntua.gr/main/labs/hgeod/IUGG_NR.pdf

The editors of this report acknowledge the work of all persons who have contributed material for the activities of their institutions, as well as the logistic support by the Hellenic Military Geographical Service for publishing the printable version of this report.

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1. GEODESY

The Institutes involved in geodetic activities in Greece during the reporting period were:

- The Hellenic Military Geographical Service
- Topographic Service of the Ministry of Agriculture
- The School of Rural And Surveying Engineering, National Technical University of Athens
- The Department of Geodesy and Surveying, Aristotle University of Thessaloniki
- The Hellenic Petroleum Corporation
- Ktimatologio S.A. and Hellenic Mapping and Cadastre Organization

1.1 HELLENIC MILITARY GEOGRAPHICAL SERVICE (HMGS)

I. Leveling

1. The first order leveling lines KORINTHOS-TRIPOLI and PIRGOS-PATRA have been measured.
2. The instruments WILD N3 and INVAR LEVELLING RODS were used in the First Order Levelling.
3. The aller-retour leveling method has been used and carried out by different observers and sets of instruments. Maximum length of site for each leveling observation was 25 meters. Geopotential numbers and orthometric heights were computed for every benchmark.
4. The difference between the aller and retour ways was always kept below 1mm/km.

II. Satellite Geodesy

HMGS planned, established, measured and adjusted the national GPS network for the entire Greece.

During the years of 1998 and 1999 office preparations and planning took place, and pillar selection was done in the field. On the top of the pillars used, there was placed a special metal structure which secures a stable antenna, so that to ensure that the same center and antenna height is used for each new measurement.

The GPS measurements were performed during the years 2000 and 2001. As a primary- reference station, it was used the permanent GPS station of Dionysos Satellite Observatory in Athens.

This network consists of:

- 27 reference stations
- 200 stations (pillars of triangulation network)

- 9 tide – stations (SELF program)
- 5 SLR stations (WEGENER program)

Additionally there were measured several triangulation pillars and leveling points (benchmarks-repers) as auxiliary and control points.

The processing of the network baselines was completed in May 2003 using the Bernese v. 4.2 software. Furthermore the adjustment of reference stations was performed using the Columbus v. 3.2 software.

Chart 1 below depicts all of the stations included in the Hellenic GPS network 2002.



Chart 1

III. Gravimetry

1. In the Second Order Gravimetric Network **55** from **86** stations in the areas of Peloponesus, East Macedonia-Thrace, Kyklades, Sporades, and Dodecanisa have been re-measured and the corresponding temporal variances of the gravity charts between the years 1990 and 2000 were compiled.
2. Gravity measurements have been carried out at **182** benchmarks of the First Order Leveling Lines VEROIA-KOZANI-GREVENA and KORINTHOS-

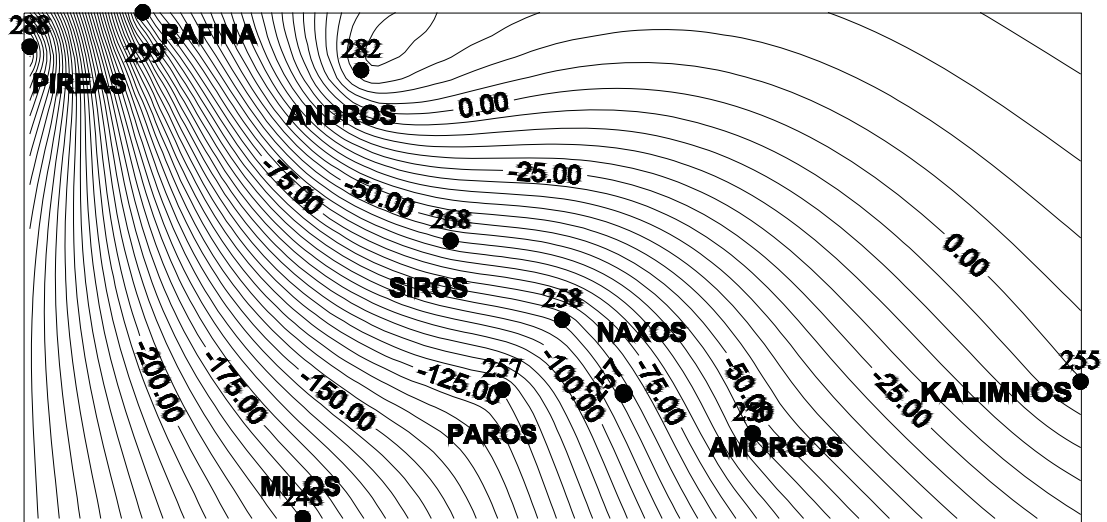
TRIPOLIS. Geopotential numbers and Orthometric heights were computed for each occupied benchmark.

3. The absolute gravity has been re-measured at **39** Leveling Bases of the First Order Leveling Line GREVENA – KOZANI – THESSALONIKI – KAVALA - ALEXANDROUPOLIS in order to calculate the gravity variation and its effect on the orthometric heights. The orthometric height differences were compared to the corresponding ellipsoidal height differences, which have been determined from GPS measurements.
4. Gravity Base of First Order Gravity Network has been established in IGSN'71 in the new National Airport of Athens in Spata.
5. The instruments LACOSTE and ROMBERG MODELS G730 and D107 have been used for the First and Second Order Gravimetric Networks.
6. The ladder-sequence loop method was used.
7. The charts, which follow, depict in order of appearance
 - The temporal variations of Gravity between 2001-1990 in the islands of KYKLADES (Chart 2a), and SPORADES, PELOPONESUS and DODECANISA (Chart 2b).
 - The temporal variations of gravity between 1998-1988 around the area of earthquake epicenter in Athens in September of 1999 (Charts 3).
 - The temporal variations of gravity between 1999-1988 in East Macedonia and Thrace (Charts 4).

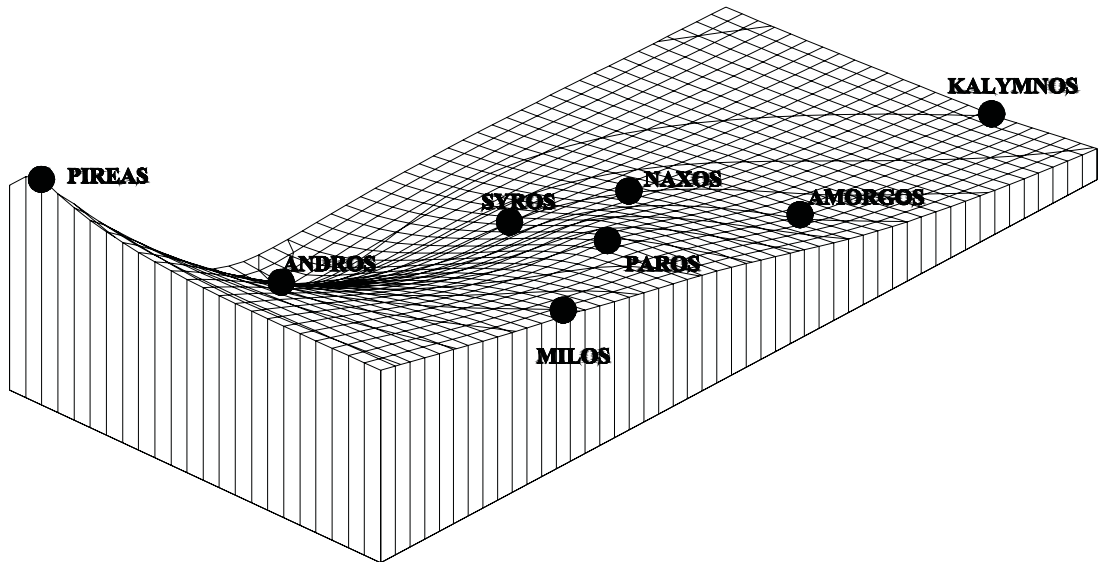
Publications

- MYLONA –KOTROGIANNI, H., TH. : 2000, Temporal variances of Gravity from re-measurement of Second Gravity Network in East Macedonia and Thrace, BUL. HEL. MIL. GEOGR. SERV., Number 149.

**TEMPORAL VARIANCES OF GRAVITY
 BETWEEN 1999-1989 IN ISLANDS OF KYKLADES.
 REFERENCE STATION: THE GRAVIMETRIC STATION OF KALIMNOS
 (THE MEASUREMENTS HAVE TAKEN PLACE FROM 7 JUN 1999 TO 8 JUL 1999
 BEFORE THE EARTHQUAKE OF ATHENS IN 7 SEP 1999)**



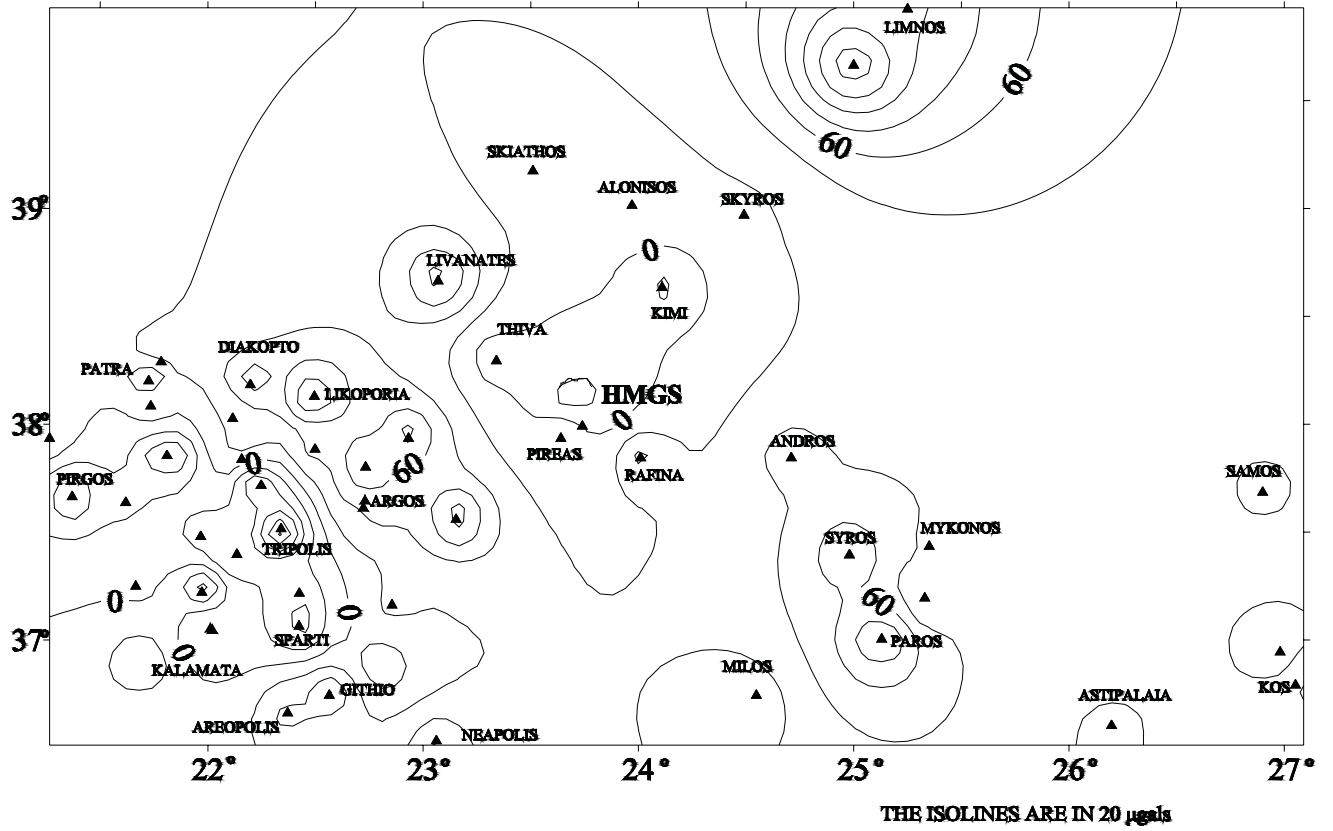
THE ISOLINES ARE IN mgals.



**TEMPORAL VARIANCES OF GRAVITY IN THIRD VIEW
 FOR ABOVE DIAGRAM IN KIKLADES.**

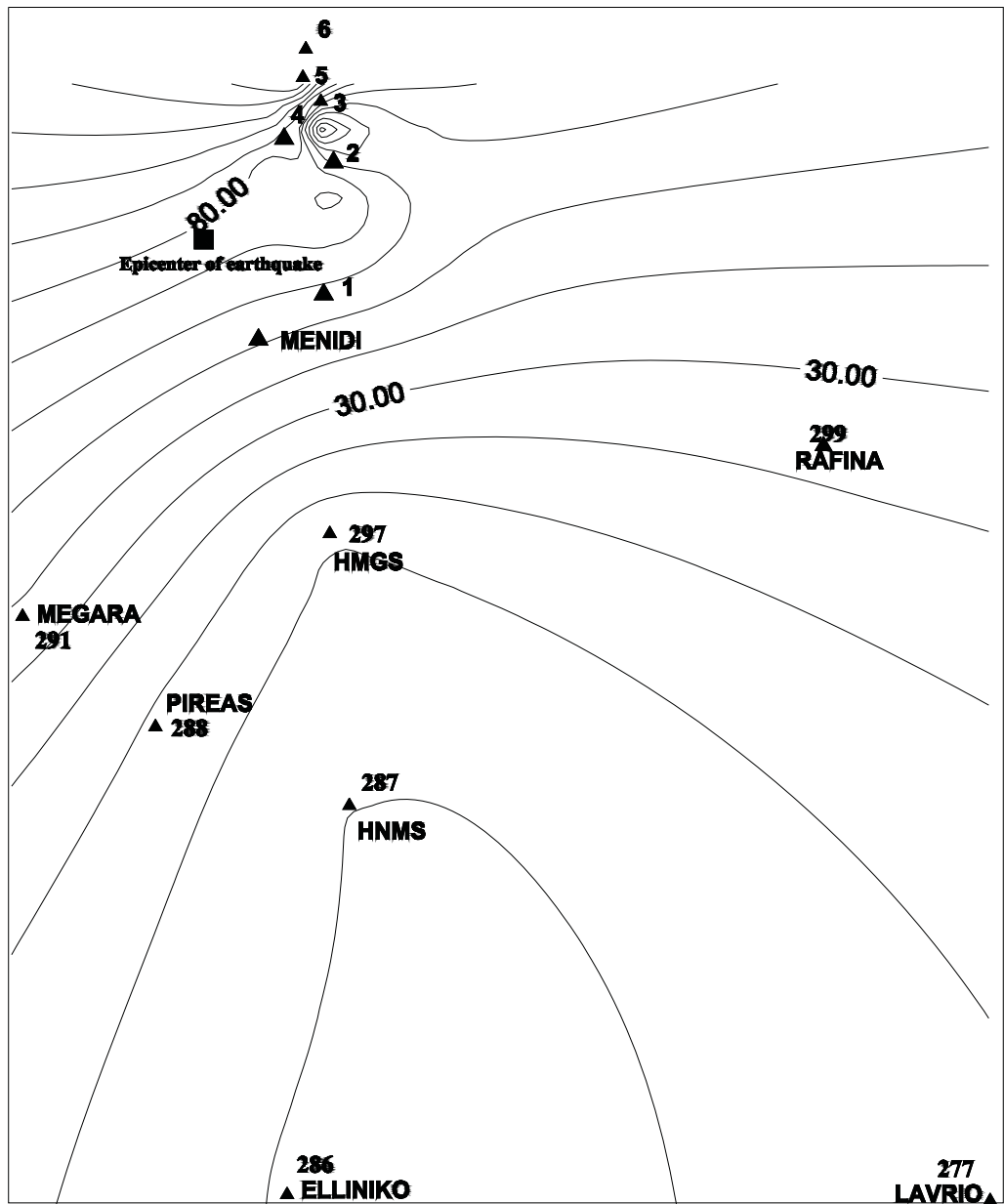
Charts 2a

**TEMPORAL VARIATION OF GRAVITY BETWEEN 2001-1990
IN PELOPONNESUS AND AEGEAN SEA ISLANDS**



Charts 2b

**TEMPORAL VARIANCES OF GRAVITY BETWEEN 1998-1988
IN REGION OF ATHENS (BEFORE EARTHQUAKE IN 7 SEP 1999)**

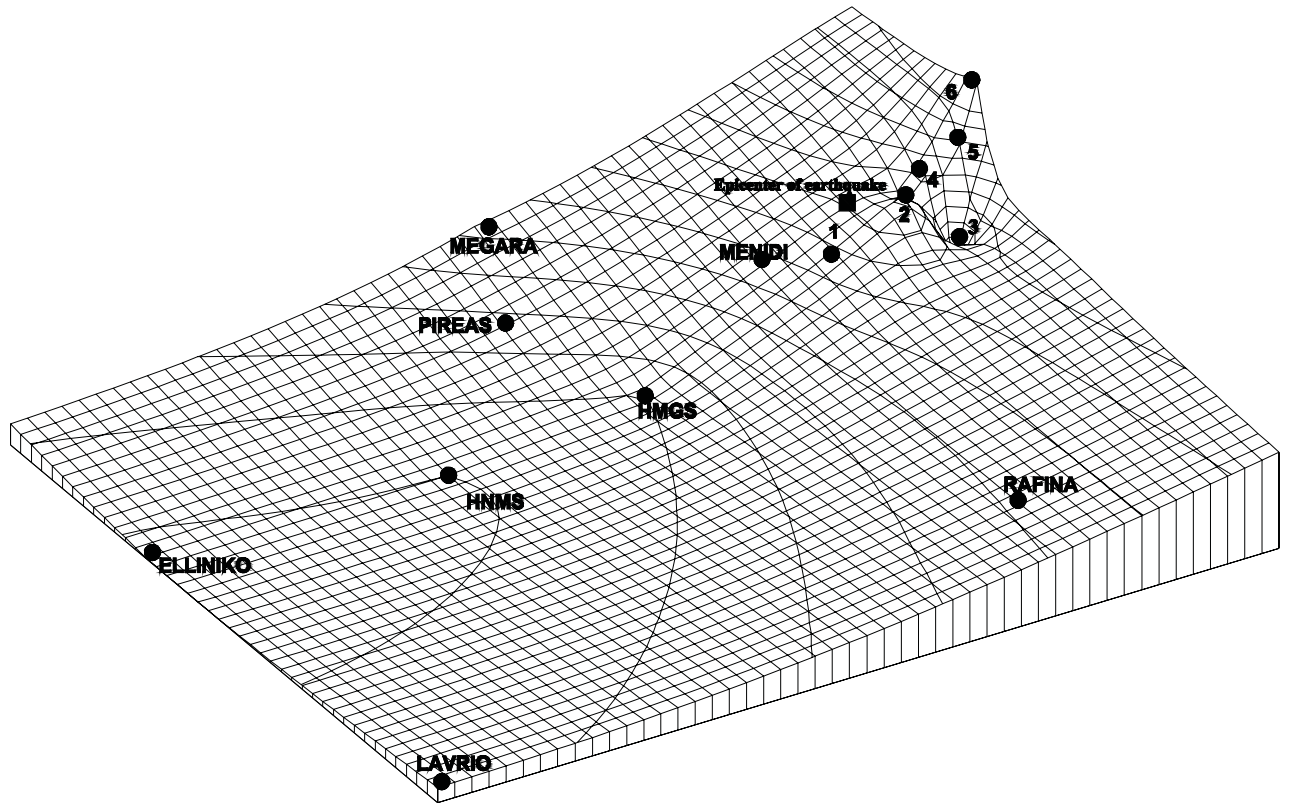


TEMPORAL VARIANCES IN μgal .

**1,2,3,4,5,6:BASE STATIONS OF CALIBRATION LINE IN PARNITHA
HMGS:NATIONAL FUNDAMENTAL GRAVITY BASE IN IGSN' 71
LAMIA ETC:GRAVITY BASES OF NATIONAL GRAVITY BASE NETWORK**

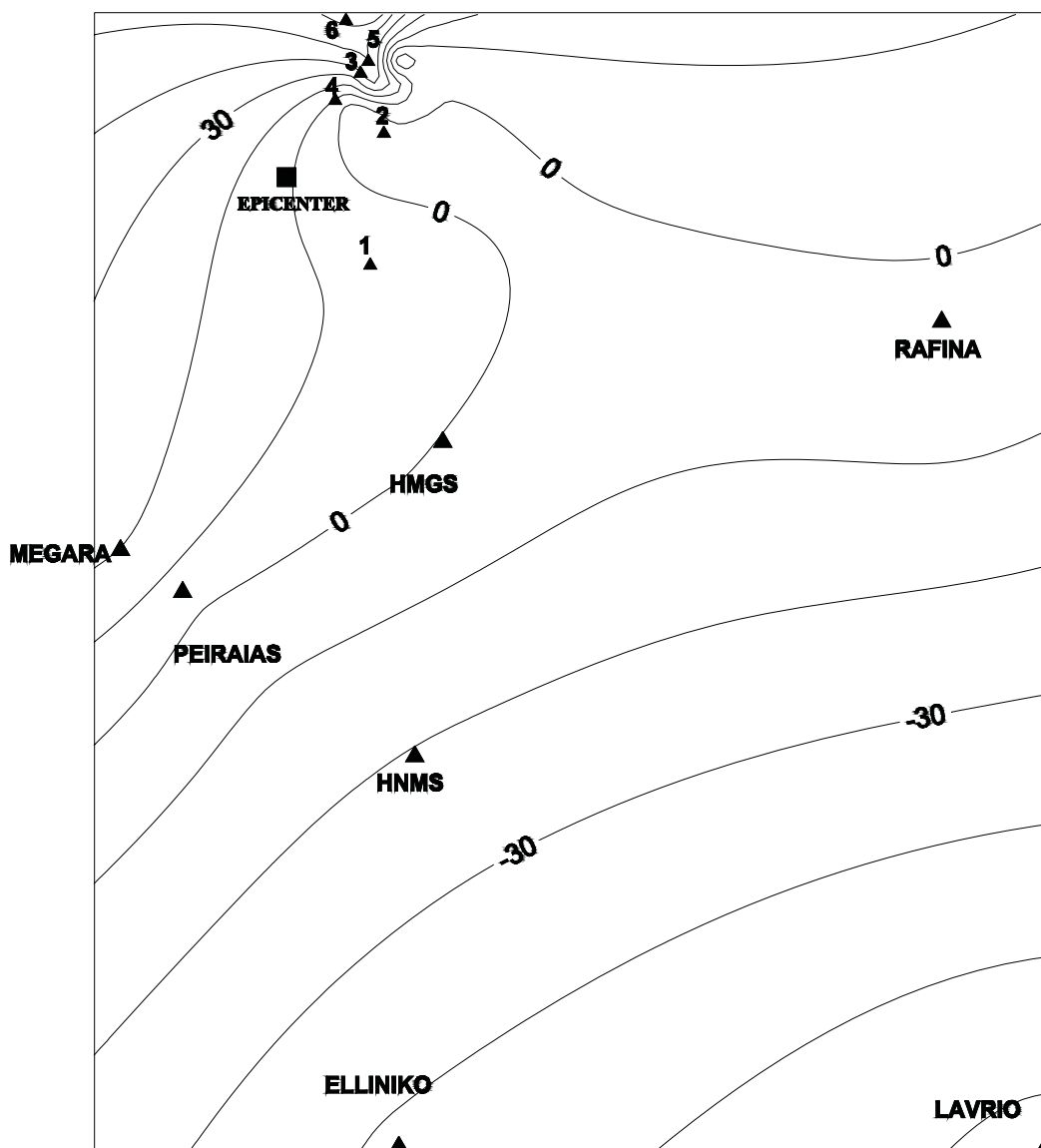
Charts 3

**TEMPORAL VARIANCES OF GRAVITY IN THIRD VIEW,
BETWEEN 1998-1998, IN REGION AROUND OF ATHENS
(BEFORE THE EARTHQUAKE IN 7 SEP 1999).**



Charts 3 Cont'd

**TEMPORAL VARIANCES OF GRAVITY BETWEEN 1999-1998
IN REGION OF ATTIKA AFTER THE EARTHQUAKE IN 7 SEP 1999.
THE MEASUREMENTS TOOK PLACE IN SEPTEMBER 1999**

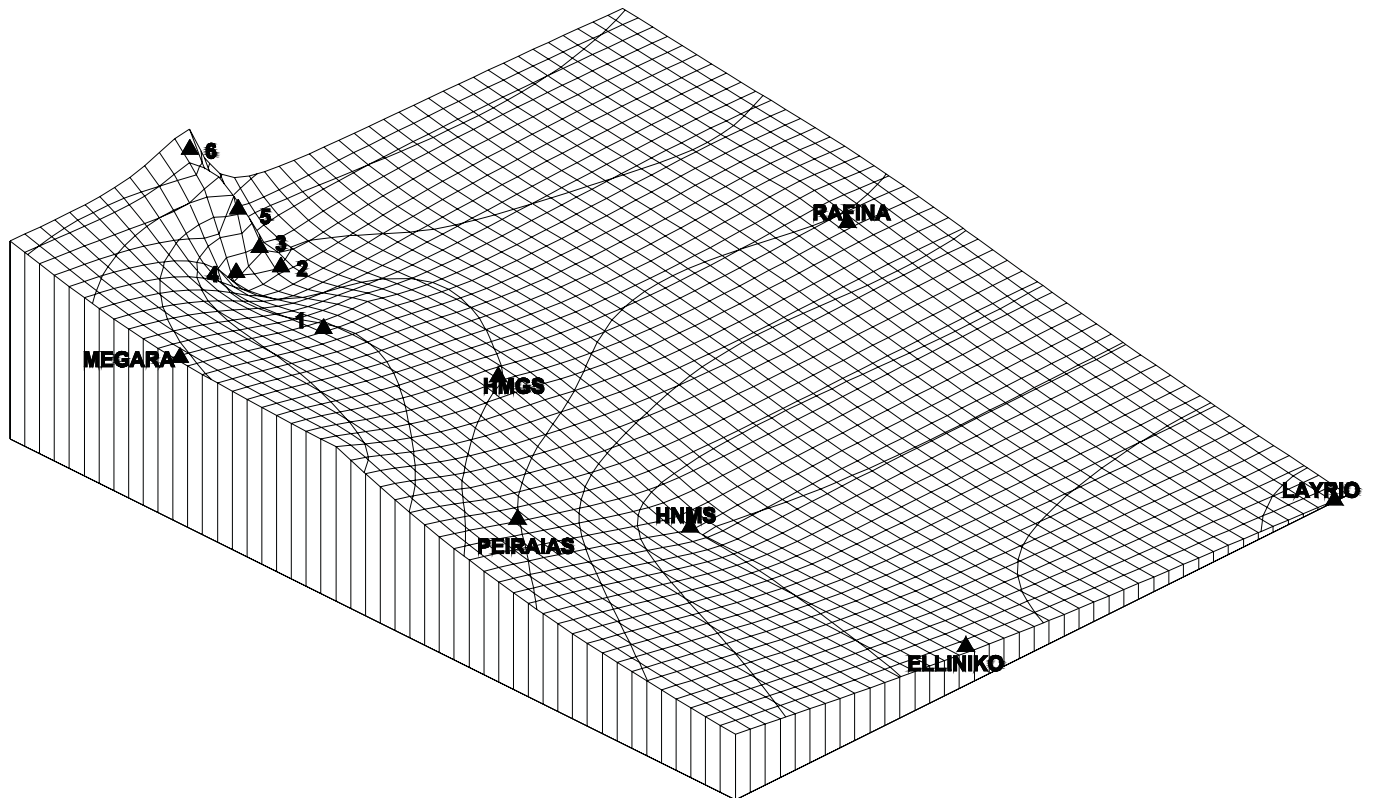


VALUES ARE IN μgal s

**1,2,3,4,5,6: THE GRAVITY STATIONS OF CALIBRATION LINE IN PARNITHA
HMGS: NATIONAL FUNDAMENTAL GRAVITY BASE IN IGSN'71
MEGARA ETC: GRAVITY BASES OF NATIONAL GRAVITY BASE NETWORK**

Charts 4 Cont'd

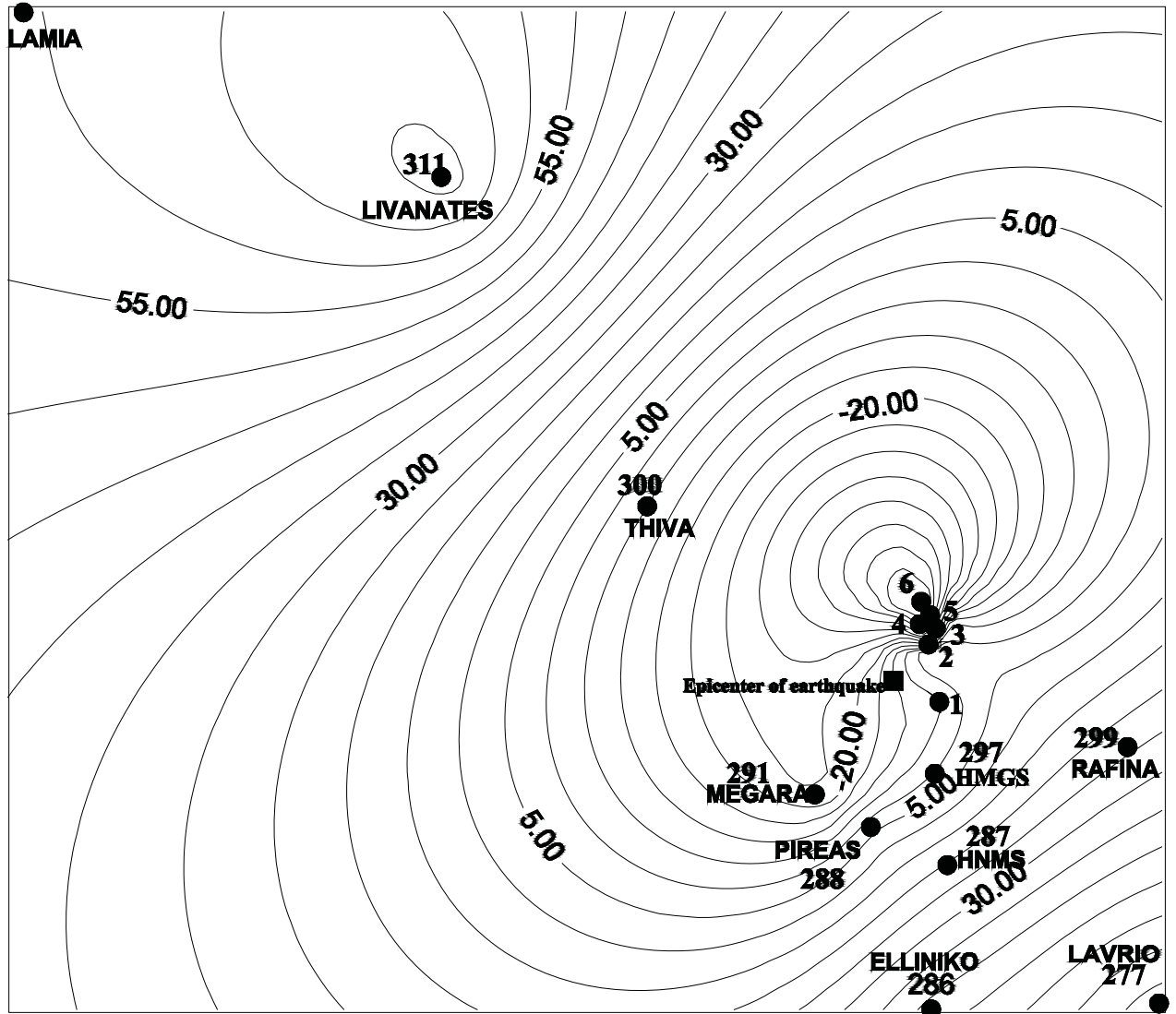
**TEMPORAL VARIANCES BETWEEN 1999-1998
IN ATTIKA AFTER EARTHQUAKE IN PARNITHA
FROM SOUTH-WEST IN THIRD VIEW.**



Charts 4 Cont'd

**TEMPORAL VARIANCES OF GRAVITY BETWEEN 1999-1998.
THE MEASUREMENTS HAVE TAKEN PLACE
AFTER THE EARTHQUAKE OF ATHENS
FROM 14 SEP 1999 TO 1 OCT 1999.**

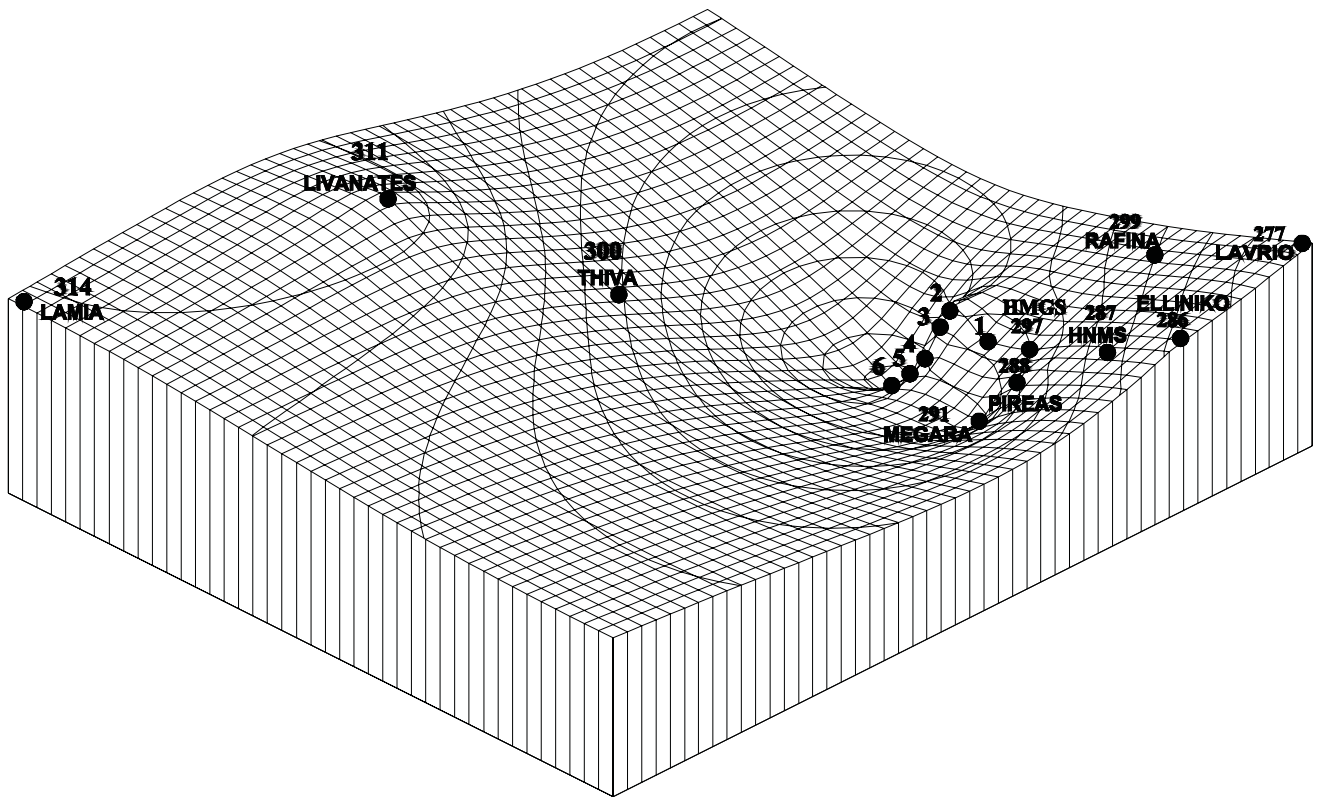
314



THE ISOLINES ARE IN μgal

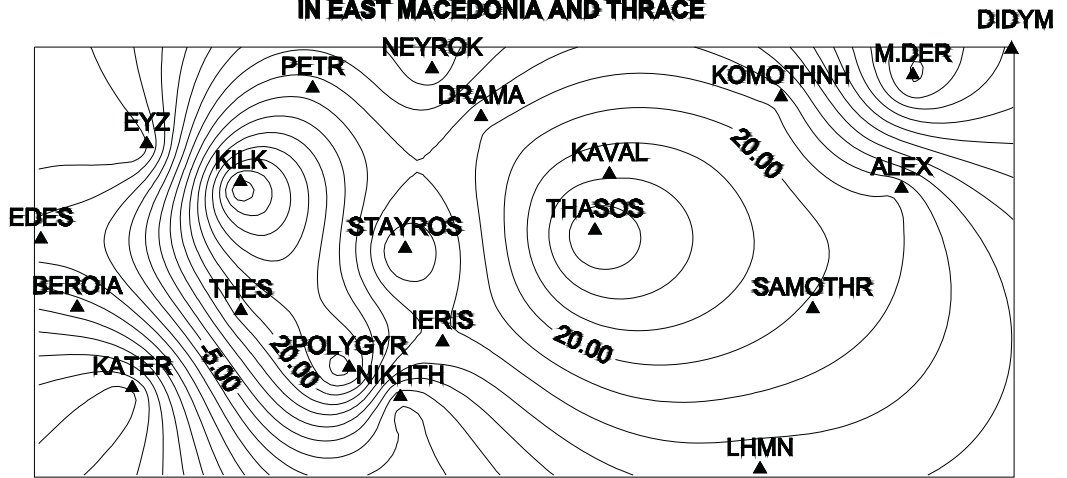
Charts 4 Cont'd

**TEMPORAL VARIANCES OF GRAVITY IN THIRD VIEW
FOR THE PREVIEWS DIAGRAM**



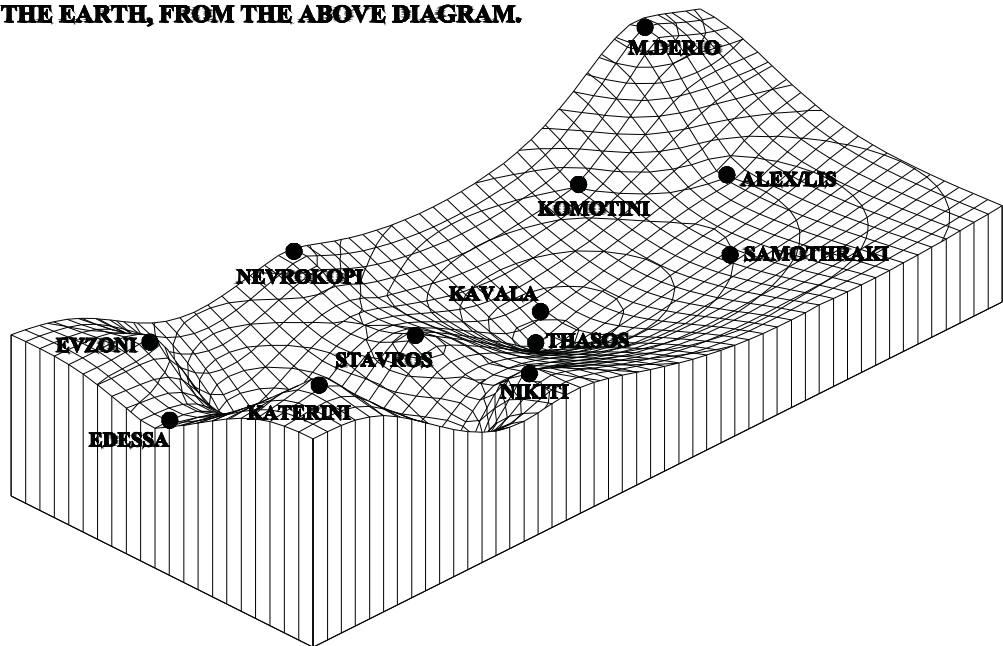
Charts 3 Cont'd

**TEMPORAL VARIANCES OF GRAVITY BETWEEN 1999-1988
IN EAST MACEDONIA AND THRACE**



THE VALUES ARE IN μgal

**TEMPORAL VARIANCES, IN THIRD VIEW, IN THE CRUST OF
THE EARTH, FROM THE ABOVE DIAGRAM.**

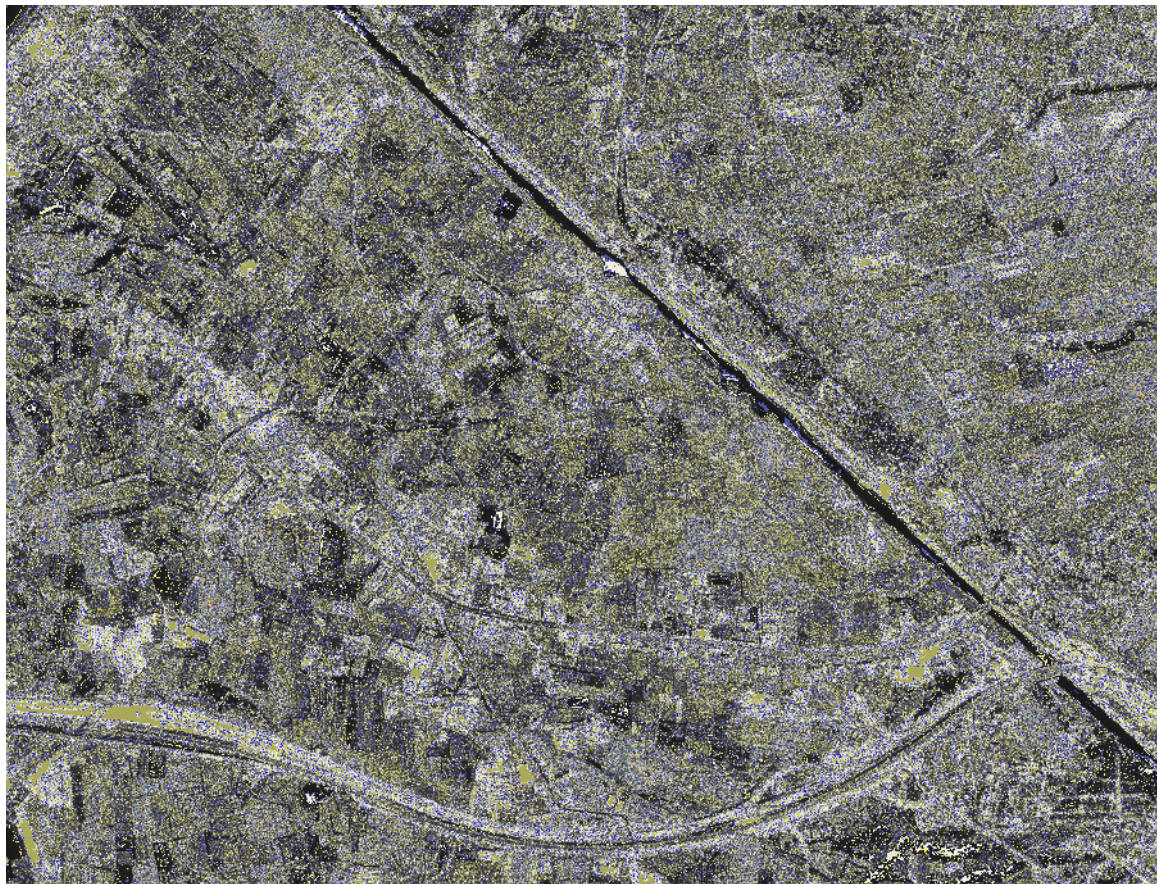


Charts 4

1.2 TOPOGRAPHIC SERVICE OF THE MINISTRY OF AGRICULTURE

During the reporting period, the activities of the Topographic Service of the Ministry of Agriculture in the field of Geodesy were the following:

- a) Except for a few areas near the northern boundaries of the country, full map coverage was achieved with the production of Orthophoto maps in a scale of 1:5000, blocks and codes. The above products were created as part of the I.A.C.S. (Integrated Administrative and Control System for arable and grazing lands) programme, and the GIS-OLI and GIS-VITI software programs (Geographic Information Systems for Olive Trees and Vineyards respectively).
- b) The completion and delivery of 264,587 km² of willing and compulsory Land Consolidation, to the beneficiary farmers, in seventy (70) agricultural and land field in several regions of Greece.
- c) Annual inspections of arable and grazing fields with the assistance of Remote Sensing, in certain areas of the country in the context of the I.A.C.S programme.



Sample orthophoto map 1:5000 (code number 408-197) of Corinthia Prefecture

1.3 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA)

During the reporting period, The Laboratory of General Geodesy (Division of Topography) of the National Technical University of Athens was mainly involved in the following areas of research:

- Deformation monitoring of small and medium scale (ground and structures)
- Metrology (quality aspects of conventional surveying and satellite positioning systems)
- Industrial surveying
- Geometric documentation of structures and monuments

Respectively, the Higher Geodesy Lab and the Dionysos Satellite Observatory were involved in the following main scientific areas:

- *Geodesy and Geodynamics using GPS and INSAR technologies*
- *Road mapping and navigation using GPS*
- *Gravity*

Publications

- Determination of the reference axis of a submarine (Balodimos D., A.M. Agatza-Balodimou, D. Stathas, S. Doggouris, E. Labrou). *Journal Technika Chronika, Issue 3, 1999* (in greek).
- “New constraints on the rapid crustal motion of the Aegean region: recent results inferred from GPS measurements (1993-1998) across the West Hellenic Arc, Greece” (M. Cocard, H. -G. Kahle, Y. Peter, A. Geiger, G. Veis, S. Felekis, D. Paradissis, H. Billiris). *Earth and Planetary Science Letters* 172, 39-47, 1999.
- “An Interdisciplinary Approach to Studying Seismic Hazard Throughout Greece” (P. R. Cruddace, P.A. Cross, G. Veis, H. Billiris, D. Paradissis,, J. Galanis, H. Lyon Caen, P. Briole, B.A.C. Ambrosius, W.J.F. Simons, E. Roegies, B. Parsons, P. England, H.-G. Kahle, M. Cocard, P. Yannick, G. Stavrakakis, P. Clarke, M. Lilje). *IUGG General Assembly, 1999*.
- Investigation of raw variance and variability spectra from non gravimetric geoidal signals (M. Doufexopoulou and V.N. Pagounis). *Bolletino di Geofisica teorica ed applicata* Sept.- Dec 1999, Vol.40 p.p 451–460.
- A comparison of geophysical signatures between Greece and Italy as deduced by geodetic data (M. Doufexopoulou, V.N. Pagounis, I. Prodromou, S. Sypsas). *General Assembly of IUGG 1999 – Birmingham – International Association of Seismology and Physics of the Earth’s Interior [IASPEI]*

- The use of geodetic techniques for the determination of tolerances in pre-fabricated structures (Georgopoulos G., S. Tsoukantas). In: *Proc. Of the 13th Hellenic Symposium in Concrete, October, 1999, Rethymnon, Greece* (in greek).
- Geometric Documentation of Archaeological Artefacts (Makris M., M. Bia, G. Galanopoulou, A. Georgopoulos). In: *Proc. International Workshop "Photogrammetric Measurement, Object Modelling and Documentation in Architecture and Industry" ISPRS, 7-9 July, 1999, Thessaloniki, Greece.*
- "CGPS Monitoring Across the Subduction Zone of the West Hellenic Arc, Greece" (Y. Peter, H.-G Kahle, M. Cocard, G. Veis, D. Paradissis, S. Felekis). *AGU Spring Meeting, 1999.*
- Active Faulting and Seismic Hazard in Attiki (Greece) SEISFAULTGREECE (G. Veis, C. Mitsakaki, K. Papazissi, H. Billiris, D. Paradissis, A. Marinou), *Final Report on the Research Programme submitted to EU, 1999.*
- Deformation Studies in the Corinthian Gulf (A.M. Agatza-Balodimou, P. Briole, C. Mitsakaki, K. Papazissi, G. Veis), *Poster Paper in the Advanced Research Workshop of NATO: Integration of Earth Science Research on the Turkish and Greek 1999 Earthquakes and Needs for Future Cooperative Research, Istanbul, May 14-17, 2000.*
- Active Deformation of the Gulf of Korinthos, Greece: Results From Repeated GPS Surveys Between 1990 and 1995 (Briole P. Rigo A., Lyon-Caen H., Ruegg J.C., Papazissi K., Mitsakaki C., Agatza-Balodimou A.M., Veis G., Hatzfeld D., Deschamps A.). *JGR, Solid Earth, Vol.105, No B11, pp. 25605-25625, Nov. 2000.*
- "Global Positioning System constraints on plate kinematics and dynamics in the eastern Mediterranean and Caucasus" (S. M Clusky, S. Balassanian, A. Barka, C. Demir, S. Ergintav, I. Georgiev, O. Gurkan, M. Hamburger, K. Hurst, H.-G Khale, K. Kastens, G. Kekelidze, R. King, V. Kotzev, O. Lenk, S. Mahmoud, A. Mishin, M. Nadariya, A. Ouzounis, D. Paradissis, Y. Peter, M. Prilepin, R. Reilinger, I. Sanli, H. Seeger, A. Tealeb, M. N. Toksoz and G. Veis.) *Journal of Geophysical Research, Vol. 105, No. B3, 5695-5719, 2000.*
- Height Determination Using Kinematic GPS (A. Karamanou, K. Papazissi, D. Paradissis, B. Psarianos), *Presented to the: GPS and SAR Interferometry on Volcanoes, 9-16 June, Catania, Italia, 2000.*
- "Speed and maneuverability trials of a 120 m ship" (D. Paradissis), *Pyrforos (3), 2000, in Greek.*
- Tectonic implied results from Geoid and Topography Signals (M. Doufexopoulou and V.N. Pagounis). *Phys. Chem. Earth. Vol.25, pp 101-106, 2000*

- Αποτύπωση Οδών με Δορυφορική Τεχνολογία (Α. Καραμάνου, Κ. Παπαζήση, Δ. Παραδείσης, Β. Ψαριανός), 3^ο Διεπιστημονικό Διαπανεπιστημιακό Συνέδριο του ΕΜΠ, Μέτσοβο, 2001.
- Geodetic control networks in industrial surveying- application in a submarine of the Hellenic Navy (Agatza-Balodimou A.M., D. Balodimos, O. Arabatzi, D. Stathas). *Journal Technika Chronika, Issue 1, 2000* (in Greek).
- Adjusting Sea Level Measurements at the Port of Alexandroupolis (A. M. Agatza-Balodimou, A. Antonopoulos, A. Maratos), *Survey Review, Vol. 36, No. 279, pp. 35-43, Jan. 2001*.
- The use of Geodesy and Photogrammetry in documentation and preservation of cultural heritage monuments (Balodimos D.) In: *Proc. Of the 3rd Scientific Symposium of the National Technical University of Athens, 7-10 June, 2001, Metsovo, Greece* (in greek).
- Α. Γεωργόπουλος, Π. Ζεντέλης, Μ. Κόμπου, Δ. Νικολούδη, Κ. Παπαζήση, Μ. Παπαντωνίου, Ανάπτυξη LIS για τα 17 τζαμιά της πόλης των Ιωαννίνων και αναπαράσταση των μιναρέδων τους, 3^ο Διεπιστημονικό Διαπανεπιστημιακό Συνέδριο του ΕΜΠ, Μέτσοβο, 2001.
- Use of geodetic methodologies for the deformation monitoring of ground and large technical projects (Georgopoulos G., E. Telioni). In: *Proc. Of 4th Hellenic Symposium in Geotechnical and Geoenvironmental Engineering, May, Athens, 2001*, (in greek).
- Digitally developing works of art (Georgopoulos A., C. Ioannidis, G. Makris, E. Tournas, S. Tapinaki). In: *Proc. CIPA Congress for Documentation of Cultural Heritage, Potsdam, September, 2001*.
- The effect of old geodetic data on deformation analyses (Agatza - Balodimou A.M., Mitsakaki C.). *Survey Review, Vol. 36, No. 282, pp. 249-254, Oct. 2001*.
- The Gulf of Corinth “CORSEIS” permanent GPS network: Framework and Perspectives (P. Briole, H. Billiris, S. Felekis, C. Mitsakaki, K. Papazissi, D. Paradissis, G. Veis, A. Avallone, O. Charade, A. Nercessian), *XXVI Gen. Assembly of European Geophysical Soc., 25-30 March, Nice, 2001*.
- “Towards the Definition of a New Height System of Reference for the Hellenic Area” (A. Antonopoulos, A.M.Agatza- Balodimou, D. Paradissis). *Bolletino di Geodesia e Scienze Affini, Anno LX-N.3, 2001*.
- “Crustal Strain in Greece and the Aegean from Multiply Repeated GPS Measurements in the Interval 1988-2000” (P.J. Clarke, P.A. Cross, P.R. Cruddace, H. Billiris, H. Lyon-Caen, M. Cocard, H.G. Kahle, Y. Peter, B. Ambrosius and G. Stravarakakis). *AGU, Fall Meeting, 2001*.

- A low cost geodetic engineering method based on observations of the height reference datum to locate suspected tectonic faults in a region (M. Doufexopoulou and V.M. Pagounis). *European Geophysical Society Assembly, EGS XXVI, Nice, 2001* [poster].
- A comparison between computed and observed undulation degree variances at the low and medium frequency spectrum (M. Doufexopoulou and V.N. Pagounis). *International Geoid Service, Bulletin N.13 – Special Issue / ISSN 1128-3955, “Regional and local gravity field approximation”, EGS Assembly, Nice March 2001.*
- “Road mapping using satellite techniques (GPS)” (A. Karamanou, K. Papazissi, D. Paradissis, B. Psarianos). *2^d Metsovo Conference, 2001, in greek.*
- Geometric documentation and three-dimensional photo-realistic presentation of the stone arc bridge of Kokkorou (Kritharas N., X. Kritsiotaki, E. Bakali, M. Papakosta, A. Georgopoulos, D. Balodimos). In: *Proc. Of the 3rd Scientific Symposium of the National Technical University of Athens, 7-10 June, Metsovo, Greece, 2001* (in greek).
- How geoid undulations interpolate in tectonic area? (V.N. Pagounis, M. Doufexopoulou, S. Sypsas, E. Triantafyllou). *European Geophysical Society Assembly, Nice March 2001.*
- “Demonstrating the utility of SAR differential interferometry for the assessment of earthquake risk” (D. Paradissis, and al.), *CD-ROM, 2001.*
- “First results using GPS measurements in the seismic region of Grevena-Kozani” (D. Paradissis, I. Fountoulis, B. Tsagaroulis, N. Veis). *Hellenic Geological Association, 50 years, 2001.*
- “A Coast-Effective Road Surveying Method for the Assessment of Road Alignments” (B. Psarianos, D. Paradissis, B. Nakos, G. Karras). *Fourth International Symposium - Turkish-German Joint Geodetic Days, 2001.*
- Dynamic Vehicle Positioning and Orientation Techniques for Inspecting Road Surface or Guiding Construction Machines (Psarianos B., M. Kontaratos, D. Stathas, J. Karabelas). *Proc. FIG Conference, May, 2001, Korea.*
- *The use of robotic total station in testing the trajectory of a moving target* (Stathas D., J. Karabelas). *Geomatics Research Australasia, 2001.*
- Monitoring of deformations of the Evripos bridge using GPS and accelerometers (Tsakiri M., B. Lekidis, G. Georgopoulos, E. Telioni). In: *Proc. Of the 4th Hellenic Symposium in Geotechnical and Geoenvironmental Engineering, May, 2001, Athens* (in greek).
- The application of GPS to dam surface monitoring (Tsakiri M., M.P. Stewart). *Journal of Geospatial Engineering, 3(1): 45-58, 2001.*

- Crustal Deformations From Sparse Geodetic Data (A.M. Agatza-Balodimou, P. Briole, C. Mitsakaki, K. Papazissi), *Survey Review*, No 283, Vol. 36, Jan. 2002.
- Geometric Recording of stone arc bridges – development of electronic archive. Application in Central Zagori (Balodimos D.) In: *Proc. Of Symposium by the Centre of Study of Stone Bridges*, 23 November, 2002 (in greek).
- “Tectonic displacements along the Aegean and from the Alkyonides Islands to Parnitha and Atalanti” (H. Billiris, I. Galanis, A. Marinou, C. Papazissi, D. Paradissis, C. Raptakis, G. Veis). *The 11th General Assembly of the WEGENER Project, CD-ROM, 2002.*
- “A ten years analysis of deformation in the Corinthian gulf via GPS and SAR interferometry” (P. Briole, A. Avallone, A.M. Agatza-Balodimou, H. Billiris, O. Charade, H. Lyon-Caen, Ch. Mitsakaki, K. Papazissi, D. Paradissis, G Veis, A Karamanou, A Marinou). *The 11th General Assembly of the WEGENER Project, CD-ROM, 2002.*
- “Constraints on the processes of crustal faulting from geodetic measurements in Greece” (P. Clarke, H. Billiris, P. England, J. Jackson, D. Paradissis, B. Parsons, G. Veis.). *The 11th General Assembly of the WEGENER Project, CD-ROM, 2002.*
- Tracing signals from the Earth’s crust by using only geodetic observations without inversion (M. Doufexopoulou). *Proceedings of Hispanoportuguese Assembly of Geodesy and Geophysics - February 2002*
- The lateral variations within the Earth’s crust revealed by an observed geoid (M. Doufexopoulou). *IAG Section III, Determination of the Gravity Field, 3rd Meeting of the International Gravity and Geoid Service (Διεθνής Γεωδαιτική Ένωση, Περιοχή III Προσδιορισμός του πεδίου βαρύτητας, 3^η Συνάντηση της Διεθνούς Επιτροπής Βαρύτητας και Γεωειδούς)*, Thessaloniki, August 2002.
- “Recent Movements of the upper crust due to creep deformation based on GPS measurements in W. Macedonia (NW Greece)” (I. Fountoulis, D. Paradissis, N. Veis, B. Tsagaroulis). *The 11th General Assembly of the WEGENER Project, CD-ROM, 2002.*
- “GPS data in Greece: Trajectories of crustal motion and error analysis.” (Ch. Hollenstein, H.-G. Kahle, M. Cocard, G. Veis, D. Paradissis, S. Felekis, H. Billiris). *The 11th General Assembly of the WEGENER Project, CD-ROM, 2002.*
- “Evolution of ground deformation of Nisyros volcano (Greece) detected by ERS2 SAR differential interferometry techniques” (O. Sykioti, C. Kontoes, P. Briole, P. Elias, M. Sachpazi, D. Paradissis and I. Kotsis). Accepted for publication in the *Journal of Remote Sensing*, 2002.

1.4 THE DEPARTMENT OF GEODESY AND SURVEYING, ARISTOTLE UNIVERSITY OF THESSALONIKI

I. Field Work

GPS measurements in the geodynamically unstable area of Lakes Volvi and Lagada, in order to detect crustal deformations.

Gravity field network measurements and shallow underground water, temperature and other meteorological parameter measurements in different areas of Greece, in the frame of an earthquake prediction program.

II. Contribution to International Associations

- Professor A. Dermanis was individual member of the Special commission SC1 “Mathematical and Physical Foundations of Geodesy”.
- Professor Michael E. Contadakis was member of the Hellenic National Astronomical Committee: 1999-2001, and he is Vice-Chairman (Responsible for Earthquakes Hazard) of the International Working Group on Natural Hazards of European Geophysical Society (2000-now) and member of the Editorial Board of the EGS International Scientific Journal “Natural Hazard and Earth System Sciences” (2002- now).
- Professor D. Rossikopoulos was member of the IAG Special Study Group 4.190 “Non-probabilistic assessment in geodetic analysis”.
- Professor I. N. Tziavos was chairman of the IAG Special Study Group 3.167 “Regional Land and Marine Geoid Modelling”, member of the editorial board of “Journal of Geodesy”, and secretary of section “Geodetic Methodology” of the European Geophysical Society (EGS).

III. Involvement in Research Projects

1. Optimization of local geoid solutions in the region of central Macedonia. A systematic and continuous study of the geoid in the area of northern Greece, combining gravity data, GPS measurements and orthometric heights. Cooperation of the Department of Geodesy and Surveying and the Hellenic Military Geographical Service. Professors A. Fotiou, D. Rossikopoulos, I.N. Tziavos and Dr. C. Pikridas contributed to this project.
2. Estimation of crustal deformation parameters in the area of Volvi Lake. Using existing classical observations and since 1995 GPS measurements a geodetic network is rigorously studied. Possible displacements and deformation parameters are estimated applying prediction methods and simultaneous adjustment of all

- epochs including extended models as it is the velocity model. Professors A. Fotiou, D. Rossikopoulos and Dr. C. Pikridas contributed to this project.
3. Monitory and study of the sea tides in the Hellenic area. Professors D. Arabelos and S. Spatalas contributed to this project.
 4. Professor D. N. Arabelos contributed to the projects:
 - Refinement of observation requirements for GOCE. ESA Sponsored GOCE Study.
 - Eoetvos to mGal .
 - European GOCE Gravity Consortium.
 - SAGRADA Satellite Gravity Data Analysis Project.
 - Geophysical investigations of sea, land and ice from a synergy of ENVISAT data. AO-ID 392.
 5. Study of the variations of ground waters level and temperature as earthquake precursory phenomena. Professors G. Asteriadis and M. Contadakis contributed to this project.

IV. References

- Andritsanos, V.D., A. Fotiou, E. Paschalaki, C. Pikridas, D. Rossikopoulos and I. N. Tziavos, Optimization of a Local Geoid Solution, Poster presented at European Geophysical Society (EGS) XXIV General Assembly, Hague, Netherlands, 19-23 April 1999.
- Andritsanos, V.D., B. Kagiadakis, G. Kostakis, E. Milona – Kontogianni, C. Pikridas, D. Rossikopoulos, I.N. Tziavos, A. Fotiou, A combination of GPS and gravity measurements for orthometric height determination. A case study in the area of Thessaloniki, *Technika Cronika*, Scientific Journal of the Technical Chamber of Greece, Vol. I, No. 3, pp. 63-76, 1999 (in greek).
- Andritsanos, V. - K.E. Katsambalos - K. Kehaidou - I.N. Tziavos, Optimization of Local Geoids using Gravity, Elevation, Density and GPS Data, *Technica Chronika*, (section I), Technical Chamber of Greece, No. 1-2, 1999.
- Andritsanos, V.D., M.G. Sideris and I.N. Tziavos, Sea surface topography estimation by a generalized multiple input-output method. Presented at IUGG99, IAG Section III, *Determination of the Gravity Field*, Birmingham, July 18 - 30, 1999.
- Arabelos D., Asteriadis G., Contadakis M. E., Zioutas G., Xu Daoyi, Zhang Cunde, Zheng Binghua, The Use of an Outlier Detecting Method in Time Series of Continuous Daily Measurements of Underground Water Level and Temperature in Earthquake Prediction Investigation, Presented in the General Assembly of IUGG, IUGG99, Birmingham, July 18 - 30, 1999.
- Arabelos, D., S.D. Spatalas, I.N. Tziavos, M.J. Sevilla, G. Rodriguez, C. De Toro, J. Catalao, J. Calvao, A new high resolution geoid for the Iberian Atlantic continental shelf area, *Bool. Geof. Teor. Appl.*, 40, N. 3-4, 411-419, 1999.

- Arabelos, D., On the possibility to estimate ocean bottom topography from marine gravity and satellite altimeter data using collocation, *IAG Symposia*, Vol. 119, pp. 105-112, 1999.
- Arabelos, D., C.C. Tscherning, Gravity field recovery from airborne gravity gradiometer data using collocation and taking into account correlated errors, *Phys. Chem. Earth (A)*, Vol. 24, No. 1, pp. 19-25, 1999.
- Arabelos, D. , C.C. Tscherning, Improvements in vertical datum control to be expected from the GOCE mission, Presented at the XXIV General Assembly of the EGS, The Hague, 19-23 April, 1999.
- Contadakis, M. E., Report for the XXIII General Assembly of the EGS, Symposium *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, News-letter of the European Geophysical Society, No 71, June 1999.
- Contadakis, M.E. and Asteriadis, G., Research for preseismic phenomena on the undergroundwater level and temperature in Pieria, Northern Greece. Presented in XXIII General Assembly of the EGS, Symposium *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, 20-25 April, The Hague. Geophysical Research Abstracts Volume 1, Number 4, 1999.
- Dermanis, A., *Space Geodesy and Geodynamics - GPS*. Editions Ziti, Thessaloniki, 450 pp., 1999 (in Greek)
- Dermanis, A., On the maintenance of a proper reference frame for VLBI and GPS global networks. In: *Quo Vadis Geodesia?*, Festschrift for Erik W. Grafarend's 60th Birthday, Department of Geodesy and Geoinformatics, University of Stuttgart, Report No. 1999.6-1, vol. 1, 79-89, 1999.
- Katsambalos, K. Conclusions from the 1st National Cadastre Pilot Project. Invited speaker in the Conference organized by the Northern Greece Lawyer's Association, Thessaloniki, 2-3 April, 1999 (in Greek).
- K. Katsambalos, K. Tokmakidis, D. Vlachos, Status of Research activities on Integrated National Monuments Inventory, ISPRS Volume XXXII , Working Groups V/5 and V/2 Thessaloniki Joint Workshop, pp. 193-202, 1999.
- Kotsakis, Chr. and D. Rossikopoulos, Very Accurate close-range triangulations. Problems and alternatives. *Technika Chronika*, Scientific Journal of the Technical Chamber of Greece, Vol. I, No. 3, pp. 11-23, 1999 (in Greek).
- Livieratos, E., M. Myridis, A. Fotiou, D. Rossikopoulos, I.N. Tziavos, Pres. at *Revitalising Interest on History of Cartography*, 19th International Cartographic Conference, Ottawa, 1999.
- Pikridas, C., The use of GPS technology and the quality control in geodetic applications, Ph. D. Dissertation. Department of Geodesy and Surveying, Aristotle University of Thessaloniki, Greece, 1999 (in Greek).

- Rossikopoulos, D., *Surveying networks and computations*, (B edition) Editions Ziti, p. 417, 1999 (in Greek).
- M.G. Sideris, P. Vanicek, J.L. Huang and I.N. Tziavos, A comparison of downward continuation techniques of terrestrial gravity anomalies. Pres. at IUGG99, IAG Section III, *Determination of the Gravity Field*, Birmingham, July 18 - 30, 1999.
- K. Tokmakidis, J. Ito, K. Inada, Applied Surveys in Archaeological Sites, Workshop: *Photogrammetric Measurement Object Modeling and Documentation in Architecture and Industry*, Thessaloniki, July 1999.
- Tscherning, C.C., O. Andersen, D. Arabelos, E. Carminati, R. Forsberg, A. Gardi, P. Knudsen, J.N. Larsen, R. Sabadini, G. Strykowski, Refinement of the current Observation Requirements for GOCE. Final Report. ESTEC Contract 13229.98/NL/GD. Oct. 1999.
- Tziavos, I.N. and R. Forsberg, (eds.) *Local and regional gravity field modeling in land/sea area*", Proceedings of session G13, XXIV EGS General Assembly, Nice, April 20 - 24, 1998, *Physics and Chemistry of the Earth (A)*, vol. 25, pages 93, 2000.
- Vlachos, D. and K. Tokmakidis, Integrated Local Monuments Inventory, Pres. at the Symposium in memory of Vaggelis Pentazos "Greeks and Thraces in Aegean Thrace", Komotini, March 19-21, 1999 (in greek).
- Xu Dao-Yi, Asteriadis, G. and Arabelos, D., Equidistance ordering of large earthquakes in Aegean and surrounding areas, *Survey Review*, Vol. 35, No. 273, pp.204-214, 1999.
- Zhilyaev, B.E., Romanyuk Ya. O., Svyatogorov, O.A., Verlyuk I.A., Khalack, V.R., Alexseev, I.Yu., Chalenko, V.E., Shakhovskoy D.N., Contadakis, M.E., Avgoloupis S.J., Seiradakis J.H., Konstantiniva-Antova R.K., Antov A.P., Detection of Fast Small-Scale Variability of the Flare Star EV Lacertae Using the Synchronous Network of Telescopes, in J. Seimenis, ed., *Proceedings of the 4th Hellenic Astronomical Conference*, pp.87-99, Samos, Greece, 16-18 September 1999.
- Zidrou, E., M. Matziri, M. Papadopoulou, I.N. Tziavos, M. Tsakiri-Starti, and S. Hatzigaki, Multispectral bathymetry supported by sounding and GPS data. *Techn. Chron. Sci. J. TCG*, 20(2), 99-110, 1999.
- Andritsanos, V.D., D. Arabelos, S.D. Spatalas, I.N. Tziavos, Mean sea level studies in the Aegean Sea, *Phys. Chem. Earth (A)*, Vol. 25, No 1, pp.53-56, 2000.
- Andritsanos, V.D., A. Fotiou, E. Paschalaki, C. Pikridas, D. Rossikopoulos and I. N. Tziavos, Local Geoid Computation and Evaluation, *Physics and Chemistry of the Earth (A)*, Vol. 25, No 1, pp.63-69, 2000
- Andritsanos, V. D., M.G. Sideris and I.N. Tziavos, A survey of gravity field modeling applications of the Input-Output System Theory (IOST), *IGeS Bulletin* N. 10, 1-17, 2000.

- Andritsanos, V. D. and I.N. Tziavos, Estimation of gravity field parameters by a multiple input/output system. Presented at the XXIV EGS General Assembly, Hague, Netherlands 19-23 April, 1998. In I.N. Tziavos and R. Forsberg, eds, Proceedings journal, *Physics and Chemistry of the Earth (A)*, vol. 25(1), 39-46, 2000.
- Andritsanos, V. D. and I.N. Tziavos, Modeling the sea surface topography in the Eastern Mediterranean Sea: Comparisons and results. Presented at XXV EGS General Assembly, Nice, France, 25-29, 2000.
- Andritsanos, V. D. and I.N. Tziavos, Investigation of the input error propagation and the kernel modification in a multiple input – multiple output system, Presented at the IAG Int. Symposium on Geoid, Gravity and Geodynamics 2000, Banff, Canada, July 31 – August 4, 2000.
- Andritsanos, V. D., G.S. Vergos, I.N. Tziavos and E.C. Pavlis, Alternative geoid solutions in the southern Aegean Sea, Presented at XXV EGS General Assembly, Nice, France, 25-29, 2000.
- Arabelos, D., *Gravimetry*, Ziti Publishing, Thessaloniki 2000 (in Greek).
- Arabelos, D., Intercomparisons of the global DTMs ETOPO5, TerrainBase and JGP95E, *Phys. Chem. Earth (A)*, Vol. 25, No 1, pp 89-93, 2000.
- Asteriadis, G. and Schwan, H., The Evolution of a Well-known Seismic Area in Northern Greece after a Large Earthquake, Accepted for publication in Survey Review, 2000.
- Contadakis, M. E., Report for the XXV General Assembly of the EGS, Symposium *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, News-letter of the European Geophysical Society, No 75, pp. 69-71, June 2000.
- Contadakis M.E., Thirty years photometry of flare stars at the Stephanion Observatory, In A. Antov, R. Konstantinova-Antova, R. Bogdanovski and M. Tsvetkov, eds., Proceedings of the Balkan Meeting of Young Astronomers, 25-29 September, 2000, Belgrachik, Bulgaria, 2000.
- Contadakis, M. and Asteriadis. G., Recent results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece, Presented at XXV General Assembly of the EGS, Symposium NH9 *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, 24-28 April, Nice. Geophysical Research Abstracts Volume 2, Number ,2000.
- Contadakis, M. E. and Asteriadis. G., The two years results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece, In proceedings of the XXVII General Assembly of the European Seismological Commission, pp. 173-177, Lisboa 10-15 Sept. 2000.

- Contadakis M.E., Avgoloupis S.J., Mavridis L.N., Stephanion Observatory. Greek-Ukrainian Astrolink. Proceedings of the Symposium Astronomy in Ukraine-2000 and Beyond, Kyiv Ukraine, 5-8 June 2000.
- Dermanis, A. and Rummel, R., Data Analysis Methods in Geodesy, In Dermanis, A., A. Gruen, F. Sanso, eds., *Geomatic Methods for the Analysis of Data in Earth Sciences*, Lecture Notes in Earth Sciences, vol. 95, p. 17-92. Springer, Heidelberg, 2000.
- Dermanis, A., Gruen, A. and Sanso, F., An overview of data analysis methods in geomatics, In Dermanis, A., A. Gruen, F. Sanso, Eds., *Geomatic Methods for the Analysis of Data in Earth Sciences*, Lecture Notes in Earth Sciences, vol. 95, p. 1-16, Springer, Heidelberg, 2000.
- Dermanis, A., Gruen, A. and Sanso F., Eds., *Geomatic Methods for the Analysis of Data in Earth Sciences*, Lecture Notes in Earth Sciences, vol. 95, Springer, Heidelberg, 2000.
- Dermanis, A., Establishing Global Reference Frames. Nonlinear, Temporal, Geophysical and Stochastic Aspects. IAG Inter. Symp. Banff, Alberta, Canada, July 31-Aug. 4, 2000. In: M.G. Sideris, ed., *Gravity, Geoid and Geodynamics 2000*, IAG Symposia vol. 123, p. 35-42, Springer, Berlin 2002.
- Fotiou, A. and E. Livieratos, Geometric Geodesy and Networks. Thessaloniki, Ziti publications, p. 440, 2000 (in greek).
- Katsambalos, K., State-of-the-Art of Geoinformation Systems applied to Archaeological Research, Ministry of Culture, Conference, Rethymno, 26-28 May, 2000.
- Theodoridou, S., K. Tokmakidis, D. Skarlatos, Use of Radio-Controlled Model Helicopters in Archaeology Surveying and in Building construction industry, XIXth ISPRS Congress: Geoinformation for all, Amsterdam 16-23 July 2000.
- Toth, J., Sz. Rozsa, V. Andritsanos, J. Adam and I.N. Tziavos, Towards a cm-geoid for Hungary: recent efforts and results. Presented at the XXIV EGS General Assembly, Hague, Netherlands 19-23 April, 1998. In *Proceedings journal (eds. I.N. Tziavos and R. Forsberg)*, *Physics and Chemistry of the Earth (A)*, vol. 25(1), 91-96, 2000.
- K. Tokmakidis, J. Ito, K. Inada, Surveys in Archaeological Sites for 3D Modeling, XIXth ISPRS Congress: Geoinformation for all, Amsterdam 16-23 July 2000.
- Tokmakidis, K. and S. Theodoridou, Digital Applied Photogrammetry in Archaeological Sites, Congress: "Advanced Technology Applications in Archaeological Research and Spreading its Results", Rethymno, May 26-28, 2000 (in greek)
- Tscherning, C.C., D. Arabelos, A study of the correlations between spherical harmonic coefficients and point related quantities, XXV General Assembly of the EGS, Nice, France April 2000.

- Tscherning, C.C., G. Moreaux, D. Arabelos, A. Albertella, F. Migliaccio, F. Sanso, Scientific data processing algorithms - the space-wise approach, H. Suenkel (ed) Eoetvos to mGal, Final report, pp. 305-311, April 2000.
- Tscherning, C.C., G. Moreaux, A. Albertella, F. Migliaccio, F. Sanso, D. Arabelos, Detailed scientific data processing using the space-wise approach, H. Suenkel (ed) Eoetvos to mGal, Final report, pp. 305-311, April 2000.
- Tscherning, C.C., D. Arabelos, G. Strykowski: The 1-cm geoid after GOCE. Pres. at Gravity, Geoid and Geodynamics 2000 (GGG2000), Banff, July 31-August 4, 2000. IAG Symposia, Vol. 123, (M.G. Sideris Ed.), 267-270.
- Tziavos, I. N., The geoid in the Mediterranean – Recent results and future plans. Invited paper, presented at the FIG Symposium *Mediterranean Surveyors in the New Millenium*, Malta, September 18-21, 2000.
- Zhilyaev, B.E., Romanyuk Ya. O., Verlyuk I.A., Svyatogorov, O.A., Khalack, V.R., Sergeev, A.V., Konstantiniva-Antova R.K., Antov A.P., Bachev R.S., Alekseev I.Y., Chalenko, V.E., Shakhovskoy D.N., Contadakis, M.E., Avgoloupis S., High-frequency optical oscillations on the flare star EV Lacertae, Proceedings of the Symposium Astronomy in Ukraine-2000 and Beyond, Kyiv Ukraine, 5-8 June 2000.
- Zhilyaev, B.E., Romanyuk Ya. O., Verlyuk I.A., Svyatogorov, O.A., Khalack, V.R., Sergeev, A.V., Konstantinova-Antova R.K., Antov A.P., Bachev R.S., Alekseev I.Y., Chalenko, V.E., Shakhovskoy D.N., Contadakis, M.E., Avgoloupis S., Detection of high-frequency optical oscillations on the flare star EV Lacertae", A&A, 364, pp. 641-645, December (II), 2000.
- Alexseev, I.Yu., Antov A.P., Avgoloupis S.J., Beskin, G.M., Borisov, N.V., Chalenko, V.E., Contadakis, M.E., Gershberg, R.E., Khalak, V.R., Konstantiniva-Antova R. K., Larionov, V. M., Panferova, I. P., Plokhotnichenko V.L., Pustil'nik, L.A., Romanyuk, Ya.O., Seiradakis J.H., Sergeev, A.V., Svyatogorov O.A., Verlyuk I.A., Zhilyaev, B.E., Coordinated observations of the red dwarf flare star EV Lac in 1998, Kinematics and Physics of Celestial Bodies, Vol. 17, No 2, p.p. 147-156, 2001.
- Andritsanos, V. D., M.G. Sideris and I.N. Tziavos, Quasi-stationary Sea Surface Topography estimation by the multiple input-output method". *Journal of Geodesy*, 75, 216-226, 2001.
- Andritsanos, V. D., G.S. Vergos, I.N. Tziavos, E.C. Pavlis and S.P. Mertikas, A high resolution geoid for the establishment of GAVDOS multi-satellite calibration site. International Association of Geodesy Symposia, Sideris (ed.), Gravity, Geoid and Geodynamics 2000, pp. 347-353, Springer-Verlag, 2001.
- Arabelos, D., C.C. Tscherning, Improvements in height datum transfer expected from the GOCE mission. *Journal of Geodesy*, 75, 308-312, 2001.
- Arabelos, D, G. Asteriadis, M. Contadakis, G. Zioutas, Daoyi Xu, Cunde Zhang and Binghua Zheng, The use of an outlier detecting method in time series of

continuous daily measurements of underground water level and temperature in earthquake prediction investigation, *Tectonophysics*, 338, 315-323, 2001.

- Arabelos, D., Calibration of Satellite Gradiometer Data by Ground Gravity Data. Presented at the IAG 2001 Scientific Assembly, Budapest, Hungary, 2-7 September 2001.
- Asteriadis, G. and Contadakis, M.E., Research on Hydrologic Seismic Precursory Phenomena in Greece, Presented in IAGA-IASPEI Joint Scientific Assembly, Hanoi, Vietnam, 19-31 August, 2001.
- Asteriadis, G. and Contadakis, M.E., Hydrologic Changes as Possible Earthquake Precursor in Greece, *NHAZ*, Vol. 23 No.(1), pp29-47, January 2001.
- Asteriadis, G., Arabelos, D., Contadakis, M., Zioutas, G., Dao-Yi Xu., Cunde Zhang, and Binghua Zheng, The use of an outlier detecting method in time series of continuous daily measurements of the underground water level and temperature in earthquake prediction investigation, *Tectonophysics*, Vol. 338, pp. 315-323.
- Contadakis, M. and Asteriadis, G., Three years results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece, Pres. at XXVI General Assembly of the EGS, Symposium *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, 26-30 March, Nice, France. Geophysical Research Abstracts *Volume 3, 2001*.
- Contadakis, M. E. and Asteriadis, G., Recent results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece, *Natural Hazards and Earth System Sciences*, Special Issue: Seismic Hazard evaluation part II, Guest Editors M.E.Contadakis and P.F.Biagi, Vol.1, No.3, Sept. 2001.
- Contadakis, M. E., J. Zshau and P. F. Biagi, Report for the XXVI General Assembly of the EGS, Symposium NH9, *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, News-letter of the European Geophysical Society, No 78, June 2001.
- Dermanis, A., Global Reference Frames: Connecting Observation to Theory and Geodesy to Geophysics, IAG 2001 Scientific Assembly *Vistas for Geodesy in the New Millenium* 2-8 Sept. 2001, Budapest, Hungary, 2001.
- Featherstone, W.E., S.A. Holmes, I.N. Tziavos and V.D. Andritsanos, Generalisation of vertical deflection formulae for a reference spheroid: Application to Australia and Greece. Presented at the *IAG Scientific Assembly*, Budapest, Hungary, Sept. 2-8, 2001.
- Mintsis, G., S. Basbas, P. Papaioannou, C. Taxiltaris and I.N. Tziavos, Applications of GPS technology in the land transportation system, Accepted for publication in *European Journal of Operational Research*.
- Rossikopoulos, D., Modeling Alternatives in deformation measurements. Pres. at the First international Symposium on Robust Statistics and Fuzzy Techniques in

Geodesy and GIS. Organised by IAG-SSG 4.190 *Non-probabilistic assessment in geodetic analysis*. Institute of Geodesy and Photogrammetry, ETH. pp 117-122, 2001.

- Rossikopoulos, D. and A. Fotiou, The sequential approach in geodetic determination of crustal deformations. Pres. at the *Vistas for Geodesy in the New Millenium*. IAG Scientific Assembly, Budapest, Hungary. 2 – 7 September 2001.
- S. D. Spatalas, A new tidal model for the Aegean Sea, in Tziavos and Barzaghi, eds., *Regional and Local Gravity Field Approximation*, pp. 133-143, EGS Gen. Assembly 2001, Nice, France, 25-30 March, 2001.
- Stylianidis, E., L. Sechidis, P. Patias, S. Spatalas, Generating Orthoimages for close-range objects by automatically detecting breaklines, Pres. at Turkish-German Geodetic days, Berlin, 2001.
- Toth, Gy., Sz. Rosza, J. Adam and I.N. Tziavos, Gravity field recovery from torsion balance data using collocation and spectral methods, Pres. at the *EGS XXVI General Assembly*, Nice, France, 26-30 March 2001.
- Toth, Gy., Sz. Rosza, J. Adam and I.N. Tziavos, Gravity field modeling by torsion balance data – a case study in Hungary, in Adam and Schwarz, eds., *Vistas for Geodesy in the New Millenium*, IAG Scientific Assembly, Springer, vol. 125, pp. 193-198, Budapest, Hungary, Sept. 2-7, 2001.
- Tsioukas, V., P. Patias, S. Spatalas, The concept of neutral geometry of digital images and its application in data fusion, Pres. at Turkish-German Geodetic days, Berlin 2001.
- Tziavos I. N. and W.E. Featherstone, First results of using digital density data in gravimetric geoid computation in Australia. *International Association of Geodesy Symposia*, Sideris (ed.), *Gravity, Geoid and Geodynamics 2000*, pp. 335-340, Springer-Verlag, 2001.
- Vergos, G. SD., F.A. Bayoud, M.G. Sideris and I.N. Tziavos, High resolution geoid computation by combining shipborne and multi-satellite altimetry data in the Eastern Mediterranean. Pres. at the *EGS XXVI General Assembly*, Nice, France, 26-30 March 2001.
- Zhilyaev, B.E., Romanyuk, Ya. O., Verlyuk I.A, Svyatogorov O.A., Karpov, A.V., Sergeev, A.V., Gershberg, R.E., Alexseev, I.Yu., Shakhovskoy, D.N., Contadakis, M.E., Avgoloupis S.J., Seiradakis J.H., Konstantiniva-Antova R.K., Antov A.P., Color characteristic of flares on EV Lacertae, in D. Hatjidimitriou, edr., *Proceedings of the 5th Hellenic Astronomical Conference*, Crete Greece, 20-22 September 2001.
- Arabelos, D., Comparison of Earth-tide parameters over a large latitude difference. *Geophys. J. Int.* 151, 950-956, 2002.
- Arabelos, D., *Introduction to Potential Theory*. Ziti Publishing, Thessaloniki, 2002 (in Greek).

- Arabelos, D., C.C. Tscherning, A-priori regional covariance models with a global coverage, Presented at the 27th General Assembly of the EGS, Nice, France, 21-26 Aprile 2002.
- Arabelos, D., P. Papapaskevas, Estimation of error covariance functions using gravity gradiometer data and surface gravity data, Presented at the 3rd Meeting of the International Gravity and Geoid Commission, Thessaloniki, Greece, August 26-30, 2002.
- Contadakis, M. and Asteriadis. G., Final results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece, Presented in XXVI General Assembly of the EGS, Symposium NH10 *Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*, 22-26 April, Nice, France. Geophysical Research Abstracts Volume 4, 2002.
- Contadakis, M. E. and Asteriadis. G., Results of the research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece", Presented in the XXVIII General Assembly of the European Seismological Commission, Genoa 1-6 Sept. 2002, Abstract book p. 119.
- Contadakis, M. E. and Asteriadis. G., The research for preseismic phenomena on the underground water level and temperature in Pieria, Northern Greece", Presented in the IX International Symposium on Natural and Human Made Hazards, Hazards 2002, Antalya Turkey 3-6 October, 2002. Abstract book pp. 52-53.
- Contadakis, M. E., J. Zschau and P.F. Biagi, Report for the XXVI General Assembly of the EGS, Symposium NH9, "*Seismic Hazard Evaluation, Precursory Phenomena and Reliability of Predictions*", News-letter of the European Geophysical Society, No 81, June 2002.
- Dermanis, A. & L. Biaggi, *Telerilevamento*. Zanichelli Group, Milano. Book and CD, 2002.
- Dermanis, A., The rank deficiency in estimation theory and the definition of reference frames. V Hotine-Marussi Symposium on Mathematical Geodesy, June 17-21, Matera, Italy, 2002.
- Fotiou, A. and C. Pikridas, The Global Positioning System – GPS. Lecture Notes for the UnderGraduate Programm, Dept. of Geodesy and Surveying, Aristotle of Thessaloniki, Greece 2002 (in greek).
- Fotiou, A. and C. Pikridas, Applications with GPS, Lecture Notes for the PostGraduate Programm Geoinformatics, Dept. Of Geodesy and Surveying, Aristotle of Thessaloniki, Greece 2002 (in greek).
- Hatjidakis, N. and D. Rossikopoulos, Orthometric heights from GPS: The integrated approach, Pres. at 3rd Meeting of the International Gravity and Geoid Commission, Section III (IAG), Thessaloniki, Greece, 26 – 30 August, 2002.

- Huang, J.L., M.G. Sideris, P. Vanicek, and I.N. Tziavos, Numerical investigation of downward continuation techniques for gravity anomalies. Accepted for publication to *Bollettino di Geodesia e Scienze Affini*, 2002.
- Olesen, A.V., I.N. Tziavos and R. Forsberg, New Airborne Gravity Data Around Crete - First Results from the CAATER Campaign, in Tziavos, I.N., ed. *Gravity and Geoid 2002*, 3rd meeting of the International Gravity and Geoid Commission, 326-331, Thessaloniki, Greece, Aug. 26-30, 2002.
- K. Katsambalos - K. Tokmakidis - D. Vlachos, Polemon, Daedalus and the Integration of National Monument Inventories, in the Volume dedicated to prof. A. Badelas (in print) 2002.
- Nakou A., K. Papadimitriou and C. Pikridas, The use of Telematics Applications on small ships, Presented at the 7th National Cartographic Congress, Lesvos, Greece, October 24 – 26, 2002 (in greek).
- Pikridas, C., V.D. Andritsanos, A. Fotiou, D. Rossikopoulos, I.N. Tziavos, Computing Orthometric Heights and Controlling their Quality by GPS and Local Geoid in Northern Greece. Proceedings of the European Navigation Conference _ GNSS2002, Copenhagen, 27 – 30 May, 2002.
- Pikridas, C., V.D. Andritsanos, A. Fotiou, D. Rossikopoulos, I.N. Tziavos, Height Datum Control by GPS and Local Geoid in the Wide Area of Thessaloniki”. Poster presented at 3rd Meeting of the International Gravity and Geoid Commission, Section III (IAG), Thessaloniki, Greece, 26 – 30 August, 2002.
- Pikridas, C. and A. Fotiou, Evaluation of the ionospheric refraction on relative GPS positioning: Application in the broader area of Thessaloniki using GPS permanent station data, *Technika Cronika*, Scientific Journal of the Technical Chamber of Greece 2002 (accepted for publication).
- Rossikopoulos, D., GPS Networks Densification, in the Volume dedicated to prof. A. Badelas (in print) 2002 (in greek).
- Tokmakidis, K., GIS Application in Archaeological Site”, Scientific meeting, *Social Practices and planning information, European and Greek experience in GIS*, Thessaloniki, June 27-28 2002 (in greek).
- Tokmakidis, K. and P.Savaidis, GIS Application for the Monuments in Mount Athos, Scientific meeting, *Social Practices and planning information, European and Greek experience in GIS*, Thessaloniki, June 27-28 2002 (in greek).
- Tokmakidis, K. and D. Vlachos, GIS Contribution in Marking Archaeological Sites, in the Volume dedicated to prof. A. Badelas (in print) 2002 (in greek).
- K. Tokmakidis, D. Skarlatos, Mapping Excavations and Archaeological Sites Using Close Range Photos, Commission V Symposium: *Close –Range Imaging, Long-Range Vision*, Corfu 2-6 September 2002.
- K. Tokmakidis, I. Tziavos, G. Mintsis, C. Taxiltaris, S. Basbas, The Use of GPS Technology and its Applications to the Greek Road and Railway Network, European Navigation Conference-GNSS 2002, Copenhagen 27-30 May 2002.

- Tsoulis, D. and I.N. Tziavos, A comparison of some existing methods for the computation of terrain corrections in local gravity field modelling, in: Tziavos, I.N. (ed) *Gravity and Geoid 2002*, 3rd meeting of the International Gravity and Geoid Commission, 326-331, Thessaloniki, Greece, Aug. 26-30, 2002.
- Tziavos, I.N., R. Barzaghi, eds., *Regional and local gravity field approximation*, Proceedings of session G7, XXVI EGS General Assembly, Nice, April 25 - 30, 2001, International Geoid Service (IGeS), Bulletin N. 13, Special Issue, pages 143, 2002.

1.5 THE HELLENIC PETROLEUM CORPORATION

Gravimetry

Acquisition

During the period 1999-2002, 552 new measurements of earth gravity field were carried out in Etoloakarnania (332) and Egeion (220)areas, with a Lacost & Romberg model G Geodetic Gravity meter along straight and crooked traverses every 300 meters and 50 meters respectively.

Processing

In the above areas the processing of these points followed and the Bouguer maps of these areas were created at a scale of 1:50000 and 1:2000 respectively. Special software was used permitting an improved Topographical Correction application, resulting in an overall reduction of the total Bouguer Anomaly values error by 20%-30%.

Publications

- Geodetic support to the special seismic program FRACARES at Portugal in cooperation with the Geological Survey of Demark and Greenland (GEUS), Instituto Geologiko e Mineiro (IGM) of Portugal and University of Liverpool (Fault Analysis Group FAG) during February –March of 1999 for predicting flow paths in fractured carbonate reservoirs. (Project No : OG/00173/97/GR/DK/PT/UK) (1999).
- Geodetic support for the navigation of special survey ships at a geophysical survey which included measurements of Environmental parameters,of water quality and monitoring of the Marine flora and auna for the Agios Kosmas Olympic Sailing Center. This project was done in cooperation with NCMR (National Center For Marine Reseach) (1999).
- Geodetic control of the verticality of the oil tanks at the Aspropyrgos refineries after the earthquake of Athens of 1999 (1999).

- Final geodetic study at scale 1:1000 of the oil pipe from Aspropyrgos oil refineries to the new International Airport of Athens “Eleftherios Venizelos”(2000).
- Geodetic support to mainland seismic research for the discovery of deposits of hydrocarbons in the areas of Pirgos-Pilos (Southeast Peloponnisos-West Greece), Epirus (Northwest Greece) and Epanomi (North Greece) (2000). Total length of seismic lines: 195 km. Equipment used: Two GTS700 total stations of TOPCON.
- Geodetic study at scale 1:50000 of the oil pipe from Burgas (Boulgaria) to Alexandroupolis (Northeast Greece) for the oil transportation from Russia through Burgas to Alexandroupolis and from there to Europe (2001).
- Processing of geodetic data of the seismic research in Albania in a common seismic project with OMV (Austria) for the discovery of oil deposits (2001).
- Geodetic processing of the earthquake’s positions at the Northwest Peloponnissos for seismic a survey project of the area (2001).
- Fixing the location of two new sea wells (E1 and E1A) to discover deposits of hydrocarbons at Kavala bay (North Greece) using Differential GPS System 4000SE LandSurveyor II of Trimble as well as DDMU 542 system of DEL NORTE as secondary system (2000-2002).
- Continuous participation at the EPSG (European Petroleum Survey Group) meetings (1999-2002).
- Topographical survey of all Hellenic Petroleum S.A installations (Refineries,oil tanks,ports etc.) all over Greece on land as well as at sea (2000-2002).
- Final geodetic study at scale 1:1000 of the gas pipe of Natural Gas from Kipi village (Evros county-North Greece) to Alexandroupolis for the transportation of Natural gas from Iran to Europe (2002).
- Processing of all the geodetic data of the seismic research of Greece on land and at sea for the period 1976 up to nowadays in a common database under a common format (2001-2002).

1.6 KTIMATOLOGIO S.A. AND HELLENIC MAPPING AND CADASTRE ORGANIZATION

KTIMATOLOGIO S.A. is responsible for the design, development and operation of the Hellenic Cadastre. The company is managing this project in common with the Hellenic Mapping and Cadastre Organization (HEMCO). The main geodetic activities of HEMCO and KTIMATOLOGIO S.A. concern the supervision of the geodetic works performed for the Hellenic Cadastre.

The geodetic data delivered by the contractors of the Hellenic Cadastre are subject to quality control, in order to ensure the required accuracy and reliability. The quality control is based on both reprocessing of the submitted data and control measurements in the field.

Field measurements have been conducted in 15 areas of the first pilot project of the Hellenic Cadastre. Established trigonometric points, photo control points and parcel boundaries have been measured using GPS receivers and optical total stations.

Submitted data from 21 areas of the second pilot and first main project of the Hellenic Cadastre have been reprocessed. Particularly, 4965 GPS-baselines have been processed using Rinex-data delivered by the contractors. These baseline vectors form 48 GPS-networks (21 trigonometric networks, 11 urban networks and 16 photo control point networks) that have been adjusted.

As a part of the project for the revision of the Technical Specifications of the Hellenic Cadastre, new specifications for the geodetic works (satellite measurements, control point networks etc.) have been compiled. The new specifications take into account recent technology advances. Furthermore, the experience gained during the quality control of the submitted geodetic data has been taken into consideration. This is expected to enhance the effectiveness of the specifications.

A digital database has been developed for the trigonometric and urban networks established for the Hellenic Cadastre. Data that have been checked for compliance with the specifications are loaded into the database. The database contains the coordinates and their precision, as well as documentation material (photos, sketches etc.). The database material will be available to surveyors in order to facilitate the maintenance of cadastral data.

Publications

- GIANNIOU, M., 2000: End of Selective Availability – What changes in the applications of GPS, Journal of Hellenic Association of Rural and Surveying Engineers, vol. 147, (in Greek).
- GIANNIOU, M., 2002: GPS-Höhenbestimmung unter Berücksichtigung von Geoidänderungen im Testgebiet Griechenland, Geodetic Week 2002, 15-17 October 2002, Frankfurt am Main, Germany.

- GIANNIOU, M., 2002: Evaluation of global geoid models for the determination of orthometric height by means of GPS-measurements, Trimble User Meeting, 28 November 2002, Athens, Greece (in Greek).
- LOLONIS, P., 2002: A Chi-Square statistic for checking satisfactory edge matching of maps and diagrams that depict adjacent areas, FIG Congress 2002, 19-26 April 2002, Washington, DC, USA.
- ROKOS, D., 2001: Conceptual modeling of real objects for the Hellenic cadastre, FIG International Workshop on 3D Cadastre, November 28-30 2001, Delft, Netherlands.

2. GEOMAGNETISM AND AERONOMY

2.1 THE INSTITUTE OF GEOLOGY AND MINERAL EXPLORATION (IGME)

Magnetic Observatory of Pendeli (GOP) has been running since 1958 under the auspices of the Institute of Geology and Mineral Exploration. The main activity of GOP during the period 1999-2002 was the recording and study of the geomagnetic field's variations, as follows:

1. Absolute measurements (twice a week) of declination (D), horizontal and vertical components (H, Z).
2. Permanent recording (per 1 sec.) of the declination, horizontal, vertical components and the total field as well.
3. Mean hourly and monthly values of H, D, Z.
4. K-indices.
5. Determination and study of rapid and special events (ssc, si, b, solar flares e.t.c.).

During 2002 a magnetic research of declination was carried out in the airport "Eleftherios Venizelos". The purpose of the research was the determination, in a magnetic "clean" location, of D value, for the monitoring of the airplane magnetic compasses.

Publications-Bibliography

1. Philippopoulos, G., Tsailas, P., Geomagnetic Results 2001, Institute of Geology and Mineral Exploration, Magnetic Observatory of Pendeli, Athens 2002.
2. Philippopoulos, G., Tsailas, P., Magnetic investigation in D12 region in the airport "Eleftherios Venizelos" for the monitoring of the airplane magnetic compasses. Institute of Geology and Mineral Exploration, Magnetic Observatory of Pendeli, Athens 2002.

3. Philippopoulos, G., Tsailas , P., Geomagnetic Results 2000, Institute of Geology and Mineral Exploration, Magnetic Observatory of Pendeli, Athens 2001.
4. Philippopoulos, G., Tsailas , P., Geomagnetic Results 1999, Institute of Geology and Mineral Exploration, Magnetic Observatory of Pendeli, Athens 2000.

3. HYDROLOGICAL SCIENCES

3.1 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA)

The Laboratory of Reclamation Works and Water Resources Management (Division of Infrastructure Works and Rural Development) of the School of Rural and Surveying Engineering, National Technical University of Athens, during the reporting period were engaged with research projects in the following areas:

- Water Resources Management
- Hydrologic modeling
- Groundwater modeling and assessment

Publications:

- G. Tsakiris and H. Vangelis, 2002. “Towards a drought watch system based on spatial SPI”, Water Resources Management. Special Volume ed. M.A.Santos
- G. Tsakiris and M. Spiliotis, 2002. “Water allocation based on fuzzy objective function and fuzzy constraint”, Keynote Paper, Proc. of the 5th International Conference of EWRA “Water Resources Management in the Era of Transition”, 4- 8 September 2002, Athens Greece, 252 – 267.
- G. Tsakiris, B. Todorovic and H. Vangelis, 2002. “NAIAS – A Practical Multi – Criteria Tool for Strategic Water System Management”, Proc. of the 5th International Conference of EWRA “Water Resources Management in the Era of Transition”, 4- 8 September 2002, Athens Greece, 320 – 329
- S. Giakoumakis and G. Tsakiris, 2001. “Experimental Validation of a Linearized Kinematic Wave Equation for Micro – Catchment Water Harvesting Design”, Water Resources Management
- Mantoglou, A. “Calibration of Aquifer Models using Neural Network Parameterization with a Simple Regularization”, IAHS Red Book Series, Vol.227, in press 2003.
- Mantoglou, A. “On Optimal Model Complexity in Inverse Modeling of Heterogeneous Aquifers”. Journal of Hydraulic Research.

4. ATMOSPHERIC SCIENCES

4.1 HELLENIC NATIONAL METEOROLOGICAL SERVICE

The mission of Hellenic National Meteorological Service (HNMS) is to provide meteorological support for protection of properties and lives of the society from atmospheric disaster, as well as to provide meteorological support to national economy and defense (Law No 161/97).

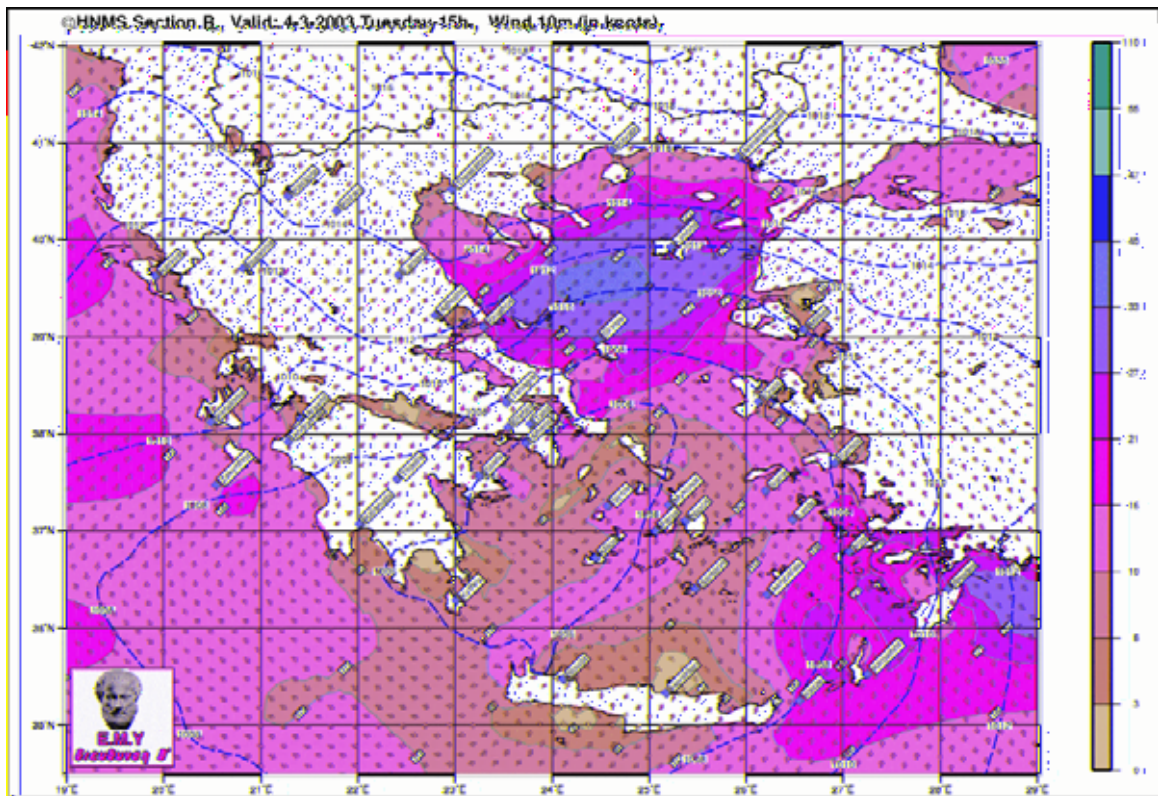
The HNMS in the frame of its activities:

- (1) Takes care of the improvement of the meteorological support to users by implementing the development projects.
- (2) Maintains and operates a network of meteorological stations (map 1), of offices of meteorological briefing, of peripheral meteorological centres and of weather offices.
- (3) Studies, develops and implements methods and systems for the weather forecast improvement and at proper time issuing warnings for dangerous weather conditions.
- (4) Receives a broad spectrum of information from the meteorological satellites METEOSAT and NOAA IPT using the system PROTEAS.
- (5) Maintains an archive of meteorological observations.
- (6) Studies all the atmospheric phenomena and data which are related to the weather and climate of Greece.
- (7) Issues weather forecasts.
- (8) Provides meteorological support to national defense and national economy support.
- (9) Is a member of the WMO, ECMWF, EUMETSAT, ECSN, EUMETNET project, COSMO and represents the country in all forum concerning meteorological aspects.
- (10) Takes part in committees responsible for the coordination and cooperation of Greek services dealing with weather aspects.

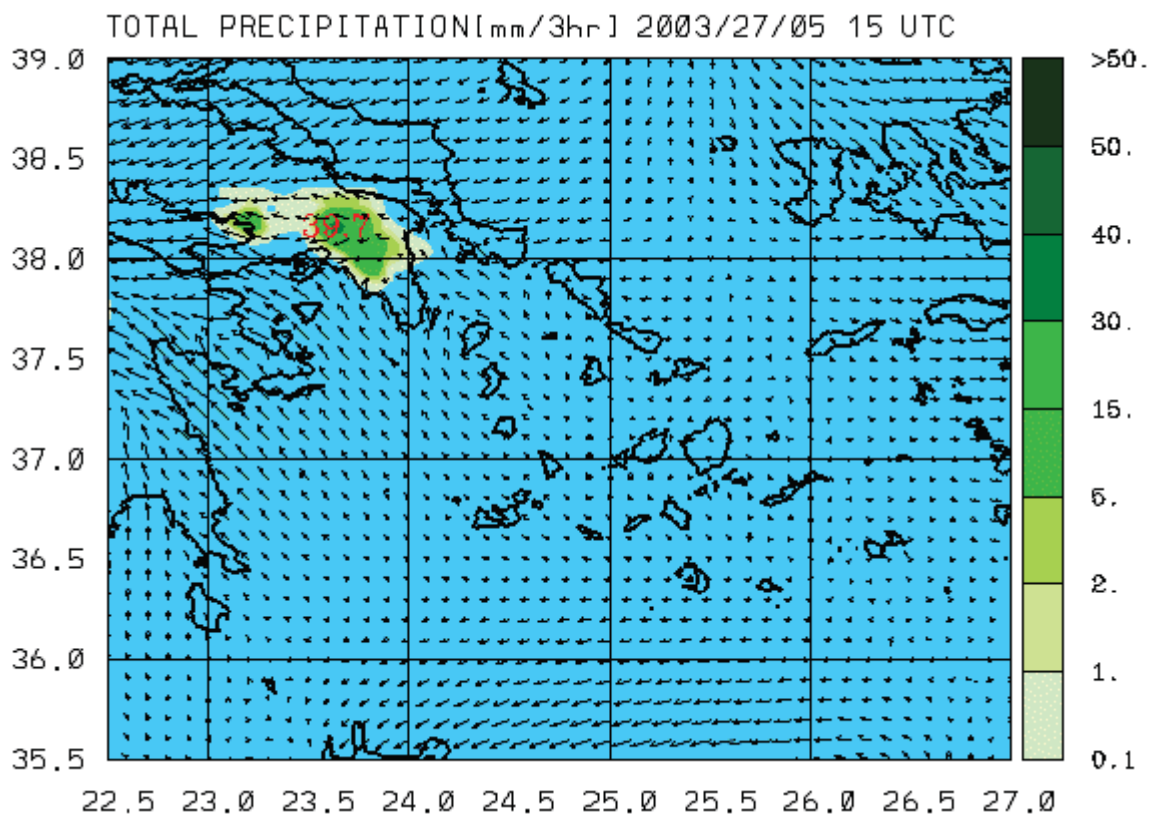
COMPLETE NETWORK OF METEOROLOGICAL STATIONS



Hellenic National Meteorological Service - Map 1

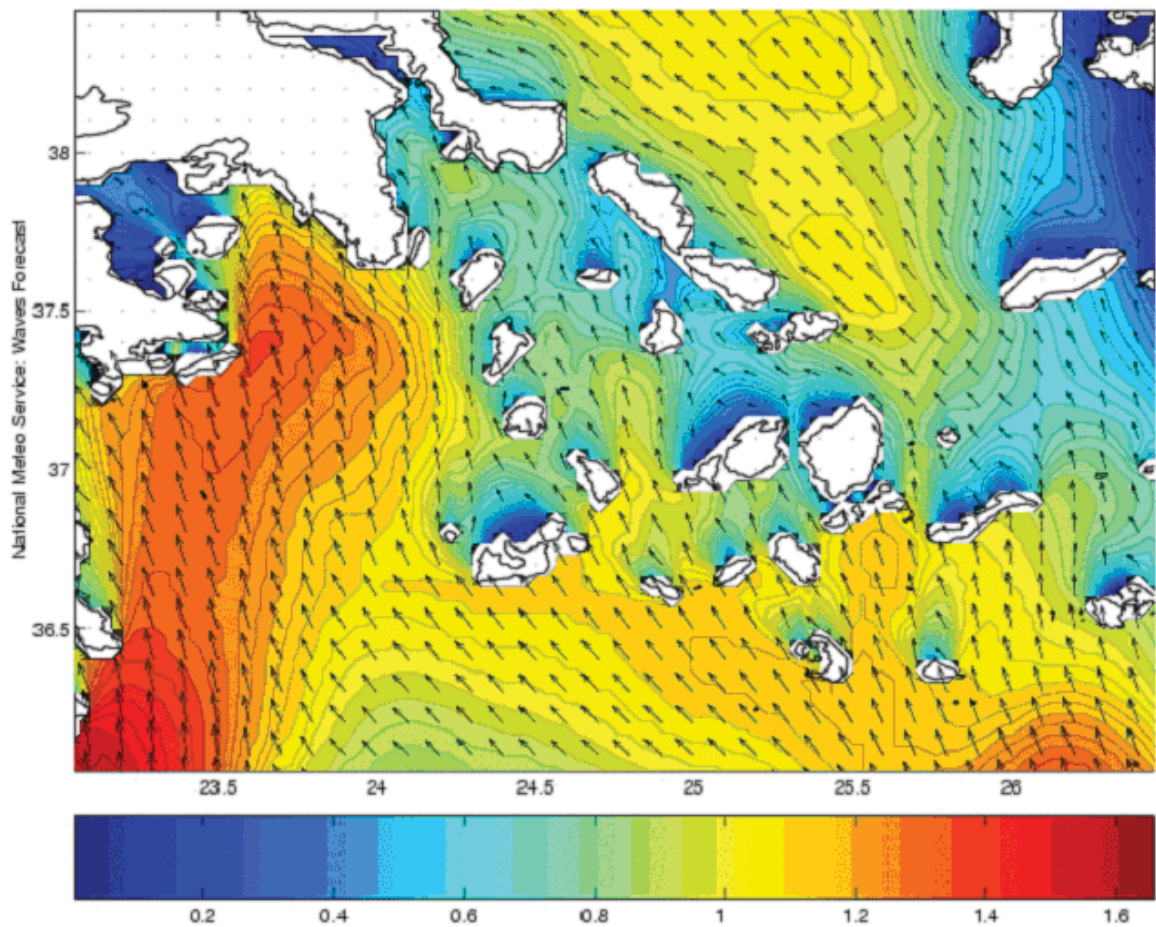


Hellenic National Meteorological Service - Map 2



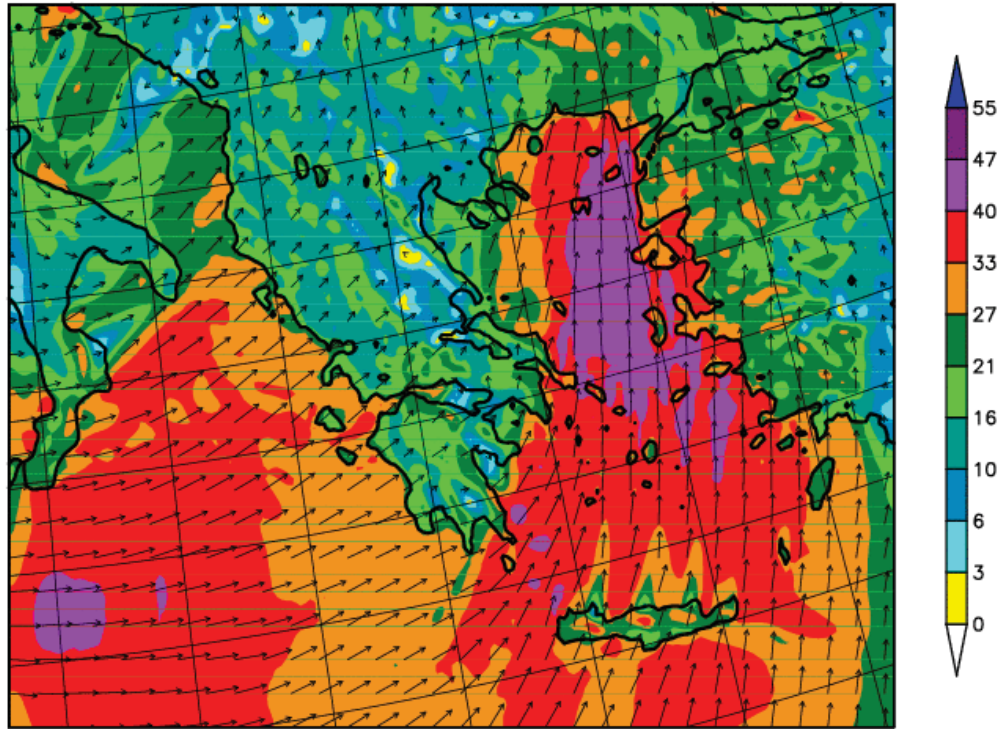
Hellenic National Meteorological Service - Map 3

11/04/03 12:00 UTC : Significant wave height(m) and direction



Hellenic National Meteorological Service - Map 4

Wind_10m 12 UTC (knots)

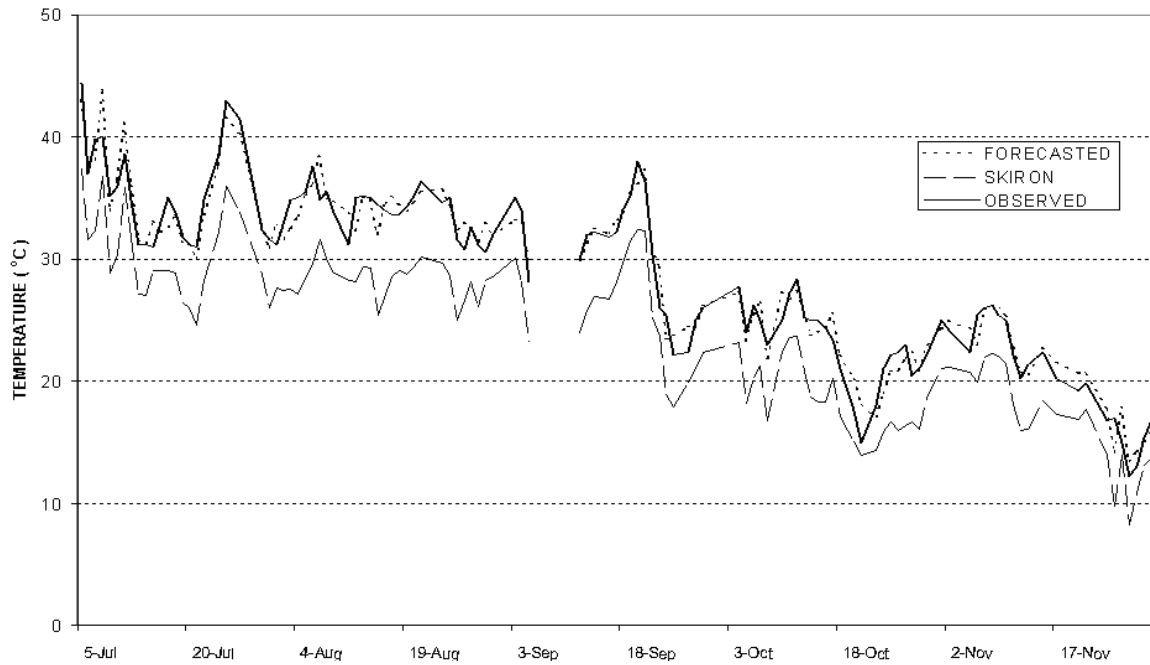


GrADS: COLA/IGES

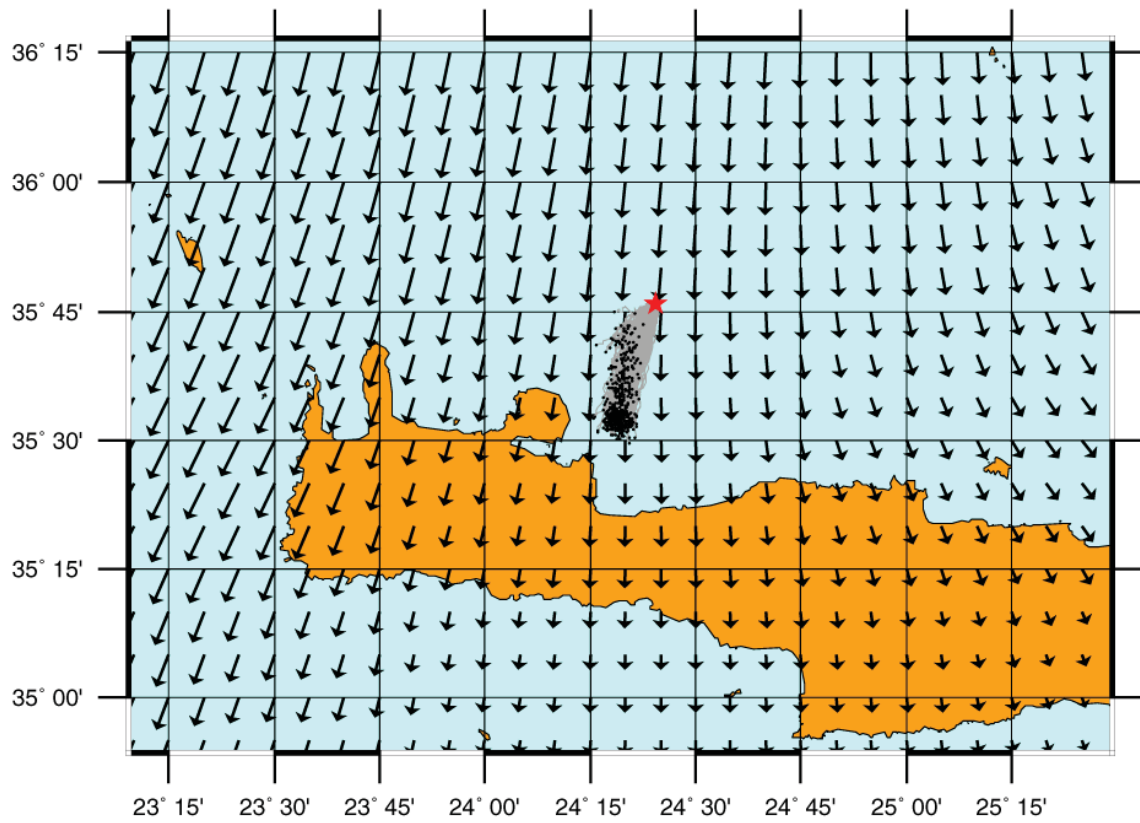
60

2003-02-05-12:17

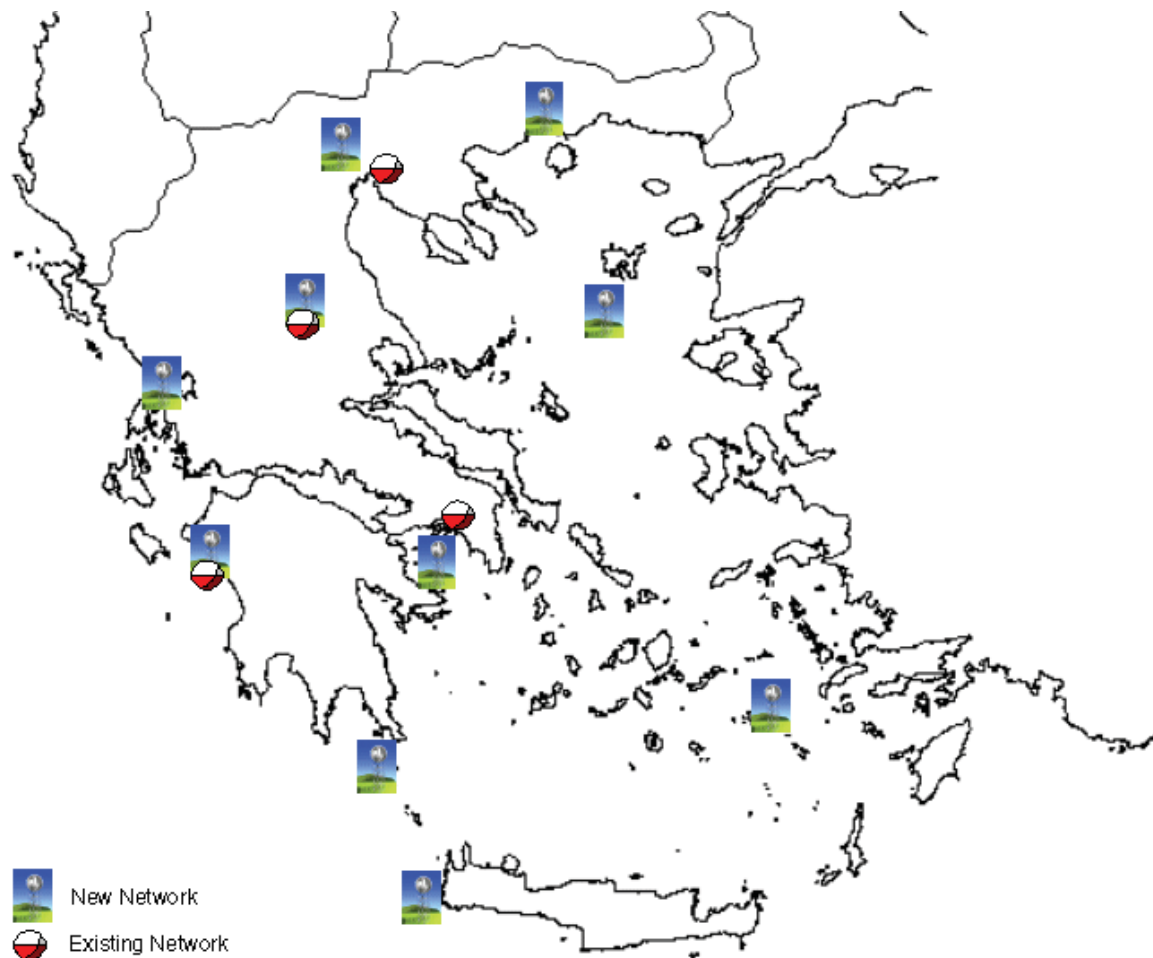
Hellenic National Meteorological Service - Map 5



Hellenic National Meteorological Service - Map 6



Hellenic National Meteorological Service - Map 7



Hellenic National Meteorological Service - Map 8

PRESENT STATUS AND FUTURE PLANS

The HNMS has been involved in a number of development activities in order to achieve its goal, through national and international cooperation.

A. PRESENT STATUS

Within these activities the following operational projects have been implemented.

(1) SATELITE STATION PROJECTS

The Primary Research Operational Tele-detection Environmental Archiving System (PROTEAS) operates in the HNMS. This system receives data from the NOAA and EUMETSAT satellites. It has been implemented as a project funded by the European Union.

(2) LIMITED AREA ATMOSPHERIC MODEL SKIRON

This is a limited area hydrostatic model and it has been implemented as a result of a European Union project in collaboration with the numerical weather prediction group

of the University of Athens. This model is used operational and one output is shown in map 2.

(3) FORECASTING SYSTEM NHREAS

In collaboration with the University of Athens and through a European Union project it has been implemented the forecasting system NHREAS. The system NHREAS consist of the non-hydrostatic atmospheric model RAMS (map 3) which run operational in three way nesting (40 km, 12 km and 4 km) the data assimilation system LAPS and the wave model WAM (map 4).

(4) FORECASTING MODEL COSMO

This model is the result of Research cooperation between the Meteorological Services of Germany, Italy, Switzerland, Greece and Poland.

Through this cooperation the non-hydrostatic model COSMO (map 5) has been developed. The development is on a continuous base and new versions of this model are produced. The model is running daily at the computers of ECMWF on a resolution of 7X7 km.

As it has been mentioned in paragraphs 3 and 4, the models RAMS and COSMO are non-hydrostatic models and both are capable of predicting small-scale features, such as sea breeze, convective clouds etc.

(5) CORRECTION OF MODELS RESULTS TOWARDS OBSERVATIONS

Due to the fact that, even if the model is integrated in small resolutions, still there are unresolved sub-grid scale processes, there is a need for correction of models output towards the observations. One method which is used of HNMS is the Kalman filtering (map 6).

(6) OIL SPELL MODEL MOTHY AND A TRAJECTORY MODEL

In cooperation with Meteo-France an oil spell model has been modified to run on a PC and it is used operationally (map 7). As well as a trajectory model it has been developed.

B. FUTURE PLANS WHICH WILL BE IMPLEMENTED SOON

In a continuous effort to update the HNMS the following project will be funded either the HNMS budget or under the C Frame Work Program of European Union.

- (1) Acquisition of a super computer system for running operational the models SKIRON, NHREAS and COSMO. This computer system will give the capability of HNMS to simulate well the small scale weather features (local winds, thunderstorms etc).
- (2) Update the whole structure of the operational data base which will give the capability to HNMS to do a better organized archiving, to improve the models high resolution experiments and to investigate climatic changes.
- (3) Enhancement of the existing network of the radar system (map 8).

- (4) Installment of lightening detection system.
- (5) Installment of wind profiler.
- (6) Installment of a now-casting system.
- (7) Research for the improvement of now-casting system using combine results of Radar, Satellite, Model output and research.

Publications

- Andreadis, T., Avgoustoglou, E., Galanis, G., Fragouli, V. : “Use and Verification of ECMWF products in Greece”, Verification of ECMWF products in Member States and Co-operating States, Report 200, European Center for Medium-Range Weather Forecasts, p.50 (September 2001).
- Avgoustoglou, E. and Schättler, U. : “The Two-Way Nesting Option in the LM”, 3rd COSMO General Meeting, Athens, Greece (October 3-5, 2001).
- Papageorgiou, J. : "A 3-D sea breeze model of PBL including pollutant dispersion", Boundary Layer Meteorology, 45, 9-29, 1988.
- Sakellarides, G. : “Atmospheric effective angular momentum functions for 1986-1987.” European center for Medium Range Weather Forecast (ECMWF), Reading, England, Tech. Report No. 62, 1987.
- Sakellarides, G. : “Some spectra of kinetic energy from the ECMWF model.” Meteorological Publ. of the Meteor. Institute of the University of Thessaloniki, pp 267-279, 1988.
- Charantonis, T. : «Συμβολή των φωτογραφιών των Μετεωρολογικών Δορυφόρων στην εκτίμηση της ηλιακής ενέργειας σε ένδεκα περιοχές της Ελλάδας..» Πρακτικά 2ου συνεδρίου ανανεώσιμων πηγών ενέργειας, σελίδες 57-64, Θεσσαλονίκη 1985.
- Ζιακόπουλος, Δ., Φραγκούλη, Π., Λαγουβάρδος, Κ. : «Μελέτη των ατμοσφαιρικών διαταραχών που προκαλούν ισχυρές βροχοπτώσεις στην Αττική το Φθινόπωρο.» Πρακτικά 4ου πανελληνίου συνεδρίου Μετεωρολογίας, Κλιματολογίας και Φυσικής της ατμόσφαιρας, Αθήνα 1998.
- Galanis G. : “Verification of ECMWF products in Greece, Verification of ECMWF products in Member States and Co-operating States”, European Center for Medium-Range Weather Forecasts, Report 2001.
- Anadranistakis M., Kerkides P., Liakatas A., Poulouvassiles A., 1999. : “How significant is the usual assumption of neutral stability in evapotranspiration estimating models?” Meteorol. Applications, 6, 155-158.
- Κωστόπουλος, Β., Ντούρος Ζ., Μαράκης Ι., Λαγουδάκης Α., Κατσίκης Μ. : “The Hellenic Satellite Ground System PROTEAS: Design Strategy, Applications & Perspectives”, 9th AVHRR USER’S MEETING.
- Παπαγεωργίου Ιωάννης : “Mesoscale modelling of the atmospheric boundary layer including pollutant dispersion over a coastal area”, PhD Thesis, 1985.
- Σακελλαρίδης Γεώργιος : «Modeling of midlatitude baroclinic waves». Dissertation for the Degree of Master of Science . Department of Geophysics, University of Reading, England, 1977.
- Χαραντώνης Θεαγένης : «Εκτίμηση της ηλιακής ακτινοβολίας στον Ελληνικό χώρο με τη χρησιμοποίηση δορυφορικών φωτογραφιών». Διδακτορική διατριβή, Θεσσαλονίκη 1985.

- Τσιούτρα Κλεονίκη : «Προσομοίωση της θαλάσσιας αύρας του Σαρωνικού κόλπου με τη χρήση ενός μοντέλου δυο διαστάσεων», διπλωματική εργασία για το μεταπτυχιακό δίπλωμα ειδίκευσης «Φυσική Περιβάλλοντος», τμήμα Φυσικής, Πανεπιστήμιο Αθηνών, 1996.
- Μπαλάμη Μαρία : «Φυσική μελέτη θερινής καταιγίδας», διπλωματική εργασία για το μεταπτυχιακό δίπλωμα ειδίκευσης «Μετεωρολογία-Κλιματολογία», τμήμα Γεωλογίας, Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης, 2001.
- Μαλαφούρη Μαρία : «Μελέτη της ανάπτυξης του εσωτερικού οριακού στρώματος και υπολογισμός των επιφανειακών ροών ορμής και θερμότητας» διπλωματική εργασία για το μεταπτυχιακό δίπλωμα ειδίκευσης «Φυσική Περιβάλλοντος», τμήμα Φυσικής, Πανεπιστήμιο Αθηνών, 1995.
- Τσινιάρη Ελευθερία : «Επίδραση της κατακόρυφης κατανομής του ανέμου επί του ολοκληρωμένου οπτικού βάθους των αερολυμάτων της ατμόσφαιρας», διπλωματική εργασία για το μεταπτυχιακό δίπλωμα ειδίκευσης «Φυσική Περιβάλλοντος», τμήμα Φυσικής, Πανεπιστήμιο Αθηνών, 1994.
- Ρεφενέ, Μ. : «Αντικειμενική πρόγνωση της μέγιστης κι ελαχίστης θερμοκρασίας του αέρος», Διεύθυνση Μελετών – Ερευνών, Αρ. 2, Νοέμβριος 1975.

4.2 NATIONAL OBSERVATORY OF ATHENS

4.2.1 Institute for Environmental Research & Sustainable Development

General Description

The Institute for Environmental Research & Sustainable Development is active over the whole area of the Sciences for the Environment with emphasis in the following fields:

- Development of reliable data bases related to the atmospheric environment, to enable the study of meteorological parameters and especially solar radiation, maintaining two meteorological stations, an Atmospheric Electricity Station and a Calibration Laboratory. The data, both raw and processed, are available for use by the scientific and the technical community.
- Experimental research on air quality, utilizing a mobile pollution measuring station, a DOAS and an Atmospheric Chemistry Laboratory equipped to measure particulate matter pollution, dioxins and other volatile organic compounds.
- Experimental and theoretical research of the Atmospheric Boundary Layer, wind power, and intense weather phenomena (storms) using both conventional and state of the art equipment, such as the mobile meteorological radar and the accompanying instrumentation, tethered balloons and radiosondes.
- Synoptic and mesoscale atmospheric modeling for research purposes as well as for providing weather forecast services to the public.

- Improvement of meteorological, hydro-meteorological and climatic events forecasting, especially intense ones.
- Application of global climatic and atmospheric chemistry models, to study, among others, the large-scale mechanisms of pollution buildup and the effect of anthropogenic warming on extreme climatic events.
- Initiatives, measures, actions and plans such as the annual Greek submissions of the national emission inventory in the scope of the European Union Monitoring Directive for the reduction of greenhouse gases emissions in Greece through the Greek Action Plan for the Reduction of Greenhouse Gas Emissions as specified in the Framework Convention on Climate Change (FCCC).
- Building physics and energy conservation applied research, investigating ventilation, building materials, indoor air quality etc. Supporting the technical community through specialized publications, software, and consultant services.
- Development of data bases for the estimation of greenhouse gases' emissions, along with methodological tools aiming to a better planning of energy and environmental policies against climatic change.
- Addressing environmental management, planning and sustainable development issues, by introducing and using methodologies for the identification and assessment of possible environmental impact, as well as risk management, prevention and treatment.
- Study of surface and underground hydrology, and the physicochemical processes affecting the fate of pollutants in an aqueous environment. Development of water resources management and protection methodologies, accounting for social, economical and legal/constitutional aspects.
- Air quality research, with specific attention to compounds suspect for toxic, carcinogenic or mutagenic activity, such a dioxins, VOCs and PAHs.

Research Activities – Funded Projects 1999-2002

- Solar Control - Integrated Approach to Solar Control Techniques (JOULE II Programme GD ×ÉÉ) 1996 –1999.
- Environmental Monitoring, Warning and Emergency System (TELEMATICS/ENVISYS), 1996-1999.
- Mediterranean Action (MEDACT) (APHRODITE Project) 1997-1999.
- Development and Test of Modern Control Techniques Applied to Solar Buildings (JOULE Programme) 1998 –1999.
- Impact Assessment Study CEO Programme 1999.
- European Large Scale Solar Heating Network (SOLAR NET) 1997-1999.
- Design, Realization, Tests, Comparative Analysis of low Electric Consumption PV Cooling Systems (PV-COOLING) 1996-1999.

- Surface Boundary Layer Refractive Index Measurements in Greece, Turkey and UK Relevant to Optical and Microwave Frequencies in Aerospace Operations (NATO/AGARD) 1997-1999.
- European Topic Centre on Air Quality, 1995-2001.
- Study and Development of Heating/Cooling Systems Using Renewable Energy (JOULE Programme) 1998 –2001.
- Island Satellite Observation for Local Exploitation «ISOLE» (Environment & Climate Programme) 1998 –2000.
- A Decision Making Tool for Selecting Office Buildings Upgrading Solutions (TOBUS) (ΓΔΧΙΙ JOULE Programme) 1998-2000.
- Park Resources Information Management Via Environmental Remotely sensed data Analysis «PRIMAVERA» CEO Programme 1998-2000 .
- Integrated Information System for Monitoring Environmental Emergencies of High Probability of Occurrence in the Mediterranean (PROMED) LIFE programme 1999-2001.
- Integrated pollution control, compliance and enforcement of EU Environmental legislation to Industries (IPPC and non IPPC) of the food production/processing sector, DGENV 2000-2001.
- TELEFLEUR - TELEMATICS Assisted Handling of Food Emergencies in Urban Areas (TELEMATICS Programme DG XII) 1998-2000.
- WASSER: Utilization of groundwater desalination & Wastewater reuse in the water supply of seasonally - stressed regions, DG XII-ENVIRONMENT 998-2001.
- Characterization of Urban Air Quality Indoor/Outdoor Particulate matter Chemical Characteristics and Source-to-Inhaled Dose Relationships (URBAN-AEROSOL) 2001-2003.
- FORMIDABLE “Friendly Operational Risk Management through Interoperable Decision Aid Based on Local Events” 2000-2002.
- MANTLE “MAPPING Night-Time Light Emissions in the EU using satellite-observed visible-near infrared emissions as a policy tool” 2000-2002.
- APMoSPHERE " Air Pollution Modelling for Support to Policy on Health, Environment and Risk Management in Europe" 2002-2005.
- MEDEX MEDiterranean EXperiment on "Cyclones that produce high impact weather in the Mediterranean" 2000-2004.
- INVESTIMO - A Decision-making Tool for Long-term Efficient Investment Strategies in Housing Maintenance and Refurbishment, 2001-2003.
- SACE-Solar Air Conditioning in Europe (NNE5/2001/00025) Fifth Framework , (DG XII), European Union, 2002-2003.
- *XENIOS - Development of an audit tool for Hotel buildings and the promotion of RUE and RES (AL 4.1030/Z/01-135/2001), 2002-2003.*
- EPA-ED Development of and preparations for the implementation of an Energy Performance Assessment Method for Existing Dwellings to stimulate RUE and the use of RES in the existing dwelling stock in Member States (AL 4.1030/Z/01-142/2001), 2002-2004.
- LIFETIME - Engineering of Buildings & Civil Infrastructures (G1RT-CT-2002-05082) GROWTH, DG for Research (DG XII), Thematic Networks, European Commission, 2002-2004.

- IEA - Task 25, *Solar Assisted Air Conditioning of Buildings International Energy Agency, Solar Heating & Cooling Programme, 1999-2004.*
- Relationship between Ultrafine and fine Particulate matter in Indoor and Outdoor air and respiratory Health (RUIOH), DG Research, 2001-2004.
- Environmental Inspectorate in Cyprus (INSPECT), 2002-2004.
- IMPEL OLIVE OIL PROJECT, 2002-2003.
- European network for the assessment of air quality by the use of bio-indicator plants (EuroBionet), LIFE-ENV, European Union, 2000-2002.
- Integrated Computational Assessment via Remote Observation System (ICAROS-NET), 2001-2004.
- MICE “Modelling the Impacts of Climate Extremes” (DG-research- European Commission), 2002-2004.
- MINOS “Mediterranean Intensive Oxidant Study” (International collaboration program funded by Max Planck Institute of Chemistry, Germany), 2002-2003.

Refereed Publications

- Balaras, C.A., Santamouris, M., Asimakopoulos, D.N., Argiriou, A.A., Paparsenos, G., and Gaglia, A.G., Energy policy and an action plan for renewable energy sources (RES) for the Hellenic Islands of the North Aegean region, *Journal of Energy*, pgs. 335-350, vol. 24, 1999.
- Argiriou, A.A., Lykoudis, S., Kontoyiannidis, S., Balaras, C.A., Asimakopoulos, D.N., Kassomenos, P., and Petrakis, M., Comparison of methodologies for TMY generation using 20 years data for Athens Greece, *Solar Energy*, pgs. 33-45, vol. 66, 1, 1999.
- Dascalaki, E., Santamouris, M., and Asimakopoulos, D.N., On the use of deterministic and intelligent techniques to predict the air velocity distribution on external openings in single sided natural ventilation configurations, *Solar Energy*, pgs. 223-243, vol. 66, 3, 1999.
- E., Dascalaki, M., Santamouris, M., Bruant, C.A., Balaras, A., Bossaer, D., Ducarme, P., Wouters, Modeling Large Openings with COMIS, *Energy & Buildings*, pgs. 105-115., vol. 30, 1999.
- Kalogiros, J.A., Helmis, C.G., Asimakopoulos, D.N., and Papageorgas, P.G., Estimation of ABL Parameters using the vertical velocity measurements of an acoustic sounder, *Boundary Layer-Meteorology*, pgs. 413-449, vol. 91, 1999.
- Ilias, I., Retalis, D., Ilias, D., and Filippou, N., Study of small air ions concentrations versus asthma attacks in the region of Athens – Greece after the Chernobyl disaster, *Aerobiologia*, pgs. 71-74, vol. 15, 1999.
- Adamopoulos, A.D., Kambezidis, H.D., Zevgolis, D., Topalis, F.B., and Djepa, V., Atmospheric optical properties during summer days in Athens *Fresenius Environmental Bulletin*, pgs. 717-725, vol. 7, 1999.

- Michaelides, J., Kalogirou, S.A., Chrysis, I., Roditis, G., Hadjiyianni, A., Kambezidis, H.D., Petrakis, M., Lykoudis, S., and Adamopoulos, A.D., Comparison of performance and cost effectiveness of solar water heaters at different collector tracking modes in Cyprus and Greece, *Energy Conversion and Management*, pgs. 1287-1303, vol. 40, 1999.
- C.A., Balaras, K., Drousa, A.A., Argiriou, D.N., Asimakopoulos, EPIQR Surveys of Apartment Buildings in Europe, *Energy & Buildings*, pgs. 111-128, vol. 31, 2000.
- C.A., Balaras, K., Drousa, A.A., Argiriou, D.N., Asimakopoulos, Potential for Energy Conservation in Apartment Buildings, *Energy & Buildings*, pgs. 143-154, vol. 31, 2000.
- Adamopoulos, A.D., Kambezidis, H.D., Zevgolis, D., and Topalis, F.B., Estimation of total ozone column over Athens, Greece using ground-based beam solar irradiance measurements, *Fresenius Environmental Bulletin*, pgs. 201-208, vol. 9, 2000.
- Kambezidis, H.D., and Synodinou, B.M., Atmospheric stability during sea-breeze conditions in Athens, Greece, *Fresenius Environmental Bulletin*, pgs. 443-450, vol. 9, 2000.
- Kambezidis, H.D., Adamopoulos, A.D., Zevgolis, D., Case studies of spectral atmospheric transmittance in the UV and VIS regions in Athens, Greece. I: Total transmittance, *Atmospheric Research*, pgs. 223-232, vol. 54, 2000.
- Kambezidis, H.D., Adamopoulos, A.D., Zevgolis, D., Case studies of spectral atmospheric transmittance in the UV and VIS regions in Athens, Greece. II: Aerosol transmittance, *Atmospheric Research*, pgs. 233-243, vol. 54, 2000.
- M., Santamouris, G., Mihalakakou, B., Psiloglou, G., Eftaxias, and D. N., Assimakopoulos, Modelling the global solar radiation on the earth surface using atmospheric deterministic and intelligent data driven techniques, *Journal of Climate*, pgs. 3105-3116, vol. 12, No 10, 2000.
- B., Psiloglou, M., Santamouris, and D. N., Assimakopoulos, Atmospheric broadband model for computation of solar radiation at the earth's surface. Application to Mediterranean climate, *Pure and Applied Geophysics*, pgs. 829-860, vol. 157, 2000.
- Darula, S., Kambezidis, H.D., Kittler, R., Daylight levels during the solar eclipse of 11 August 1999, *Meteorology & Atmospheric Physics*, pgs. 251-256, vol. 76, 2001.
- Kambezidis, H.D., Adamopoulos, A.D., Gueymard, C., Total NO₂ column amount over Athens, Greece, 1996-97, *Atmospheric Research*, pgs. 1-8, vol. 57, 2001.
- Kambezidis, H.D., Adamopoulos, A.D., Zevgolis, D., Determination of Ångström and Schüepp parameters from ground-based spectral measurements of beam

irradiance in the ultraviolet and visible spectrum in Athens, Greece, *Pure & Applied Geophysics*, pgs. 821-838, vol. 158, 2001.

- A.A., Argiriou, I., Bellas-Velidis, C.A., Balaras, A.I., Dounis, Use of Artificial Neural Networks for Predicting the Heating Requirements of Single Family Houses, *International Journal of Knowledge-Based Intelligent Engineering Systems*, pgs. 234-239, vol. 5, 2001.
- M., Santamouris, N., Papanikolaou, I., Livada, I., Koronakis, C., Georgakis, A., Argiriou, D. N., Asimakopoulos, On the impact of urban climate on the energy consumption of buildings, *Solar Energy*, pgs. 201-216, vol. 70, No 3, 2001.
- Kotroni, V., and K., Lagouvardos, Precipitation forecast skill of different convective parameterization and microphysical schemes: application for the cold season over Greece, *Geophysical Research Letters*, pgs. 1977-1980, vol. 108, No 10, 2001.
- Kotroni, V., K., Lagouvardos, and D., Lalas, The effect of Crete island on the Etesian winds over the Aegean Sea, *Quarterly Journal of Royal Meteorological Society*, pgs. 1917-1938, vol. 127, 2001.
- E., Georgopoulou, A., Kotronarou, A., Koussis, P. J., Restrepo, A., Gomez-Gotor, J. J., Rodriguez Jimenez, A methodology to investigate brackish groundwater desalination coupled with aquifer recharge by treated wastewater as an alternative strategy for water supply in Mediterranean areas, *Desalination Journal*, Elsevier Science B.V., pgs. 307-315, vol. 136, 2001.
- Diakoulaki, D., Zervos, A., Sarafidis, J., and Mirasgedis, S., Cost Benefit Analysis for Solar Water Heating Systems, *Energy Conversion and Management*, pgs. 1727-1739, vol. 42(14), 2001.
- C.A., Balaras, K., Droutsas, A.A., Argiriou, K., Wittchen, Assessment of energy and natural resources conservation in office buildings using TOBUS, *Energy & Buildings*, pgs. 135-154, vol. 34, 2002.
- C.A., Balaras, A.A., Argiriou, Infrared thermography for building diagnostics, *Energy & Buildings*, pgs. 171-184, vol. 34, 2002.
- A.A., Argiriou, C.A., Balaras, S.P., Lykoudis, Single-sided ventilation of buildings through shaded large openings, *Energy*, pgs. 93-115, vol. 27, 2002.
- C.A., Balaras, (*Guest Editor*) Foreword: TOBUS - A European Method and Software for Office Building Refurbishment, *Energy & Buildings*, pgs. 111-112, vol. 34, 2002.
- E., Dascalaki, and M., Santamouris, On the potential of retrofitting scenarios for offices, *Building & Environment*, pgs. 557-567, vol. 37, 6, 2002.

- M., Santamouris, and E., Dascalaki, Passive retrofitting of office buildings to improve their energy performance and indoor environment: the OFFICE project, *Building & Environment*, pgs. 575-578, vol. 37, 6, 2002.
- C. A., Roulet, F., Flourentzou, H.H., Labben, M., Santamouris, I., Koronaki, E., Dascalaki, and V., Richalet, ORME: A multicriteria rating methodology for buildings, *Building & Environment*, pgs. 579-586, vol. 37, 6, 2002.
- E., Georgopoulou, Y., Sarafidis, S., Mirasgedis, S., Zaimi, D.P., Lalas, A multiple criteria decision-aid approach in defining national priorities for greenhouse gases emissions reduction in the energy sector, *European Journal of Operational Research*, pgs. 199-215, vol. 146, Issue 1, 2002.
- Y., Sarafidis, S., Mirasgedis, E., Georgopoulou, D.P., Lalas, Economic Evaluation of CO₂-emission Abatement Measures in the Greek Energy Sector, *Journal of Environmental Planning and Management*, pgs. 181-198, vol. 45(2), 2002.
- S., Mirasgedis, Y., Sarafidis, E., Georgopoulou, D.P., Lalas, The Role of Renewable Energy Sources within the Framework of the Kyoto Protocol: the case of Greece, *Renewable and Sustainable Energy Reviews*, pgs. 247-269, vol. 6, Issue 3, 2002.
- Kollas, G.I., and Mirasgedis, S., Health and Environmental Impacts of the Hydro Fuel Cycle, *International Journal of Risk Assessment and Management*, pgs. 23-40, vol. 3, No.1, 2002.
- Kavouras, I.G., Stephanou, E.G., Direct evidence of atmospheric secondary organic aerosol formation through heteromolecular nucleation, *Environmental Science and Technology*, pgs. 5083-5091, vol. 36, 2002.
- Kambezidis, H.D., Oikonomou, Th.I., Zevgolis, D., Daylight climatology in the Athens urban environment: guidance for buildings designers, *Lighting Research & Technology*, pgs. 297-312, vol. 34(4), 2002.
- Bilbao, J., de Miguel, A., Kambezidis, H.D., Air temperature model evaluation in the north Mediterranean belt area, *Journal of Applied Meteorology*, pgs. 872-884, vol. 4(8), 2002.
- Klumpp, A., Ansel, W., Klumpp, G., Belluzzo, N., Calatayud, V., Chaplin, N., Garrec, J.P., Gutsche, H.-J., Hentze, H.-W., Kambezidis, H.D., Laurent, O., Peñuelas, J., Pilkington, K., Rasmussen, S., Ribas, A., Ro-Poulsen, H., Rossi, S., Sanz, M.J., Shang, H., Sifakis, N., Vergne, P., EuroBionet: A Pan European Bio-monitoring Network for Urban Air Quality Assessment, *Environmental Science & Pollution Research*, pgs. 199-203, vol. 9(3), 2002.
- Adamopoulos, A.D., Kambezidis, H.D., Zevgolis, D., Case studies of atmospheric turbidity in Athens, Greece: comparison between summer and winter, *Fresenius Environmental Bulletin*, pgs. 480-483, vol. 11(8), 2002.

- Adamopoulos, A.D., Kambezidis, H.D., Zevgolis, D., Case studies of total NO₂ column in the atmosphere of Athens, Greece: comparison between summer and winter, *Fresenius Environmental Bulletin*, pgs. 484-487, vol. 11(8), 2002.
- Kalogiros, J.A., and Q., Wang, Aerodynamic effects on wind turbulence measurement with research aircraft, *Journal of Atmospheric and Oceanic Technology*, pgs. 1567-1576, vol 19, 2002.
- Anadranistakis, M., K., Lagouvardos, V., Kotroni, and K., Skouras, Combination of Kalman filter and an empirical method for the correction of near-surface temperature forecasts: application over Greece, *Geophysical Research Letters*, pgs. 1776-1779, vol. 16, 2002.
- K.-Y., Wang, D.E., Shallcross, P., Hadjinicolaou, and C., Gianakopoulos, An efficient chemical systems modelling approach, *Environmental Modelling and Software*, pgs. 731-745, vol. 17, 2002.
- Mihalakakou, G., Psiloglou, B., Santamouris, M., and Nomidis, D., Application of renewable energy sources in the Greek islands of the South Aegean Sea, *Renewable Energy*, pgs. 1-19, vol. 26, 2002.

4.2.2 Institute for Space Applications & Remote Sensing

Space Physics Research Group

General Description

The activities of the Space Physics Research Group focus on solar and heliospheric physics, interplanetary disturbances, magnetospheric dynamic processes and impacts on the terrestrial atmosphere. The Group is particularly active in investigations of:

- Solar atmosphere dynamics
- Charged particle acceleration mechanisms
- Space magnetic storms and space weather
- Magnetosphere-ionosphere coupling
- Storm-time ring current dynamics
- Particle propagation in Coronal Mass Ejections

Such investigations are achieved by means of:

- Data processing, analysis and interpretation of spacecraft data.
- Development of modeling software for the implementation of mission objectives.
- Computer simulations of basic physical processes.

Researchers of ISARS have been participating in several space missions under the Co-Investigator or Group Member status. Active co-operation exists with a number of research institutes in Europe and USA.

Detailed information on the activities of the Space Physics Research Group of ISARS can be found at the following URL address

http://www.space.noa.gr/space_physics/isars_space_physics_main.htm

Research Activities 1999 – 2002

For the period 1999 – 2002 the Group's research activities were the following:

- Theoretical work on the energy release process during solar flares by constructing MHD consistent Cellular Automata models.
- Study of solar energetic particle acceleration, transport and radiation during solar flares. Modeling and numerical simulations.
- Interpretation of the statistical properties of the observed radiation signatures from solar energetic events.
- Study of magnetic flux emergence in active regions using observations from SOHO, TRACE and ground based instruments.
- Study of sunspot oscillations from observations obtained with THEMIS .
- Study of the fine structure of the solar chromosphere.
- Study of the development and decay of geospace storms through ground magnetic disturbances.
- Study of intense geospace storms by solar/interplanetary drivers and internal magnetospheric properties.
- Study of particle acceleration by substorm-induced electric fields and interaction of Mercury's magnetosphere with the solar wind.

Organization of International Meetings

The Institute for Space Applications and Remote Sensing of the National Observatory of Athens (NOA) organized, during the period 1999 – 2002, the following International Meetings:

1. 6th Workshop on Magnetic Storm Dynamics, Athens, Greece April 1999.
2. NATO Advanced Study Institute on Space Storms and Space Weather Hazards, Crete, Greece, June 2000.
3. Eutoconference/IAU colloquium 188 on: "Magnetic coupling of the solar atmosphere", Santorini, Greece, June, 2002.

Externally Funded Projects

The members of the Space Physics Research Group were/are the principal investigators of the following externally funded projects:

- The role of Solar wind an Earth's ionosphere in the development of Magnetic Storms in Geospace, Greek General Secretariat of Research and Technology, French-Greek bilateral research project, 2002 - 2004.
- Dynamics of the Solar Atmosphere using ground based and space borne observations, Greek General Secretariat of Research and Development, French-Greek bilateral research project, 2001-2002.
- Interpretation of the Statistical Properties of the Observed Radiation Signatures from Solar Energetic Events, Greek General Secretariat of Research and Development, French-Greek bilateral research project, 2001-2002.
- Magnetic Coupling of the Solar Atmosphere, European Commission, DG RTD Human Potential Programme - High-Level Scientific Conferences, 2002.
- STORMS 2000: Space Storms and Space Weather Hazards, Advanced Study Institute, NATO, 2000.

Refereed Publications

- Anastasiadis, A: 'Electron acceleration in solar flares by spatially random DC electric fields', *Physics and Chemistry of the Earth*, 24, 269, 1999.
- Blanc, M., J. L. Horwitz, J. B. Blake, I. A. Daglis, J. F. Lemaire, M. B. Moldwin, S. Orsini, R. M. Thorne, and R. A. Wolfe: 'Source and loss processes in the inner magnetosphere', in *Magnetospheric plasma sources and losses*, Space Science Series of the International Space Science Institute, vol. 6, pp. 137-206, edited by B. Hultqvist, M. Oieroset, G. Paschmann, and R. Treumann, Kluwer Academic Publishers, Dordrecht, 1999.
- Daglis, I. A., W. Baumjohann, J. Geiss, S. Orsini, E. T. Sarris, M. Scholer, B. T. Tsurutani, and D. Vassiliadis: 'Recent advances, open questions and future directions in solar-terrestrial research', *Physics and Chemistry of the Earth*, 24, 5-28, 1999.
- Daglis, I. A., R. M. Thorne, W. Baumjohann, and S. Orsini : 'The terrestrial ring current: Origin, formation, evolution and decay', *Reviews of Geophysics*, 37, 407-438, 1999.

- Daglis, I. A., G. Kasotakis, E. T. Sarris, Y. Kamide, S. Livi, and B. Wilken: 'Variations of the ion composition during a large magnetic storm and their consequences', *Physics and Chemistry of the Earth*, 24, 229-232, 1999.
- Daglis, I. A., E. T. Sarris, W. I. Axford, G. Karagevrekis, G. Kasotakis, S. Livi, and B. Wilken: 'Influence of interplanetary disturbances on the terrestrial ionospheric outflow', *Physics and Chemistry of the Earth*, 24, 61-65, 1999.
- De Michelis, P., I. A. Daglis, and G. Consolini : 'Quiet time magnetospheric proton plasma parameters in the equatorial plane', *Physics and Chemistry of the Earth*, 24, 163-166, 1999.
- De Michelis, P., I. A. Daglis, and G. Consolini : 'An average image of proton plasma pressure and of current systems in the equatorial plane derived from AMPTE/CCE-CHEM measurements', *Journal of Geophysical Research*, 104, 28,615-28,624, 1999.
- Kamide, Y., W. Baumjohann, I. A. Daglis, W. D. Gonzalez, M. Grande, J. A. Joselyn, R. L. McPherron, J. L. Phillips, G. D. Reeves, G. Rostoker, A. S. Sharma, H. J. Singer, B. T. Tsurutani, and V. M. Vasyliunas: 'Reply to Comment by Wallace H. Campbell on "Current understanding of magnetic storms: Storm/substorm relationships', *Journal of Geophysical Research*, 104, 7051-7052, 1999.
- Karagevrekis, G., I. A. Daglis, A. Belehaki, E. T. Sarris, D. Sarafopoulos, and D. J. Williams: 'Energetic particle bursts and substorm activity observed by GEOTAIL at X= -32 RE', *Physics and Chemistry of the Earth*, 24, 173-178, 1999.
- Kasotakis, G., E. T. Sarris, P. Marhavilas, N. F. Sidiropoulos, P. Trochoutsos, and I. A. Daglis : 'Variations in the ratio of proton to magnetic field energy density, as observed by Ulysses/HI-SCALE', *Physics and Chemistry of the Earth*, 24, 79-81, 1999.
- Manolakou, K., A. Anastasiadis and L. Vlahos: 'Particle acceleration and radiation in the turbulent flow of a jet', *Astronomy and Astrophysics*, 345, 653, 1999.
- Milillo, A., S. Orsini, I. A. Daglis, and S. Livi: 'An empirical model of the ion distributions in the equatorial inner magnetosphere', *Physics and Chemistry of the Earth*, 24, 209-214, 1999.
- Shiokawa, K., R. R. Anderson, I. A. Daglis, W. J. Hughes, and J. R. Wygant : 'Simultaneous DMSP and CRRES observations of broadband electrons during a storm-time substorm on March 25, 1991', *Physics and Chemistry of the Earth*, 24, 281-285, 1999.

- Tsiganis, K., A. Anastasiadis and H. Varvoglis: 'On the relation between maximal LCN's and the width of the stochastic layer in a driven pendulum', *Journal of Physics A*, 32, 431, 1999.
- Tsiganis, K., A. Anastasiadis and H. Varvoglis: 'Effective Lyapunov Numbers and correlation dimensions in a 3-D Hamiltonian system', in *The impact of modern dynamics in Astronomy*, (Eds: J. Henrard and S. Ferraz-Mello), Kluwer Academic Publishers, p. 447, 1999.
- Tsiropoula, G., Madi C., Scmieder B.: 'Derivation of physical parameters of chromospheric structures assuming a constant and a varying source function', *Solar Physics*, 187, 11, 1999.
- Tsiropoula, G., Madi C., Scmieder B. and Preka-Papadema P.: 'Analysis of H α profiles. Physical parameters of chromospheric mottles: a case study', *Astronomical and Astrophysical Transactions*, 18, 455, 1999.
- Daglis, I. A.: 'Intense magnetic storms: The topic of intense scientific discussion', *Eos Transactions AGU*, 81 (6), 56, 2000.
- Daglis, I. A. , Y. Kamide, C. Mouikis, G. D. Reeves, E. T. Sarris, K. Shiokawa, and B. Wilken: 'Fine structure" of the storm-substorm relationship', *Advances in Space Research*, 25 (12), 2369-2372, 2000.
- H. Isliker, A. Anastasiadis, L. Vlahos : 'MHD consistent cellular automata (CA) models I: Basic Features', *Astronomy and Astrophysics*, *Astronomy and Astrophysics*, 363, 1134, 2000.
- Malandraki, O., E. T. Sarris, P. Trochoutsos: 'Probing the magnetic topology of coronal mass ejections by means of Ulysses/HI-SCALE energetic particle observations', *Ann. Geophysicae*, 18, 129, 2000.
- Malandraki, O., E. T. Sarris, Gr. Kasotakis, N. Sidiropoulos : ' Study of CME structure and evolution deduced from Ulysses/HI-SCALE energetic particle observations', *Advances in Space Research*, 26(5), 875, 2000.
- Orsini, S., A. Milillo, I. A. Daglis, and S. Livi : 'Simulation of ENA fluxes along the Geotail spacecraft orbit', *Journal of Atmospheric and Solar-Terrestrial Physics*, 62, 919-926, 2000.
- Tsiganis, K., A. Anastasiadis and H. Varvoglis: 'Dimensionality differences between sticky and non-sticky chaotic trajectory segments in a 3-D Hamiltonian system', *Chaos, Solitons & Fractals*, 11(14), 2281, 2000.
- Tsiropoula, G.: 'Determination of the line-of-sight Velocities in the Dark Penumbral Fibrils', *New Astronomy*, 5, 1, 2000.

- Tsiropoula, G.: 'Physical Parameters and Flows along Chromospheric Penumbra Fibrils', *Astronomy and Astrophysics*, 357, 735, 2000.
- Tsiropoula, G., Alissandrakis C. E., Mein P.: 'Chromospheric Sunspot Umbral Oscillations and Running Penumbra Waves. I. Morphological Study', *Astronomy and Astrophysics*, 355, 375, 2000.
- Daglis, I. A.: 'The storm-time ring current', *Space Science Reviews*, 98, 343-363, 2001.
- Daglis, I. A., D. N. Baker, Y. Galperin, J. G. Kappenman, L. J. Lanzerotti: 'Space Storms: Their nature and their hazards for the technological geospace', *Eos Transactions AGU*, 82, 585-592, 2001.
- Isliker, H., A. Anastasiadis, L. Vlahos: 'MHD consistent cellular automata (CA) models II: Applications to Solar Flares', *Astronomy and Astrophysics*, 377, 1068, 2001.
- Milillo, A., S. Orsini, I. A. Daglis: 'Empirical model of proton fluxes in the equatorial inner magnetosphere: Development', *Journal of Geophysical Research*, 106, 25713-25729, 2001.
- Malandraki, O. E., E.T. Sarris, L.J. Lanzerotti, C.G. MacLennan, M. Pick, G. Tsiropoula: 'Tracing the magnetic topology of Coronal Mass Ejection events by Ulysses/Hi-Scale energetic particle observations in and out of the ecliptic', *Space Science Review*, 97, 263, 2001.
- Tsiganis, K., A. Anastasiadis, H. Varvoglis: 'On a Fokker - Planck approach to asteroidal transport', in *New Developments in the Dynamics of Planetary Systems*, (Eds: R. Dvorak and J. Henrard), Kluwer Academic Publishers, p. 337, 2001.
- Daglis, I. A., J. U. Kozyra,: 'Outstanding issues of ring current dynamics', *Journal of Atmospheric and Solar-Terrestrial Physics*, 64, 253-264, 2002.
- Anastasiadis, A.: 'Acceleration of solar energetic particles: The case of solar flares', *Journal of Atmospheric and Solar-Terrestrial Physics*, 64(5-6), 481, 2002.
- Malandraki O.E., Sarris E.T., Trochoutsos P., Tsiropoula G., Pick M.: 'Solar energetic particles inside a Coronal Mass Ejection event observed by ACE', *Journal of Atmospheric and Solar-Terrestrial Physics*, 64, 517, 2002.
- Tsiganis, K., H. Varvoglis, A. Anastasiadis: 'Diffusion of asteroids in mean motion resonances', in *Modern Celestial Mechanics: From Theory to Applications*, (Eds: A. Celletti, S. Ferraz-Mello and J. Henrard), Kluwer Academic Publishers, 2002.
- Tziotziou C., G. Tsiropoula, P. Mein : 'CaII umbral oscillations observed by THEMIS', *Astronomy and Astrophysics*, 381, 279, 2002.

Ionospheric Group

General Description

The Ionospheric Group activities during the last four years 1999-2002 concern the investigation of the physical processes characterizing the dynamics of the Earth's Ionosphere for scientific purposes and operational applications. More precisely the activities are focused on:

- Monitoring the state of the ionosphere over Greece operating a DPS4 station, providing real-time information through the web page <http://www.iono.noa.gr>
- Providing ionospheric data in real-time to the World Data Centers in Europe (RAL), USA (Boulder) and Australia (IPS)
- Ionospheric mapping over Europe in real-time
- Ionospheric storm forecasting models driven by solar wind parameters
- Modeling of the topside ionosphere and plasmasphere
- Modeling of ionospheric storm effects at middle latitudes

Participation in the Space Missions as Co-Investigator

CHAMP Space Mission, Co-Investigators in the GPS Receiver TRSR-2 experiment onboard CHAMP on “Comparative studies between Athens digisonde and CHAMP ionospheric data”.

SWARM “A constellation to study the dynamics of the Earth's magnetic field and its interactions with the Earth system”, Earth Explorer Opportunity Missions, ESA.

Participation in International Research Programs

Cooperation with the Australian Forecast Center (IPS) to support HF radio in Europe (<http://www.iono.noa.gr>)

Cooperation with Northwest Research Associates for the derivation of Ionospheric Indices to support space weather applications (<http://www.nwra-az.com>)

Externally funded projects

- Installation and Operation of the Ionospheric Station in NOA, Greek General Secretariat for Research and Technology, 1998-2001
- COST271, Effects of the upper atmosphere on terrestrial and Earth-space communications, European Commission, 2000-2004

- COST724, Developing the scientific basis for monitoring, modeling and predicting space weather, European Commission, 2002-2007
- Modeling of the topside ionosphere for operational applications, NATO Collaborative Linkage Grant, 2002-2005
- Geomagnetic Indices Forecasting and Nowcasting Ionospheric Tools, ESA Space Weather Pilot Project, 2002-2004
- Earth to space communication and positioning systems: maps and models of ionospheric and plasmaspheric variability, Greek General Secretariat for Research and Technology, Italian-Greek Bilateral Agreement, 2002-2004.

Publications

- Belehaki A., G. Moraitis and I. Tsagouri, On the derivation of an hourly local index to define the normal ionosphere, *Annali di Geofisica*, 43, 1, 189-204, 2000.
- Tsagouri I., A. Belehaki, G. Moraitis and H. Mavromichalaki, Positive and negative ionospheric disturbances at middle latitudes during geomagnetic storms, *Geophysical Research Letters*, Vol. 27, No. 21, 3579-3582, 2000.
- Belehaki A. and I. Tsagouri, Study of the thermospheric-ionospheric response to intense geomagnetic storms at middle latitudes, *Proc. of EGS2000, Nice (France)*, April 2000.
- Belehaki A., G. Moraitis and Tsagouri I., Determination of the ionospheric F2 layer disturbance and quietness, *Proc. of EGS2000, Nice (France)*, April 2000.
- Belehaki, A., D. Lalas and G. Moraitis, Operation of a new fully automated digisonde by the National Observatory of Athens, *Space Storms and Space Weather Hazards, NATO Advanced Study Institute, Crete*, 2000.
- Belehaki A. and I. Tsagouri, Study of the thermospheric-ionospheric response to intense geomagnetic storms at middle latitudes, *Physics and Chemistry of the Earth (C)*, Vol. 26, 5, 309-313, 2001.
- Belehaki A. and I. Tsagouri, The normal state of the F2 ionospheric layer at high latitudes, *Physics and Chemistry of the Earth (C)*, Vol. 26, 5, 353-357, 2001.
- Reinisch, B.W., Huang, X., Belehaki, A., Jodogne, J., Bottom and Topside Ionospheric TEC Obtained from Ground-Based Ionosonde Measurements, *Beacon Satellite Symposium Proceedings*, 2001.
- Belehaki, A., Lj Cander, B. Zolesi, J. Bremer, C. Juren, M. Hatzopoulos, I. Ioannidis and D. Dialetis, The DIAS: Digital Upper Atmosphere Server, ESA

Space Weather Workshop: Space Weather Applications Pilot Project, Proceedings, 16-18 December 2002, ESTEC, Noordwijk, The Netherlands.

- Cander, L., A. Belehaki and I. Tsagouri, Real-Time dynamic ionospheric modeling, ESA Space Weather Workshop: Space Weather Applications Pilot Project, Proceedings, 16-18 December 2002, ESTEC, Noordwijk, The Netherlands.
- Belehaki A., and I. Tsagouri, Investigation of the relative bottomside/topside contribution to the Total Electron Content estimates, *Annals of Geophysics*, Vol. 45, 1, 2002.
- Tsagouri I., and A. Belehaki, On the nature of night-time ionization enhancements observed with the Athens Digisonde, *Annales Geophysicae*, 20, 1225-1238, 2002.
- Belehaki, A., and N. Jakowski, Studies of the ionospheric ionization over Athens using ground ionosonde and GPS derived TEC values, *Acta Geod. Geoph. Hung.*, 37(2-3), 163-170, 2002.
- Belehaki, A., and N. Jakowski, Comparison of ionospheric ionization measurements over Athens using ground ionosonde and GPS derived TEC values, *URSI, XXVIIIth General Assembly, CD-proceedings, session GH-2 (paper GH-2.0.2)*, Maastricht, 17-24 August 2002.
- Belehaki A., and I. Tsagouri, On the occurrence of storm induced nighttime ionization enhancements at ionospheric middle latitudes, *J. Geophys. Res.*, 107, 8, 22, 2002.
- Tsagouri I. and A. Belehaki, Nighttime ionisation enhancements observed with the Athens Digisonde, *URSI, XXVIIIth General Assembly, CD-proceedings, Maastricht, The Netherlands, August 2002.*
- Belehaki, A., and N. Jakowski, The plasmaspheric electron content variation at low L-shells extracted from GPS and ground ionosonde TEC estimates, *Proc. of COST271, Products for ITU-R and other Radiocommunication Applications (CD edition)*, Faro, Portugal, October 2002.
- Zolesi B., A. Belehaki, I. Tsagouri, Lj. R. Cander, Real-time SIRM (simplified ionospheric regional model) updating, *Proc. of COST271, Products for ITU-R and other Radiocommunication Applications (CD edition)*, Faro, Portugal, October 2002.
- Cander Lj. R., B. Ramesh, A. Belehaki, I. Tsagouri, Real-time dynamic ionospheric storm modeling, *Proc. of COST271, Products for ITU-R and other Radiocommunication Applications (CD edition)*, Faro, Portugal, October 2002.

5. PHYSICAL SCIENCES OF THE OCEAN

5.1 HELLENIC NAVY HYDROGRAPHIC SERVICE

I. Hydrographic Topographic Surveys

For the period 1999-2002 an extensive programme of hydrographic surveys was conducted by Hellenic Navy Hydrographic Service. The three hydrographic vessels were employed for 1637 working days in site around Hellenic seas while the topographic teams were employed for 692 working days. The purpose of all the hydrographic topographic projects, was the publishing of fair sheets at different scales, due to the necessity of publishing new charts as well as to cover the operational needs of Hellenic Navy General Staff, the support of Ministry of Merchant Marine and the support of Olympic Games of ATHENS. In detail the hydrographic and topographic teams conducted 228 missions (101 for hydrography) in Aegean and Ionian Sea and especially in 38 port areas, at scales 1 : 500-1 : 1.000, 34 coastal areas, at scales 1 : 2.000-1 : 5.000 29 off shore areas at scales 1 : 5.000-1 : 25.000 and 127 topographic surveys at scales 1 : 200÷1 : 2.000. The main hydrographic activities are shown on the attached chart.

Also HNHS participated in the following projects:

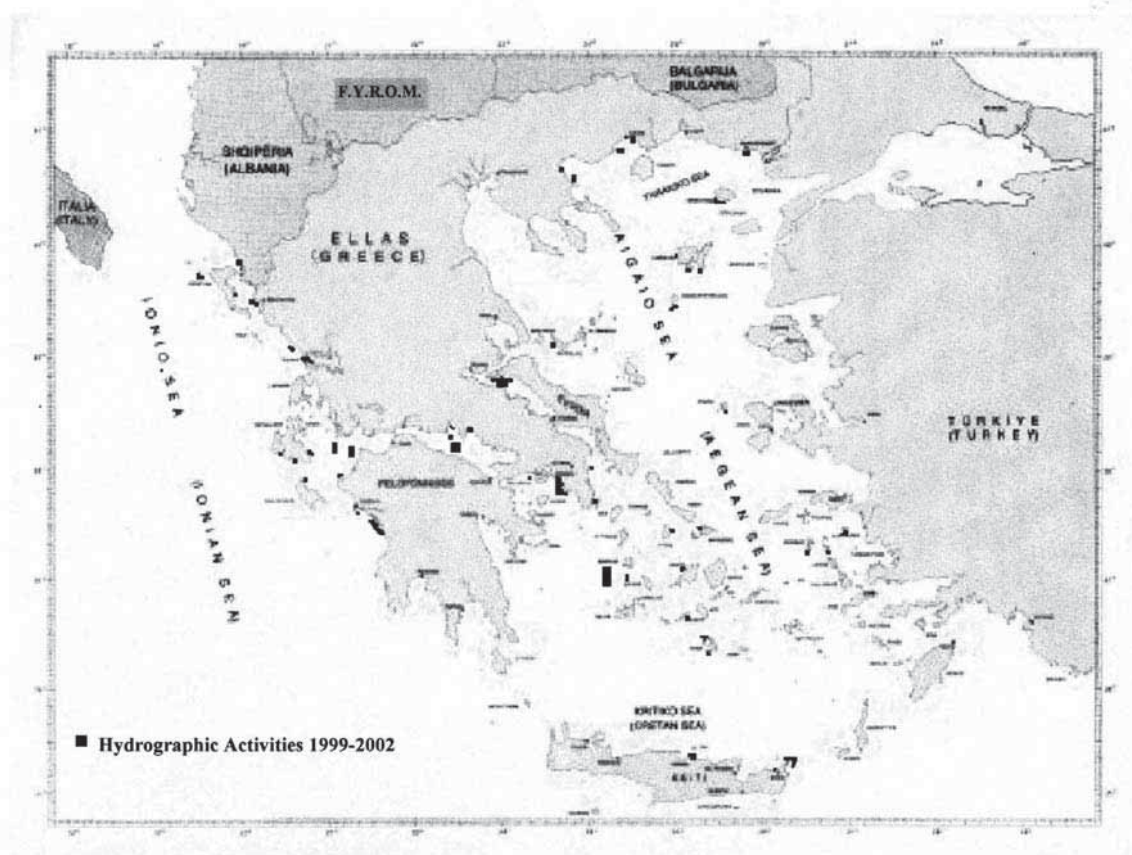
- GAVDOS Project
- ESEAS Project

II. Physical Oceanography

During the period 1999-2002 the activities in Physical Oceanography were concentrated on the areas of understanding the physical phenomena in Hellenic Seas. The collection, analysis and study of various kinds oceanographic data like temperature, salinity, oxygen, current etc form the basics of our data bases.

Specially 15 oceanographic cruises were carried out covering areas of Navy's interest in order to provide environment support for naval operations.

There is also in operation a permanent network of stations for a systematic measurement of Sea-surface temperature and Sea-state.



Hellenic Navy Hydrographic Service Activities 1999-2002

III. Sea Level Measurements

For the measurement of Sea level variations, Hellenic Navy Hydrographic Service has established a permanent network of 19 Tide Gauges. Data and statistical results are published as technical reports providing the basis for scientific presentations and studies.

IV. Geological Oceanography

Selected areas of the Aegean and Ionian Seas were examined by bottom sampling and coring, while the bottom structure has been examined using Side Scan Sonar and Sub Bottom Profilers.

5.2 NATIONAL TECHNICAL UNIVERSITY OF ATHENS (NTUA)

Publications

- **Impacts of the Accelerated Sea Level Rise on Greek Protective Regions** (E. Doukakis), 3rd International Forum on Integrated Water Management: The Key to Sustainable Water Resources, Athens, March 21-22, 2002.
- **The Greenhouse effect on the Greek airports** (E. Doukakis), 6th International Conference on Protection and Restoration of the Environment, July 1-5, 2002, Skiathos, Greece.
- **Impacts of the Accelerated sea level rise on three selected Greek Lagoons** (E. Doukakis), 5th International Conference: Water Resources Management in the Era of Transition, European Water Resource Association, Athens, 4-8 September 2002.
- **The impact of islets and rocks on Greek territorial waters** (E. Doukakis), International Symposium on “Oceanographic Aspects for a sustainable Mediterranean” Athens, 27-29/9/2002
- **Coastal Vulnerability of the Island of Kos** (E. Doukakis), International Symposium on “Oceanographic Aspects for a sustainable Mediterranean” Athens, 27-29/9/2002

Publications in Greek

- **Κυριαρχικά Δικαιώματα Διαχείρισης και Εκμετάλλευσης Θαλάσσιων ζωνών στην Κρήτη** (E. Δουκάκης), 10^ο Πανελλήνιο Συνέδριο Ιχθυολόγων για την Διαχείριση και Αειφορική Ανάπτυξη Υδάτινων και Παρυδάτιων Περιοχών, Χανιά, 18-20 Οκτωβρίου 2001.
- **Η Επίδραση του Φαινομένου του Θερμοκηπίου σε Περιβαλλοντικά Ευαίσθητες Παραλιακές Περιοχές** (E. Δουκάκης, Π. Αντωνίου), 10^ο Πανελλήνιο Συνέδριο Ιχθυολόγων για την Διαχείριση και Αειφορική Ανάπτυξη Υδάτινων και Παρυδάτιων Περιοχών, Χανιά, 18-20 Οκτωβρίου 2001.
- **Ένα Ολοκληρωμένο Σύστημα Παρακολούθησης και Διαχείρισης της Θαλάσσιας Κυκλοφορίας** (E. Δουκάκης), 10^ο Πανελλήνιο Συνέδριο Ιχθυολόγων για την Διαχείριση και Αειφορική Ανάπτυξη Υδάτινων και Παρυδάτιων Περιοχών, Χανιά, 18-20 Οκτωβρίου 2001.
- **Ακουστικά Δίκτυα και Ναυσιπλοικοί Κίνδυνοι στο Αιγαίο, Πανελλήνιο Συνέδριο** (E. Δουκάκης), «Acoustics 2002», Πάτρα 30/9-1/10/2002.
- **Εκτίμηση Παράκτιων Διαβρώσεων με συνδυασμό Στατικού και Δυναμικού Μοντέλου** (E. Δουκάκης), Β΄ Πανελλήνιο Συνέδριο για τη Διαχείριση και Προστασία των ακτών, Αθήνα, 25-28/11/2002.

- **Επίδραση του φαινομένου του Θερμοκηπίου στον Αιγιαλό και Παραλία (Ε. Δουκάκης), Β' Πανελλήνιο Συνέδριο για τη Διαχείριση και Προστασία των ακτών, Αθήνα, 25-28/11/2002.**

6. SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR

6.1 NATIONAL OBSERVATORY OF ATHENS - INSTITUTE OF GEODYNAMICS

1. Introduction

The Institute of Geodynamics (I.G) is one of the four Institutes comprising the National Observatory of Athens (N.O.A.), which is a National Research Center supervised by the General Secretariat of Research and Technology, Ministry of Development. I.G is one of the oldest Institutes in Greece operating continuously since 1893. In 1897 the first seismograph was installed in Athens and in 1899 the first seismic network started to operate. Since then, systematic and detailed seismic observations started for the region extending from 34°N to 42°N and 19°E to 30°E. The location of the Head Office of I.G is on the hill of Nymphs, opposite to Acropolis, at the center of Athens.

The mission of the G.I is the study and the promotion of research in the fields of: Seismology, Physics of the Earth's Interior, Geophysics, Volcanology and Geothermy, and Neotectonics. The main tasks of I.G are collection and processing of various seismological - geophysical parameters, the elaboration of research projects and relevant studies, and the training and services provided to third bodies. The G.I operates around the clock, 365 days a year. For the service and the maintenance of the various instruments, the I.G employs experienced technical staff.

The infrastructure and daily operations of the Institute are the following.

a. The I.G operates the National Seismic Network (Figure 1), consisting of twenty five (25) telemetric, digital seismic stations (6 of these stations are permanently staffed). These use leased telephone lines. All stations are equipped with broadband, 3D component seismometers. Two stations are linked with international networks (Athens is a WWSSN station and Anogeia of Crete a MEDNET station – code name IDI). IDI serves as an auxiliary station for CTBTO. The Athens station is equipped with a prototype, Wood-Anderson seismometer for the calculation of local earthquake magnitude. Since 1999, 7 radio-telemetric stations from E.P.P.O (Earthquake Planning and Protection Organisation) seismic network are linked to the base station at I.G. The National seismic network monitors regional and local seismicity with magnitude threshold smaller than 3 M_L . Teleseismic events are also recorded.

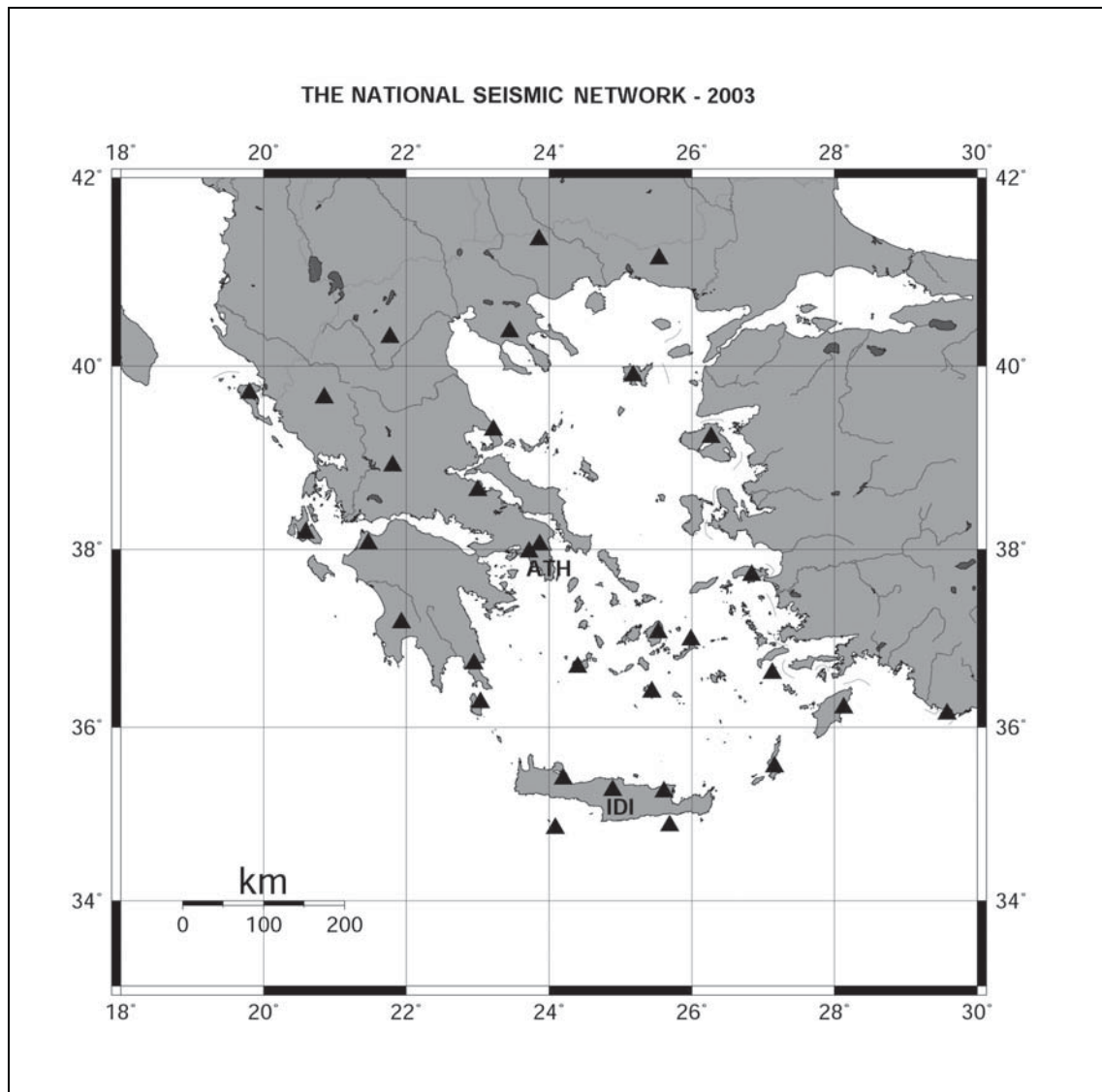


Figure 1. *The National Seismic Network. Solid triangles denote locations of the seismological stations of the Institute of Geodynamics. ATH indicates location of I.G and IDI the MEDNET station.*

Since 2001, I.G contributes data from four (4) stations to the European Network (ODC) at ORFEUS, under the project MEREDIAN. These stations operate in real-time and are connected to main server in Holland via Internet. Further collaboration with GEOFON and MEDNET has established an Internet-based network for the Eastern Mediterranean comprising all very broadband stations with I.G serving as a node.

Data collected from all stations, corresponding to earthquakes occurring in the territory of Greece and the bordering areas, are analysed routinely in detail. In-house software is used for processing the digital records. The results are listed in the monthly seismological bulletins of the Institute. These bulletins are distributed regularly all over the world, to several Seismological Centres and Universities, as well as to different National Centres, Universities, Organizations and Libraries.

b. Attention is also paid to record microseismicity, which gives useful information about the local seismicity within a short period of time. From this point of view I.G possesses a mobile network of seven radio link seismic stations. Furthermore there are ten units of portable seismographs. All the above set of mobile and portable seismographs largely help to better monitor the aftershock activity, for regional seismotectonic studies etc.

c. The I.G operates a permanent strong motion network consisting of 32 analog and 11 digital accelerographs (Figure 2). These instruments are installed at major cities of Greece. Moreover, 13 digital accelerographs are used for monitoring aftershock activity or in the frame of research projects. The records of accelerographs are the input information for earthquake resistant design. I.G has developed a strong motion record database covering the period 1973 - 1996.

The data collected by the networks of I.G are registered into archives. For this purpose the appropriate computer facilities as well as sophisticated software are available. All Greek earthquakes recorded by NOA are available at www.gein.noa.gr. Monthly seismicity maps are also available. A seismicity alert web page also exists with seismic phases, epicentre and magnitude information.

Preliminary readings and final products are sent to the neighboring countries and to International Centers on a weekly basis. Moreover, raw data (seismograms) are supplied to several Observatories and Institutes abroad. Many other miscellaneous seismological information is provided mostly for engineering purposes, to insurance companies, as well as to the public.

The contribution of I.G. to the education is considerable. A large number of undergraduate, postgraduate and PhD theses have or are being carried out at the Institute.

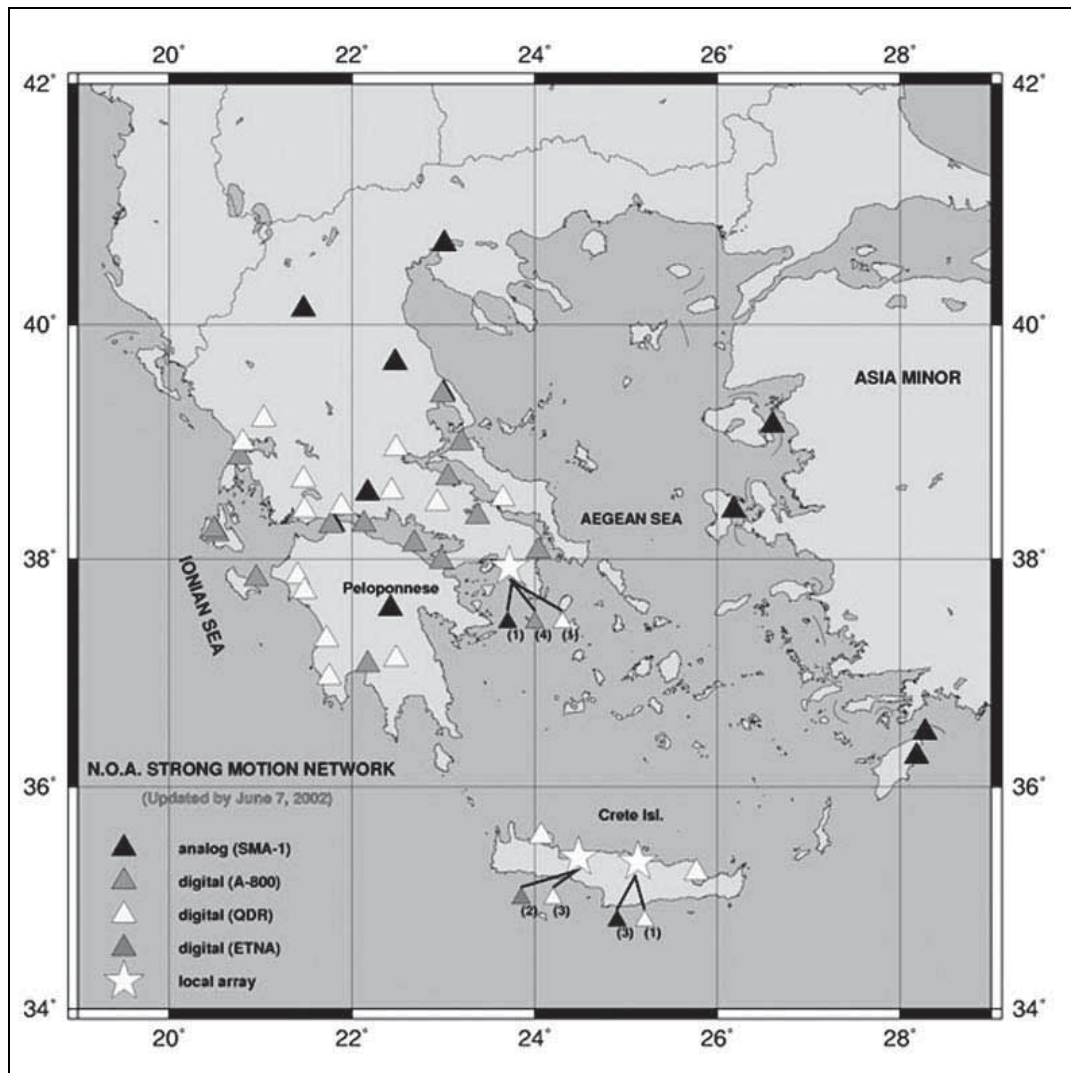


Figure 2. The configuration of the strong motion network of the Institute of Geodynamics. Locations of accelerographs are denoted by triangles.

2. Research

The research activities of the Institute of Geodynamics during the period 1999-2002 cover a broad spectrum of Seismology, Physics of the Earth's Interior and Geophysics. Results published so far, appear in the next sections. In particular, the I.G scientists were active in the following fields:

Seismicity

- Preshock, mainshock, aftershock sequences
- Seismotectonics of various regions
- Microseismic activities along selected seismic zones
- Seismic potential of active faults
- Seismic quiescence of regions of Greece and surrounding areas
- Induced seismic activity

Interaction of active faults
Recognition of characteristics of seismic activity
Focal mechanisms of earthquakes - Properties of the seismic source
Spectral characteristics of preshocks, mainshocks and aftershocks
Rupture mode of strong earthquakes
Dynamic parameters of ruptures

Propagation of seismic waves - Strong Ground Motion

Attenuation of strong ground motion
Directivity of propagation of seismic energy
Synthetic strong ground motions (stochastic procedures)
Synthetic strong ground motions using Green functions
Seismic hazard - Microzonation studies
Improvement of algorithms for calculation of expected seismic accelerations, velocities and displacements
Improvement of algorithms for calculation of statistical parameters
Improvement of microzonation methods

Structure

Structure of Earth's crust and mantle
Seismic wave attenuation
Distribution of seismic velocities
Seismic tomography and determination of seismic parameters

Earthquake prediction

Seismic quiescence of regions of Greece and surrounding areas
Recognition of characteristics of seismic activity
Magnetotelluric methods

Multidisciplinary, parametric investigation of geophysical-seismological parameters

Recognition of characteristic patterns of seismicity
Geophysical methods
Statistical methods
Algorithms of amalgamation of the different characteristics of seismic activity
Seismotectonics - Paleoseismology
Correlation of microseismic activity with active faults
Historical seismicity and association with known faults

Seismic Sea Waves (Tsunamis)

Catalogue compilation
Generation mechanisms and propagation
Wave simulation
Palaeotsunami investigation

Hazard assessment and applications
Awareness and Education

Geological Remote Sensing

Remote sensing of active faults
Remote sensing of landslides
Fault segmentation - Neotectonics
Thermal remote sensing of volcanic arcs and known faults
Hyperspectral remote sensing of hydrothermal mineralisations
Digital Geomorphometry
SAR Interferometry

Applied Geophysics

Reflection and Refraction Seismics
Seismic tomography
Geoelectrical imaging
Ground Penetrating Radar
Magnetic and Gravity methods
Electromagnetic methods
Archaeological surveys

3. International Research Programs

The G.I participated as Coordinator or Contractor to the following international projects:

1. " Earthquake Seismological Information"(EPSI)
2. "Geo-spatial warning systems Nissyros volcano (Greece). An emergency case study" (GEOWARN)
3. "Developing existing earthquake data infrastructures towards a Mediterranean European rapid earthquake data information and archiving network" (MEREDIAN)
4. "Towards Practical, Real-Time Estimation of Spatial Aftershock Probabilities: a Feasibility Study in Earthquake Hazard" (PRESAP)
5. «Landslide Early Warning Integrated System»
6. "Geological Identification of Historical Tsunamis: Application in the Corinth Gulf, Greece»
7. "3F KORINTH"
8. "SEISCANEX"
9. "Making Seismic Reflection Profiles Available to the Wide Scientific Community" (SEISCAN)
10. "Overall GPS Strain Determination and Assessment of Seismic Hazard in Greece" (GPS-HAZARD)
11. "Faults as a Tool of Seismological Studies" (FAUST)

12. "Assessment of Seismic Potential in European Large Earthquake Areas" (ASPELEA)
13. "Utilisation of Groundwater Desalination & Wastewater Reuse in the Water Supply of Seasonally-Stressed Regions" (WASSER)
14. "Telematics Assisted Handling of Flood Emergencies in Urban Areas" (TELEFLEUR)
15. Upgrade of the Seismological station of Anogeia, Crete.
16. Saving and Studying the Seismograms of the Strongest Euro-Mediterranean Earthquakes (EUROSEISMOS). For more information:
http://80.117.141.2/Es_web/

4. National Research Programs

The G.I participated as Coordinator or Contractor to the following national projects:

1. «Μικροσεισμική Μελέτη και Δομή του Σαρωνικού Κόλπου»
2. «Μελέτη Σεισμικής Ησυχίας στην ευρύτερη περιοχή Κεφαλληνίας»
3. «Συλλογή, επεξεργασία και ανάλυση σεισμολογικών δεδομένων του Ελληνικού χώρου»
4. " Δημιουργία Σεισμικού Άτλαντα της Ελλάδος"
5. "Ανατόλια ΙΙ"
6. " Σεισμολογικό Δίκτυο Δ.Ε.Η. "
7. "Μελέτη Σεισμικότητας στις περιοχές των μεγάλων υδροηλεκτρικών έργων ΔΕΗ"
8. "Μαγνητοτελλουρικές μετρήσεις του ρήγματος της Αταλάντης "
9. "Επεξεργασία επιταχυνσιογραμμάτων Γεωδυναμικού Ινστιτούτου και δημιουργία βάσης δεδομένων»
10. "Συλλογή και επεξεργασία σεισμικών δεδομένων και εκπόνηση νέου χάρτη σεισμικής επικινδυνότητας της Ελλάδας συμβατού με τον ισχύοντα Ελληνικό Αντισεισμικό Κανονισμό και τον Ευρωκώδικα 8»
11. "Προσδιορισμός των περιοχών του Ελλαδικού Χώρου με αυξημένη πιθανότητα ισχυρού σεισμικού συμβάντος την επόμενη πενταετία (2000-2005)"
12. "Αξιοποίηση υπάρχοντος ενόργανου εξοπλισμού για την ανάπτυξη πολυδύναμου δικτύου σεισμογραφικής παρακολούθησης του ευρύτερου χώρου του Νοτίου Αιγαίου"
13. ΓΑΙΑ: Πρόγραμμα στα πλαίσια της δράσης: E23 – «ΠΗΝΕΛΟΠΗ με σκοπό τη δημιουργία Μητρώου Εκπαιδευτικού Λογισμικού (2000)»
14. «Caucasian Seismic Information Network for Hazard Assessment»
15. "Αναβάθμιση του σεισμολογικού σταθμού Ανωγείων, Κρήτης"
16. "Numerical modeling of the crustal deformation associated with the Athens earthquake of 7 September 1999" (Japanese Society for the Promotion of Science)
17. «Συντήρηση και λειτουργία του τηλεμετρικού δικτύου σεισμογράφων του ΟΑΣΠ»
18. «Ο κίνδυνος από σεισμικά παλιρροϊκά κύματα (τσουνάμι) στην ακτογραμμή της πόλεως της Ρόδου και πρακτικά μέτρα για την αντιμετώπισή του»

19. "Γεωφυσική Έρευνα στο Αιγαίο" (ΓΕΑ)
20. "Συγχρηματοδότηση διδακτορικής διατριβής με θέμα Γεωφυσική Έρευνα στο Αιγαίο"
21. "Διερεύνηση των τεκτονικών στοιχείων της σεισμικής επικινδυνότητας Β. Αιγαίου με τη χρήση πυκνού δικτύου χερσαίων και υποθαλάσσιων σειсмоγράφων"
22. «Διερεύνηση της κατάστασης και της θεμελίωσης του φράγματος του Μαραθώνα"
23. "Deep Geodynamic Laboratory- Gulf of Corinth" DGLab-Corinth"
24. "Εργαστήριο Βάθους Γεωδυναμικής Κορινθιακού Κόλπου – Δίκτυο Ελληνικών Εργαστηρίων" (ΠΛΟΥΤΩΝ)
25. "Modeling of tsunami excitation by complex earthquake and sediment slumping mechanisms: the case of the 1956 large wave in the South Aegean Sea, Greece"
26. "Deep Seismic Imaging of Active Continental Extension in the Gulf of Corinth"
27. "Geological Identification of Historical Tsunamis: Application in the Corinth Gulf, Greece" (EU/12th DG/ Marie Curie Fellowships)
28. "Coastal Tsunami Hazard Assessment and Disaster Management in Greece" (Coventry University, UK)
29. "Παροχή Συμβουλευτικών Οδηγιών σε Περίπτωση Ισχυρών Σεισμικών Κινήσεων"
30. "Σεισμολογικές Μελέτες για το ΜΕΤΡΟ Αθήνας"
31. "Σεισμική Παρακολούθηση της Περιοχής Κοζάνης - Γρεβενών"
32. "Σεισμική Παρακολούθηση Περιοχών Κρήτης, Θεσσαλίας, Κ. Ελλάδας"
33. "Μελέτη των Ενεργών Ρηγμάτων της Α. Θεσσαλίας"
34. «Μελέτη σεισμοτεκτονική - σεισμικότητα και σεισμική επικινδυνότητα αγωγού μεταφοράς πετρελαίου Θεσ/νίκη- Σκοπίων».

5. Joint Research Programs with other countries

The G.I participated as Partner to the following international, bi-lateral projects:

1. «Αίτια και Μηχανισμός της σεισμικής ησυχίας» (ΕΛΛΑΔΑ – ΚΙΝΑ)
2. «Διερεύνηση σεισμικών παραμέτρων στην περιοχή του Κορινθιακού Κόλπου» (ΕΛΛΑΔΑ – ΠΟΛΩΝΙΑ)
3. «Dynamic maps of potential earthquakes for Greece and Caucasus based on recent physical models, methods and algorithms» (ΕΛΛΑΔΑ – ΡΩΣΙΑ)
4. «Seismic hazard assessment in south Balkans area» (ΕΛΛΑΔΑ – ΒΟΥΛΓΑΡΙΑ)
5. «Ελληνο - Ιταλική Διακρατική Συνεργασία: Crustal strain measurements in Thessaly, central Greece by use of satellite geodesy (GPS), differential Interferometry and Morphotectonics., 2002-2004» (ΕΛΛΑΔΑ – ΙΤΑΛΙΑ)
6. «Εντοπισμός Κοιτασμάτων Επιθερμικού Χρυσού δια της Χαρτογραφίσεως ζωνών Υδροθερμικής Εξαλλοιώσεως με χρήση Δορυφορικών Δεδομένων από τον Σαρωτή ASTER» (ΕΛΛΑΔΑ – ΜΕΓ. ΒΡΕΤΑΝΙΑ)

7. "Συλλογή, επεξεργασία και ανταλλαγή σεισμολογικών δεδομένων» (ΕΛΛΑΔΑ – ΚΥΠΡΟΣ)
8. "Αξιοπιστία των Διαφορετικών Μεθόδων Υπολογισμού Συνθετικών Καταγραφών της Ισχυρής Σεισμικής Δόνησης στον Ελληνικό Χώρο" (ΕΛΛΑΔΑ - ΓΕΩΡΓΙΑ)
9. Εφαρμογή και Αξιοπιστία Διαφόρων Μοντέλων Σεισμικής Επικινδυνότητας - Χρήση και Εμπλουτισμός Βάσης Δεδομένων Ισχυρών Εδαφικών Κινήσεων" (ΕΛΛΑΔΑ - ΤΣΕΧΙΑ)
10. "Σεισμοτεκτονική Μελέτη του Ηφαιστείου της Σαντορίνης χρησιμοποιώντας Πρωτοποριακές Μεθόδους Υποθαλάσσιας Έρευνας" (ΕΛΛΑΔΑ - ΙΣΠΑΝΙΑ)
11. "Προσδιορισμός του Παράγοντα Εξασθένησης στον Ελληνικό χώρο με τη Χρήση Σεισμικών Κυμάτων Ουράς. Μελέτη της Χωρικής και Χρονικής Μεταβολής του Παράγοντα Εξασθένησης και η Συμβολή της Διασποράς και της Απόσβεσης στην Εκτίμησή του" (ΕΛΛΑΔΑ - ΙΣΠΑΝΙΑ)
12. "Ανάπτυξη Εργαλείου GIS για την Πρόγνωση του Κινδύνου από Τσουνάμι σε Παράκτιες Περιοχές - Εφαρμογή στην Περιοχή Ηρακλείου Κρήτης" (ΕΛΛΑΔΑ - ΙΣΠΑΝΙΑ)
13. "Αξιοπιστία των Διαφορετικών Μεθόδων Υπολογισμού Συνθετικών Καταγραφών της Ισχυρής Σεισμικής Δόνησης στον Ελληνικό Χώρο" (ΕΛΛΑΔΑ - ΓΕΩΡΓΙΑ)

6. Publications

6.1 Papers in International Journals

1. Baskoutas, I., Kalogeras, I.S., Kourouzidis, M. and Panopoulou G. A modern technique for the retrieval and processing of historical seismograms in Greece. *Natural Hazards*, pgs. 55-64, vol. 21, 2000.
2. Baskoutas I, Panopoulou, G., and Th. Rontoyanni. Seismic attenuation in two geological distinct regions of central Greece. *Bolletino Geof. Theor. Applicata*, pgs. 233-242, vol. 41 (3), 2000.
3. Baumont, D., Courboux, F., Scotti, O., Melis, N.S. and Stavrakakis, G.N. Slip distribution of the Mw 5.9, 1999 Athens earthquake inverted from regional seismological data. *Geophysical Research Letters*, vol. 29(15), (10.1029/2001GL014261), 2002.
4. Benedetti L., Finkel R., Papanastassiou D., King G., Armijo R., Ryerson F., Farber D. and F. Flerit. Post-glacial slip history of the Sparta fault (Greece) determined by ³⁶Cl cosmogenic dating: Evidence for non-periodic earthquakes. *Geophysical Research Letters*, vol. 29, 2002.
5. Benetatos, Ch., Roumelioti, Z., Kiratzi, A. and Melis, N. Source parameters of the M 6.5 Skyros island (North Aegean Sea) earthquake of July 26, 2001. *Annali di Geofisica*, pgs. 513-526, vol. 45, 2002.
6. Bouckovalas, G.D., Kouretzis, G., Kalogeras, I. Site-specific analysis of strong motion data from the September 7, 1999 Athens Greece earthquake. *Natural Hazards*, pgs. 105-131, vol. 27, 2002.

7. Chouliaras, G. and Stavrakakis, G. Current seismic quiescence in Greece; Implications for earthquake prediction research. *Journal of Seismology*, pgs. 595-608, vol. 5, 2001.
8. Clement, Ch., Hirn A., Charvis P., Sachpazi M., and Marnelis F. Seismic structure and the active Hellenic subduction in the Ionian islands. *Tectonophysics*, pgs.141-156, vol. 329, 2000.
9. Cundy A. B., S. Kortekaas, T. Dewez, I. S. Stewart, I. W. Croudace, H. Maroukian, D. Papanastasiou, P. Gaki-Papanastasiou, K. Pavlopoulos, A. Dawson. Coastal wetlands as recorders of earthquake subsidence in the Aegean. A case study of the 1894 Gulf of Atalanti earthquakes, central Greece. *Marine Geology*, pgs.3-26, vol. 170, 2000.
10. Delibasis, N., Ziazia, M., Voulgaris, N., Papadopoulos, T., Stavrakakis, G., Papanastassiou, D. and G. Drakatos. Microseismic Activity and Seismotectonics of Heraklion Area (central Crete Island, Greece). *Tectonophysics*, pgs. 237-248, vol. 308, 1999.
11. Dimitriu, P., Kalogeras, I. and Theodulidis. N. Evidence of nonlinear site response in HVSR from near field earthquakes. *Soil Dynamics and Earthquake Engineering*, pgs. 423-436, vol. 18 (6), 1999.
12. Dominey-Howes, D.T.M., Papadopoulos, G.A., & Dawson, A.G. Geological and historical investigation of the 1650 Mt. Columbo (Thera Island) eruption and tsunami, Aegean Sea, Greece. *Natural Hazards*, pgs. 83-96, vol. 21, 2000.
13. Drakatos G., Melis N., Papanastassiou D., Karastathis V., Papadopoulos G. and G. Stavrakakis. 3-D crustal velocity structure from inversion of local earthquake data in Attiki (Central Greece) region. *Natural Hazards*, pgs. 1-14, vol. 27, 2002.
14. Drakatos, G. and J. Latoussakis. A catalog of Aftershock Sequences in Greece (1971-1997)-Their Spatial and Temporal Characteristics. *Journal of Seismology*, pgs. 137-145, vol. 5, 2001.
15. Drakatos, G. Relative seismic quiescence before large aftershocks. *PAGEOPH*, pgs. 1407 – 1421, vol. 157, 2000.
16. Galanis, O.Ch., T. M. Tsapanos, G.A. Papadopoulos, and A.A. Kiratzi. Bayesian extreme values distribution for seismicity parameters assessment in South America , *Balkan Geophys. J.* , pgs. 77-86, vol. 5, 2002.
17. Gallart J., Driad L., Charvis Ph., Sapin M., Hirn A., Diaz J., de Voogd, B., and Sachpazi M. Perturbation to the lithosphere along the hotspot track of La Reunion, from an offshore-onshore seismic transect. *J. Geophys. Res.*, pgs. 2895-2908, 1999.
18. Ganas, A., Lagios, E., and Tzanettos, N. An investigation on the spatial accuracy of the IKONOS 2 orthoimagery within an urban environment. *International Journal of Remote Sensing*, pgs. 3513-3519, vol. 23 (17), 2002.
19. Ganas, A., G.A. Papadopoulos and S.B. Pavlides. The 7 September 1999 Athens 5.9Ms earthquake: remote sensing and digital elevation model inputs towards identifying the seismic fault . *Int. J. Remote Sensing*, pgs. 191-196, vol. 22, 2001.
20. Ganas, A., and Papoulia, I. High-resolution Digital Mapping of the Seismic Hazard within the Gulf of Evia rift, Eastern Central Greece using normal fault segments as line sources. *Natural Hazards*, pgs. 203-223, vol. 22, 2000.

21. Ganas, A., and Athanassiou, E., 2000. A comparative study on the production of satellite orthoimagery for geological remote sensing. *GeoCarto International*, pgs. 51-59, vol. 15 (2), 2000.
22. Jones, R.E., B.S.J. Isserlin, V. Karastathis, S. P. Papamarinopoulos, Syrides G.E, Uren J., Balatsas I., Kapopoulos Ch., Maniatis Y and G Facorellis (2000). Exploration of the Canal of Xerxes, Northern Greece: the Role of geophysical and other techniques. *Archaeological Prospection*, pgs. 147-170, vol. 7, 2000.
23. Kalogeras, I.S. A strong motion database in Greece. *Natural Hazards*, pgs. 265-277, vol. 26, 2002.
24. Kalogeras, I.S, Stavrakakis, G.N. and Solomi, K. The October 9th, 1996 earthquake in Cyprus: Seismological, macroseismic and strong motion data. *Annali di Geofisica*, pgs. 85-98, vol. 42 (1), 1999.
25. Karastathis, V.K., Karmis, P.N., Drakatos, G. and G. Stavrakakis. Geophysical methods contributing to the testing of concrete dams. Application of the Marathon Dam. *J. Appl. Geophysics*, pgs 247 – 260, vol. 50, 2002.
26. Karastathis, V.K., Karmis, P.N., Drakatos, G. and G. Stavrakakis. Assessment of the dynamic properties of highly saturated concrete using one-sided Acoustic Tomography. Application in the Marathon Dam. *Construction and Building Materials*, pgs 261 – 269, vol. 16, 2002.
27. Karastathis, V.K., Papamarinopoulos S, Jones RE. 2-D Velocity structure of the buried ancient canal of Xerxes: an application of seismic methods in archaeology. *Journal of Applied Geophysics*, pgs. 29-43, vol. 47/1, 2001.
28. Karastathis, V. K., Louis J. F., Arvanitis M., and Karmis P. Application of inverse ray-tracing seismic modeling techniques in the Ikaria Airport site. *Journal of the Balkan Geophysical Society*, pgs. 107-114, vol. 5(4), 2002.
29. Kontoes, C, Briole P., Sachpazi M., Veis G., Elias P., Sykioti, O., Remy D., & Kotsis I., 2000. Displacement field and fault model for the September 7, 1999 Athens earthquake inferred from ERS2 satellite radar Interferometry. *Geophys. Res. Letters*, p. 3989, vol. 27, No. 24, 2000.
30. Kornichev Y. F., Baskoutas I., and I. N. Sokolova. Pairs of large earthquakes and geodynamic processes in region of central South Asia. *Volcanology and Seismology*, pgs.49-58, vol. 5, 2002.
31. Laigle, M., Hirn A., Sachpazi M., & Clément, C. Seismic coupling and structure of the Hellenic subduction zone in the Ionian Islands region. *Earth and Planetary Sciences Letters*, pgs. 243-253, vol. 200, 2002.
32. Laigle M., Hirn A., Sachpazi M., and Roussos N. North Aegean crustal deformation: an active fault imaged to 10 km depth by reflection seismics. *Geology*, pgs 71-74, vol. 28 (1), 2000.
33. Lekidis, V.A., Karakostas, C.Z., Dimitriu, P.P., Margaris, B.N., Kalogeras, I.S. and Theodulidis, N. The Aigio (Greece) seismic sequence of June 1995: Seismological, strong motion data and effects of the earthquakes on structures. *Journal Earthquake Engineering*, pgs. 349-380, vol. 3(3), 1999.
34. Louis J, Karastathis V., Vafidis A. and Louis F. Resistivity Modeling and Imaging Methods for Mapping Near-Surface Features: Application to a Site Characterization at the Ancient Temple of Olympian Zeus in Athens. *Journal of the Balkan Geophysical Society*, pgs. 135-144, vol. 5(4), 2002.
35. Makaris, D. I., Theodulidis, N. P. and Stavrakakis G. N. Estimation of Strong Ground Motion Due to Hypothetical Fault Ruptures and Comparison with

- Recorded Values: The Zakynthos, Western Greece Earthquake of 18 November 1997. *Natural Hazards*, pgs. 297-315, vol. 21, 2000.
36. Maroukian H., Gaki-Papanastassiou K., Papanastassiou D. and N. Palyvos. Geomorphological Observations in the Coastal Zone of Kyllini Peninsula, NW Peloponnesus-Greece, and their Relation to the Seismotectonic Regime of the Area. *Journal of Coastal Research*, pgs. 853-863, vol. 16/3, 2000.
 37. Maroukian, H., Papanastassiou, D. & K. Gaki-Papanastassiou. Palaeogeographic Evolution and Seismotectonic Implications of the Broader Area of Eurotas River (Greece) during the Quaternary. "*Zeitschrift für Geomorphology*", *Suppl.-Bd.*, pgs.135-146, vol. 118, 1999.
 38. Matsumoto, H., Papadopoulos, G.A., & Ganas, A. Re-examination of the unexpected earthquake of 7 September 1999 in Athens, Greece. *Research Reports on Earthquake Engineering No 82*, Tokyo Institute of Technology, pgs. 1-17, 2002.
 39. Minoura, K., Imamura, F., Kuran, U., Nakamura, T., Papadopoulos, G.A., Takahashi, T., Yalciner, A.C. Discovery of Minoan tsunami deposits. *Geology*, pgs. 59-62, vol. 28(1), 2000.
 40. Pantosti, D., De Martini P., Papanastassiou D., Palyvos N., Lemeille F. and G. Stavrakakis. A reappraisal of the 1894 Atalanti earthquake ruptures, Central Greece. *Bull. Seism. Soc. America*, pgs. 760-780, vol. 91/4, 2001.
 41. Papadopoulos, G.A. The Athens, Greece, Earthquake (Ms5.9) of 7 September 1999: An Event Triggered by the Izmit, Turkey, 17 August 1999 Earthquake? *Bulletin Seismological Society America*, pgs. 312- 321, vol. 92, 2002.
 42. Papadopoulos, G., Ganas, A., and Plessa, A. The Skyros earthquake (Mw6.5) of 26 July 2001 and precursory seismicity patterns in the North Aegean Sea. *Bulletin of the Seismological Society of America*, pgs. 1141-1145, vol. 92 (30), 2002.
 43. Papadopoulos, G., Ganas, A., and Pavlides, S. The problem of seismic potential assessment: Case study of the unexpected earthquake of 7 September 1999 in Athens, Greece. *Earth Planets Space*, pgs. 9-18, vol. 54, 2002.
 44. Papadopoulos, G.A., G. Drakatos, D. Papanastassiou, I. Kalogeras and G. Stavrakakis. Preliminary results about the catastrophic earthquake of 7 September 1999 in Athens, Greece. *Seismological Research Letters*, pgs. 318-329, vol. 71, 2001.
 45. Papadopoulos, G.A., G. Drakatos, D. Papanastassiou, I. Kalogeras and G. Stavrakakis. Preliminary results about the catastrophic earthquake of 7 September 1999 in Athens, Greece: Erratum. *Seismological Research Letters*, pgs. 72-73, vol. 71(4), 2001.
 46. Papadopoulos, G., Drakatos, G. and A. Plessa. Foreshock activity as a precursor of strong earthquakes in Corinth Gulf, Central Greece. *Phys. Chem. Earth*, pgs 239 – 245, vol. 25 (3), 2000.
 47. Papadopoulos, G.A., and Plessa A. Magnitude-distance relations for earthquake-induced landslides in Greece. *Eng. Geology*, pgs. 377- 386, vol. 58, 2000.
 48. Papanastassiou, D. Seismic Hazard Assessment in the Area of Mystras-Sparta, south Peloponnesus, Greece, based on local Seismotectonic, Seismic, Geologic information and on different models of rupture propagation. *Natural Hazards*, pgs. 237-251, vol. 18, 1999.

49. Papoulia, J., Stavrakakis, G., Papanikolaou, D. Bayesian prediction of strong earthquakes in the Inner Messiniakos fault zone, southern Greece, based on seismological and geological data. *Journal of Seismology*, pgs. 233-242, vol. 5, 2001.
50. Parcharidis I., Serelis, K., Nikolakopoulos K., & Baskoutas, I. Synergistic use of optical and radar satellite data for active faults and corresponding displaced landforms detection in Kozani basin (Greece). *Geocarto International*, pgs. 17-24, vol. 16(3), 2001.
51. Pavlides, S. B., Papadopoulos, G., and Ganas, A. The fault that caused the Athens September 1999 Ms=5.9 earthquake: field observations. *Natural Hazards*, pgs. 61-85, vol. 27(1-2), 2002
52. Perissoratis, C. and G. Papadopoulos. Sediment instability and slumping in the southern Aegean Sea and the case history of the 1956 tsunami. *Marine Geology*, vol. 161, pgs. 287-305, 1999.
53. Pham V.N., D. Boyer, G. Chouliaras, A. Savaidis, G. Stavrakakis, J.L. Le Mouel. Sources of anomalous transient electric signals (ATESs) in the ULF band in the Lamia region (central Greece) : electrochemical mechanisms for their generation. *Phys. Earth Planet. Inter.*, pgs. 209-233, vol. 130, 2002.
54. Pham, V.N., Bernard, P., Boyer, D., Chouliaras, G., Le Mouel, J.,L. and G.N. Stavrakakis. Electrical conductivity and structure beneath the Central Hellenides around the Gulf of Corinth (Greece) and their relationship with seismotectonics. *Geophys. J. Int.*, pgs. 948-969, vol. 142, 2001.
55. Pham, V.N., Boyer, D., Le Mouel, J.L., Chouliaras, G. and G.N. Stavrakakis. Electromagnetic signals generated in the solid Earth by digital transmission of radio-waves as a plausible source for some so-called "Seismic Elastic Signals" (SES). *Physics Earth and Planetary Interiors*, pgs. 141-163, vol. 114, 1999.
56. Ranguelov, B., Van Ect, T., Papadopoulos, G., Pavlides, S., Shanov, S., & Schenk, V. Initial data for the magnitude reevaluation of the strong earthquakes during 1904 in Kresna- Kroupnik zone (SW Bulgaria). *Reports on Geodesy – Warsaw Univ. of Technology*, pgs. 51 – 55, vol. 4, 2000.
57. Ranguelov, B., A. Kies, G.A. Papadopoulos, S. Pavlides and S. Shanov. The Kresna-Kroupnik active seismogenic zone – a model of a geodynamic machine. *Cahiers du Centre Européen Géodynamique et de Séismologie*, pgs. 125-128, vol. 18, 2001.
58. Roberts, G. P. and Ganas, A. Fault-slip directions in central and southern Greece measured from striated and corrugated fault planes: Comparison with focal mechanism and geodetic data. *Journal of Geophysical Research*, pgs. 23443-23462, vol. 105 (B10), 2000.
59. Sachpazi M., Kontoes Ch.,Voulgaris N., Laigle M., Lepine J. Cl., Sikioti O., Baskoutas I., Kalogeras I., and G. Stavrakakis. Seismological and INSAR signature of unrest at Nissyros caldera, Greece. *Journal of Volcanology and Geothermal Research*, pgs. 19-33, vol. 116, 2002.
60. Sachpazi M., Hirn A., Clement C., Haslinger F., Kissling E., and Charvis P. Western Hellenic Subduction and Cephalonia Transform: Local Earthquakes and Plate Transport Strain. *Tectonophysics*, pgs. 301-319, vol. 319, 2000.
61. Stavrakakis, G.N., Chouliaras, G. and Panopoulou, G. Seismic source parameters for the Athens earthquake on September 7, 1999, from a new telemetric broad band seismological network in Greece. *Natural Hazards*, pgs. 47-60, vol. 27, 2002.

62. Tassos, S.T. Excess Mass Stress Tectonics (EMST): An outline of the Hypothesis. *Himalayan Geology*, pgs. 117-132, vol. 22 (1). 2001.
63. Tassos, S. The Role of Micro-fractures in the Excess mass Stress Tectonics (EMST) Model. *Geology of Pacific Ocean*, pgs. 74-84 vol. 21(2), (Russian Edition), 2002.
64. Telesca, L., Cuomo, V., Lapenna, V., Vallianatos, F. and G. Drakatos. Analysis of the temporal properties of Greek aftershock sequences. *Tectonophysics*, pgs. 163-178, vol. 341, 2001.
65. Van der Lee, S., F. Marone, M. van der Meijde, D. Giardini, A. Deschamps, C. Chiarabba, L. Margheriti, P. Burkett, S.C. Solomon, P.M. Alves, M. Chouliaras, A. Abdurazzag, E. Abdunnur, S.H. Gasut, M. Herak, R. Ortiz, J.M. Davila, A. Ugalde, J. Villa, K. Yelles. Eurasia-Africa Plate Boundary Region Yields New Seismographic Data. *EOS*, pgs. 637-646, vol. 82 (51), 2001.

6.2 Publications in International Web Pages with peer-review

1. Melis, N.S., Stavrakakis, G.N. and Zahradnik, J. Focal properties of the Mw=6.5 Skyros, Aegean Sea, earthquake. *ORFEUS Electronic Newsletter*, vol. 3(2), p. 11, 2001.
2. Stavrakakis G., Chouliaras G. and Papanastassiou D. The database of the Institute of Geodynamics of the National Observatory of Athens. *CSEM newsletter*, No. 14, p. 6, 1999.
3. van Eck, T., Trabant, C., Heino, A., Dost, B., Sleeman, R., Goutbeek, F., Hanka, W., Carenno, E., Tome de la Vega, M., Mazza, S., Mandiello, A., Ollivieri, M., Chouliaras, G., Melis, N., Deschamps, A., Lenhardt, W., Horn, N., Baer, M., Schweitzer, J., Zivcic, M., Mocnik, G., Solomi, K., Zednik, J., Kivisilla, J., ROult, G., Granet, M., Stammler, K., Shapira, A., Russi, M., Costa, G., Wiejacz, P., Buforn, E., Pazos, A., Aktar, M., Kalafat, D., Towards a Virtual European Broadband Seismograph Network. *ORFEUS Electronic Newsletter*, vol. 4(1), page 5, 2002.

6.3 Publications in Conference Proceedings

1. Benedetti L., Finkel R., King G., Caffee M., Armijo R., Van der Woerd J., Papanastassiou D., Ryerson F.J., Flerit F. & Farber, D. Earthquake time-slip histories determined from in situ ³⁶Cl cosmogenic dating of limestone fault scarps: the Sparta (Greece) and the Hedgen lake (Montana) normal faults. *XI meeting of the European Union of Geosciences, Reading GB. 1.*, 2001.
2. Γάκη-Παπαναστασίου Κ., Μαρουκιάν, Χ., Παπαναστασίου, Δ. και Παλυβός, Ν. Αρχαιογεωλογία και Μορφοτεκτονική στην περιοχή Λιβανάτων - Κύνου - Αρκίτσα κατά το Ολόκαινο. *5ο Πανελλήνιο Γεωγραφικό Συνέδριο*, Αθήνα, 11-13 Νοεμβρ., pgs. 101-111, 1999.
3. Δαπόντες Ν., Κωτσάνης Ι., Καραστάθης Β. Κ., Δάλκος Γ., 2002. ΓΑΙΑ: Η μετάβαση από μία αναπαράσταση σε άλλες για τη διερευνητική μελέτη της Γης. *3ο Πανελλήνιο Συνέδριο για τη διδακτική των Φυσικών Επιστημών και την*

εφαρμογή των Νέων Τεχνολογιών στην Εκπαίδευση, Πανεπιστήμιο Κρήτης – Ρέθυμνο, 9 – 11 Μαΐου 2002.

4. Drakatos G., Melis N., Karastathis V., Papadopoulos G., Papanastassiou D., and G. Stavrakakis. Three dimensional P-wave crustal velocity structure beneath Athens region (Greece) using micro-earthquake data. Integration of Earth Science Research on the Turkish and Greek 1999 Earthquakes and Needs for future Cooperative Research, Istanbul, Turkey 14-17 May 2000, edited by N. Görür, G. Papadopoulos and N. Okay. *NATO Science Series: IV: Earth and Environment Sciences*. Volume 9, Kluwer Academic Publishers, Dordrecht, pgs. 127-140, 2002.
5. Drakatos, G., Voulgaris, N., Pirli, M. and N. Melis. 3-D crustal velocity structure in western Greece and its seismotectonic interpretation. *Proc. PAANCARDI Meeting*, 19-23 September 2001, Sopron (Hungary).
6. Gaki-Papanastassiou K., Maroukian H., Papanastassiou D., Palyvos N. and F. Lemeille. Geomorphological study in the Lokrian coast of N. Evoikos Gulf (Central Greece) and evidence of Palaeoseismic destructions. *36th CIESM Congress*, Monaco, September 2001.
7. Gaki-Papanastassiou K., Maroukian H. and D. Papanastassiou. Recent costal changes in the Northern Laconic Gulf, Greece, based on Geomorphological and Archeoological evidence. *36th CIESM Congress*, Monaco, September 2001.
8. Ganas, A. Methods for imaging earthquake deformation using satellite data and digital elevation models. Proceedings of the NATO Seminar on Integration of Earth Science Research on the Turkish and Greek 1999 Earthquakes and Needs for future Cooperative Research, held in Istanbul, Turkey from 14-17 May 2000. *NATO SCIENCE SERIES: IV: Earth and Environmental Sciences : Volume 9. Kluwer Academic Publishers*, Dordrecht, ISBN 1-4020-0653-5, June 2002 , 224 pp.
9. Ganas A., Lagios E., Dietrich V.J., Vassilopoulou S., Hurni L., & G. Stavrakakis, Interferometric mapping of ground deformation in Nissyros volcano, Aegean Sea, during 1995-1996. *6th Pan-Hellenic Geographical Congress, Thessaloniki*, Volume II, pgs. 135-141, 2002.
10. Γκανάς Α. & G. Ferrier. Ψηφιακή ανάλυση υπερφασματικών δεδομένων DAIS για την χαρτογράφηση εμφανίσεων διαγνωστικών αργλικών ορυκτών επιθερμικού χρυσού στη νήσο Μήλο. *6th Pan-Hellenic Geographical Congress, Thessaloniki*, Volume II, pgs. 118 – 126, 2002.
11. Γκανάς Α. & Ε. Νικολάου. Πρόγραμμα Aperture : Συνεργεία περιβαλλοντικού δικαίου – τηλεπισκόπησης για την έκδοση και ενημέρωση χαρτών χρήσεων γης σε ευαίσθητες περιοχές. *6th Pan-Hellenic Geographical Congress, Thessaloniki*, Volume II, pgs. 127-134, 2002.
12. Ganas, A., Nikolaou, E., Demertzopoulos, Th., and Papadopoulos, G.A. A GIS for Tsunami Risk Mapping and Management. In NATO Advanced Research Workshop “Underwater Ground Failures on Tsunami Generation, Modeling, Risk, and Mitigation” *Book of Abstracts*, 249-252, Istanbul, Turkey, May 23-26, 2001.
13. Ganas, A., Stavrakakis, G., Lagios, E., Papadopoulos, G., & Pavlides, S. Investigation of the seismic fault that ruptured during the 7/9/99 Athens earthquake using space techniques. *Proceedings of the First Annual*

- Conference of the Remote Sensing & Photogrammetry Society*, 12-14 September 2001, ISBN 0 946226 31 (8), pgs. 4-11, 2001.
14. Herraiz, M., A.C. Pérez, I. Baskoutas, J. V. Cantavella, I. Kalogeras, O. Vadillo, G. Panopoulou, & L. Lozano. Distribución del factor de calidad Q_c en Grecia Quality factor, Q_c , distribution in Greece. *Proceedings of the 3rd Spanish-Portuguese Assembly of Geodesy and Geophysics. Valencia, February 2002.*
 15. Karastathis V., Sampson D., Dapontes N., Karmis P. and Y. Kotsanis. "Interactive Educational Software for Exploratory Learning of Geophysics". *The 14th World Conference on Educational Multimedia, Hypermedia and Telecommunications ED-MEDIA 2002*, Denver, Colorado, USA, 24-29 June 2002.
 16. Καραστάθης, Β., Δρακάτος, Γ. & Γ. Σταυρακάκης. Συμβολή της μεθόδου της Ακουστικής Τομογραφίας στον Έλεγχο του Φράγματος του Μαραθώνα. *3^ο Εθνικό Συνέδριο ΕΛΕΜΚΕ "Μη καταστροφικοί έγχοι. Εμπειρίες- Εφαρμογές – Καινοτομίες "*. Θεσ/κη (Ελλάς), 9 Ιουνίου 2001, pgs. 123-130, 2001.
 17. Karastathis, V., Karmis, P., Drakatos, G. and G. Stavrakakis. Examination of the Marathon Dam by the use of Geophysical methods. *63rd EAGE Conference and Technical Exhibition*. 11-15 June 2001, Amsterdam, The Netherlands.
 18. Κωτσάνης Γ., Ν. Δαπόντες, Β. Καραστάθης, Δ. Σάμψων, & Α. Παπαγεωργίου. Η διαθεματική και διερευνητική μελέτη της Γης μέσα από τους μικρόκοσμους του λογισμικού "ΓΑΙΑ". *Πανελλήνιο Συνέδριο "Πληροφορική και Εκπαίδευση", Σύλλογος Εκπαιδευτικών Πληροφορικής Ν. Θεσσαλονίκης (ΣΕΠΛΕΘ)*, Θεσσαλονίκη 11 και 12 Νοεμβρίου 2000.
 19. Margaritis, B., Papazachos, K., Papaioannou, Ch., Theodulidis, N., Kalogeras, I. & Skarlatoudis, A. Ground motion attenuation relations for shallow earthquakes in Greece *XXVIII ESC General Assembly*, 1-6 September, Genoa, 2002.
 20. Margaritis, B., Papazachos, K., Papaioannou, Ch., Theodouylidis, N., Kalogeras, I. & Skarlatoudis, A. Ground motion attenuation relations for shallow earthquakes in Greece. *12th European Conference on Earthquake Engineering*. Proceed. Published by Elsevier Science Ltd, 2001.
 21. Melis, N.S., Drakatos, G., Papanastasiou, D., Latousakis, I., Papatsimpa, K. Koutlis, M., Tsironis, G., Mantes, T., Vasileiou, G., Kyrimis, K. An Earthquake Atlas for Greece: Presentation of seismicity in Greece through an interactive tool. *9th International Symposium on Natural and Man-made Hazards*, Antalya, Turkey, October 3-6, 2002.
 22. Melis, N. and Fringas, Ch. The Grevena - Kozani earthquake, lessons learnt. NEDIES project: 'Lessons learnt from earthquake disasters that occurred in Greece'. *Athens Meeting, June 2000*. Editors: Ch. Theofili and A. Arellano, EUR 19946 EN, 6-8, 2001.
 23. Meyer B., Armijo R., King J., Hubert A., Rigo A., Barka A., and Papanastassiou, D. Active faulting in Marmara Sea and Corinth rift areas, implications on evolution of the Anatolian-Aegean region. "*Active fault Research for the new millennium*" International Symposium and School of Active Faulting in commemoration of the fifth anniversary of the 1995 great Hansin - Awaji earthquake, Hokudan-cho, Awaji Island, Hyogo, Japan 17-26 January 2000.

24. Mucciarelli, M. and the FAUST working group. Faults as a seismologists' tool: current advancement of the EC project "FAU.S.T". Proceedings XXVII General Assembly of the European Seismological Commission (ESC). Lisbon, Portugal, 10-15 September 2000, 319-324.
25. Papadopoulos, G.A. Earthquake Triggering in Greece and the Case of the 7 September 1999, Athens Earthquake. In: *Integration of Earth Sciences Research on the 1999 Turkish and Greek Earthquakes and Needs for Future Cooperative Research*, N. Gorur and G.A. Papadopoulos (Editors), Kluwer Academic Publishers, pgs. 141-152, 2002.
26. Papadopoulos, G.A., Ziazia, M., Plessa A., Ganas A., Karastathis V., Melis N. and G. Stavrakakis. Seismic Anisotropy in the East Mediterranean Lithosphere: The Mw=6.3 Karpathos Intermediate Depth Earthquake of 22 January 2002 in the Hellenic Arc. *XXVII GENERAL ASSEMBLY OF THE EUROPEAN SEISMOLOGICAL SOCIETY*. Genova, Palazzo Ducale, September 1st - 6th 2002.
27. Papadopoulos, G.A. and A. Vassilopoulou. Historical and archaeological evidence of earthquakes and tsunamis felt in the Kythira strait, Greece. In : *G.T. Hebenstreit (ed.) Tsunami Research at the End of a Critical Decade, Advances in Natural & Technological Hazards Research*, Kluwer Academic Publishers, pgs. 119 – 138, 2002.
28. Papadopoulos, G.A., and F. Imamura, Proposal for a new tsunami intensity scale. *Proc. Internat. Tsunami Confer.*, Seattle , 7-9 August 2001, 569-577.
29. Papadopoulos, G.A. Tsunamis in the East Mediterranean: 1. A Catalogue for the Area of Greece and Adjacent Seas. *International Tsunami Workshop*, 14-18 June 2000, Moscow.
30. Papadopoulos, G.A. Tsunamis in the East Mediterranean: 1. A Catalogue for the area of Greece and adjacent seas. *Proc. Internat. Tsunami Workshop*, Moscow, 14-16 June, 2000.
31. Papanastassiou, D. Destructive earthquakes and seismotectonics in the Gulf of Corinth, Central Greece: A Review. *Integration of Earth Science Research on the Turkish and Greek 1999 Earthquakes and Needs for future Cooperative Research*, Istanbul, Turkey 14-17 May 2000, edited by N. Görür, G. Papadopoulos and N. Okay. *NATO Science Series: IV: Earth and Environment Sciences*, Volume 9, Kluwer Academic Publishers, Dordrecht. 153-174, 2002.
32. Papanastasiou, D., Sieh K., Yule D, Gaki-Papanastassiou K., Meyer B. and Vrenzou, E. Seismological and archaeological trenching to detect past earthquakes: a case study from the area of Sparta, Peloponnesus, Greece. 9th International Symposium on Natural and Man-made Hazards, Antalya, Turkey, October 3-6, 2002.
33. Παπαναστασίου, Δ. Ανιχνευτικότητα και ακρίβεια προσδιορισμού των εστιακών παραμέτρων των σεισμών που καταγράφηκαν απο το σεισμολογικό δίκτυο του Γεωδυναμικού Ινστιτούτου του ΕΑΑ σε διάφορες χρονικές περιόδους. Διεθνής ημερίδα προς τιμή του Ακαδημαϊκού καθ. Α. Γαλανόπουλου: "Οι εξελίξεις της Σεισμολογίας στον Ελληνικό χώρο". Τομέας Γεωφυσικής – Γεωθερμίας Πανεπιστημίου Αθηνών, 31 Οκτωβρίου- 2 Νοεμβρίου 2002.
34. Papanastassiou, D. The Gulf of Corinth, central Greece, characteristic example of active extensional tectonics "Active tectonics of Western Turkey"

- International workshop in memoriam to Prof. Paul L. Hancock. Istanbul, Turkey, 15-16 June 2000.
35. Παπαναστασίου, Δ., Σεισμοτεκτονικές δομές του Κορινθιακού κόλπου. *Ημερίδα: Εργαστήριο Βάθους Γεωδυναμικής Κορινθιακού κόλπου - Δίκτυο Ελληνικών Εργαστηρίων. Σεισμοτεκτονική του Κορινθιακού κόλπου.* Οργανωτής Τομέας Γεωφυσικής-Γεωθερμίας Πανεπιστημίου Αθηνών. Αθήνα, 31 Μαΐου 2001.
 36. Papanastassiou, D. New aspects on the seismotectonics of the Corinth Gulf. *Workshop: Corinth Rift Laboratory.* Egion, September 30-October 4, 2001.
 37. Παπαναστασίου, Δ. και Σταυρακάκης, Γ. Προκαταρκτικά αποτελέσματα των παραμέτρων του σεισμού της Αθήνας (7 Σεπτεμβρίου 1999) και της μετασεισμικής ακολουθίας. *Ημερίδα: Προκαταρκτικά αποτελέσματα ερευνητικών εργασιών απο τον σεισμό της 7ης Σεπτεμβρίου 1999.* Τομέας Γεωφυσικής- Γεωθερμίας, 2 Νοεμβρίου 1999.
 38. Parcharidis I., Sakkas V.A., Ganas A. & A. Katopodi, A production of Digital Elevation Model (D.E.M.) by means of SAR tandem images in a volcanic landscape and its quality assessment. *6th Pan-Hellenic Geographical Congress, Thessaloniki*, Volume II, pgs 201-207, 2002.
 39. Pavlides, S.B., Papadopoulos, G.A., and Ganas, A. Seismic Hazard in urban areas: The 7th September 1999 Athens earthquake case study. *Proceedings of the Hokudan International Symposium and School on Active Faulting* (edited by Koji Okumura, Keita Takada and Hideaki Goto), pgs. 367-370, 2000.
 40. Pinto V., Rivero L., Schaming M., Sachpazi M., Marchetti A., and Miles P.R. “2000 Seiscan: Un proyecto para crear un archivo digital de perfiles de sismica de reflexion marina de la Zona Economica Exclusiva Europea (ZEEE). *Proceedings of the 2a Assembleia Luso-Espanhola de Geodesia e Geofisica*, Lagos (Algarve, Portugal) 8-12 February pgs. 633-634.,2000.
 41. Ranguelov, B., Kies, A., Papadopoulos, G., Pavlides, S., Shanov, S., & Schenk, V. The Kresna-Kroupnik active seismogenic zone : a model of a geodynamic machine. *Workshop on “Evaluation of the Potential for Large Earthquakes in Regions of Present Day Low Seismic Activity in Europe”*, 13 – 17 March 2000, Han – sur – Lesse, Belgium, pgs. 125 – 128, 2000.
 42. Schenkova, Z., I. Kalogeras, V. Schenk, R. Pichl, C. Papatsimpa, G. Panopoulou, & Kottnauer, P. Isoseismals of selected events of Central Greece in relation to geological and tectonic structures. *XXVIII ESC General Assembly*, SCA-0, 1-6 September, Genoa, 2002.
 43. Tassos, S., Isotropy, Volcanism, and Heat flow. In “*Proceedings International Symposium on NCGT*”, May 2002, Otero Junior College, La Junta, Colorado, pgs. 231-245, 2002.
 44. Tassos, S., Anisotropy, Spatial and Temporal Correlation between Deep and Shallow Earthquakes, Positive Free-Air Gravity and Geoidal Anomalies, and the Dominance of Uplift. In “*Proceedings International Symposium on NCGT*”, May 2002, Otero Junior College, La Junta, Colorado, pgs. 247-277, 2002.
 45. Τάσσοσ, Σ., Μύθος και Πραγματικότητα στην Περιβαλλοντική Εκπαίδευση. Η Περίπτωση των Γεωεπιστημών. In: “*Proceedings of International Symposium of Protected Natural Areas and Environmental Education*”, UNESCO, pgs. 509-516, 2001.

46. Τάσσος, Σ. Γεωτεκτονική Σημασία Διαφόρων Γεωφυσικών Παραμέτρων, και του Μηχανισμού Γένεσης των Σεισμών της Αθήνας και της Νικομήδειας. In: *“Proceedings of International Symposium of Protected Natural Areas and Environmental Education”*, UNESCO, pgs. 569-577, 2001.
47. Tassos, S. Earthquake Generation and Ophiolite Suites in the Context of Excess Mass Stress Tectonics (EMST). In: *Proceedings “Global Wrench Tectonics International Workshop” Fortum Petroleum*, 16 pp., 2001.
48. Τάσσος Σ.Τ. Η Γεωτεκτονική Σημασία Διαφόρων Γεωφυσικών Παραμέτρων και του Μηχανισμού Γένεσης των Σεισμών της Αθήνας και της Νικομήδειας. *Πρακτικά Διεθνούς Συνεδρίου: Προστατευμένες Φυσικές Περιοχές και Περιβαλλοντική Εκπαίδευση*, 2000.
49. Τάσσος Σ.Τ. Μύθος και Πραγματικότητα στην Περιβαλλοντική. Η Περίπτωση των Γεωεπιστημών. *Πρακτικά Διεθνούς Συνεδρίου: Προστατευμένες Φυσικές Περιοχές και Περιβαλλοντική Εκπαίδευση*, 2000.
50. Voulgaris, N., Vassilakis, E., Soukis, K., Alexopoulos, J., Drakatos, G. and I. Parcharides, Development of a GIS application for earthquake disaster management. *Συμπόσιο στη μνήμη του Ακαδημαϊκού Άγγελου Γαλανόπουλου*. 31/10 – 1/11/ 2002, Αθήνα.

6.4 Publications in Greek Journals

1. Γκανάς, Αθανάσιος and Ferrier, Graham. Mapping epithermal gold in Milos using DAIS Hyperspectral data - Χαρτογράφηση εμφανίσεων διαγνωστικών ορυκτών επιθερμικού χρυσού στη νήσο Μήλο με χρήση υπερφασματικών δεδομένων DAIS. *ΟΡΥΚΤΟΣ ΠΛΟΥΤΟΣ (Mineral Wealth)*, pgs. 37-46, vol. 122, 2002.
2. Ganas, A., Lagios, E., & Stavrakakis, G. Computer techniques for imaging earthquake deformation using satellite data and digital elevation models. *Bull. Geol. Soc. Greece*, pgs. 2033-2038, vol. 34/5, 2001.
3. Ganas, A., Papadopoulos, G.A., and Pavlides, S.B. The 7th September 1999 Athens unexpected earthquake: 3D visualisation and field evidence of the seismic fault. *Annales Géologiques des pays Helléniques*, (Volume in Memory of Prof John Drakopoulos), 38, Fasc B, pgs. 113-129, 2000.
4. Νικολάου, Ε., Γκανάς, Α., Αθανασίου, Ε., & Ρετάλης, Α. Χρήση δεικτών βλάστησης για τη διαχρονική χαρτογράφηση καμένων εκτάσεων στην περιοχή του όρους Πεντέλη. *Γεωτεχνικά Επιστημονικά Θέματα*, σειρά II, τόμος 11, τεύχος 3/2000, σελ 258-271, 2000.
5. Galanis, O.Ch., T.M. Tsapanos, G.A. Papadopoulos & A.A. Kiratzi. An alternative Bayesian statistics for probabilistic earthquake prediction in Mexico, Central and South America. *Bull. Geol. Soc. Greece*, pgs. 1485-1491, 2001.
6. Papadopoulos, G.A. and A. Plessa, 2001. Historical earthquakes and tsunamis of the south Ionian Sea occurring from 1591 to 1837. *Bull. Geol. Soc. Greece*, pgs. 1547-1554, 2001.
7. Παπαδόπουλος, Γ.Α., Α. Γκανάς και Σ. Παυλίδης. Ενόργανες και υπαίθριες παρατηρήσεις για τον καθορισμό της σεισμογόνου δομής του σεισμού της 7ης Σεπτεμβρίου 1999 στην Αθήνα. *Δελτίο Ελλην. Γεωλ. Ετ.*, pgs. 1457-1464, 2001.

8. Papanastassiou, D. The July-August, 1996, Konitsa (NW Greece) earthquakes: a seismological – seismotectonic study. *Bulletin of the Geological Society of Greece*, pgs. 1555-1562, vol. 34(4), 2001.
9. Papanastassiou, D., Stavrakakis G. and D. Makaris. Recent Micro-earthquake activity at northern Evoikos gulf, central Greece. *Bulletin of the Geological Society of Greece*, pgs. 1567-1572, vol. 34(4), 2001.
10. Papanastassiou, D., Latoussakis J. and G. Stavrakakis. A revised catalogue of earthquakes in the broader area of Greece for the period 1950-2000. *Bulletin of the Geological Society of Greece*, pgs. 1563-1566, vol. 34(4), 2001.
11. Papanastassiou, D., Stavrakakis, G., Drakatos, G. and G. Papadopoulos. The Athens, September 7, 1999, Ms=5.9 earthquake: first results on the focal properties of the main shock and the aftershock sequence. *Annales Geol. Pays Hellen*. V38/b, pgs. 73-88, 2000.
12. Papanastassiou, D., Gaki-Papanastassiou, K., Maroukian, H., Karimbalis, E. and D. Makaris. Implications of Morphology and seismicity on the hazard assessment in the ancient monument of Mystras in Southern Peloponnesus, Greece. *Annales Geol. Pays Hellen*. V39, 2000.

6.5 Internal Publications of the Institute of Geodynamics

1. Λατουσάκης, Ι., & Πανοπούλου Γεωργία. Επιλογή καταλληλότερου μοντέλου ταχυτήτων για την καθημερινή ανάλυση του Γεωδυναμικού Ινστιτούτου, 2002.
2. Kalogeras, I.S. & Stavrakakis. Processing of accelerograms recorded by the strong motion network of Cyprus, Time period 1996 – 2002. National Observatory of Athens, Institute of Geodynamics, Publication 16, p 174, 2002
3. Kalogeras, I. S. & Stavrakakis, G. N. Analysis of Greek accelerograms recorded at stations of NOA's network. Time period 1997-1999. National Observatory of Athens, Institute of Geodynamics, Publication 13, p 160, 2001.
4. Kalogeras, I. S. & Stavrakakis, G. N. The Athens, Greece September 7, 1999 earthquake: Strong motion data processing (7/9/1999-31/3/2000). National Observatory of Athens, Institute of Geodynamics Publication 14 (CD-ROM with user's manual), 2001.
5. Kalogeras, I. S. Strong motion database. Time period 1973 – 1999. National Observatory of Athens, Institute of Geodynamics Publication 15 (CD-ROM with user's manual), 2001.
6. Papadopoulos, G. A. Historical Earthquakes and Tsunamis in the Corinth Rift, Central Greece. Institute of Geodynamics, National Observatory of Athens, Publication 12, p 128, 2000.

6.6 Authorship of Books

1. Tassos, S. Micro- and Macro- Manifestations of Excess Mass. In ' *A book in honour of Ott Christoph Hilgenger* ', Instituto Nazionale di Geofisica e Vulcanologia, Rome and TU Berlin-Institut für Angewandte Geowissenschaften I (in press), 2002.
2. Τάσσος Σ.. Η Γη τρέμει. Περί Σεισμών ο Λόγος. Εκδόσεις 'Καστανιώτης', 125 σελ., 2001.

3. Παπαδόπουλος, Γ. Α. Η Πολιτική Προστασία στην Ελλάδα - Αντιμετώπιση Φυσικών και Τεχνολογικών Καταστροφών. Εκδόσεις ΙΩΝ, σελ. 157, 2000.

6.2 Department of Geophysics, Aristotle University of Thessaloniki

- AIDONA, E., SARRIS, A., KONDOPOULOU, D., SANAKIS, Y.: 1999. A detailed study of the archaeological site of Kitros (N. Greece) by combined magnetic and spectrometry methods. *Archaeometry symposium Proceedings*, vol. 31.
- BABA, V.A.:1999. Relations between local magnitudes of earthquakes in South Balkan Area. *M.Sc.Thesis*, p.p. 69, (advisor: E.E.Papadimitriou).
- ERMOKHIN, K.M., TSOKAS, G.N., TSOURLOS, P., AND GLAZUNOV, V.V.:1999. Calculation of the azimuthal inhomogeneity ratio response of 3-D structures using analytical forward modelling scheme. *Journal of the Balkan Geophysical Society*, 1, 4, 53-63.
- HASLINGER, F., KISSLING, E., ANSORGE, J., HATZFELD, D., PAPADIMITRIOU, E., KARAKOSTAS, V., MAKROPOULOS, K., KAHLE, H.-G. AND PETER, Y.: 1999, 3D crustal structure from local earthquake tomography around the gulf of Arta (Ionian region, NW Greece). *Tectonophysics*, 304, 201-218.
- HATZFELD, D., ZIAZIA, M., KEMENTZETZIDOU, D., HATZIDIMITRIOU, P., PANAGIOTOPOULOS, D., MAKROPOULOS, K., PAPADIMITRIOU, P. AND DESCHAMPS, A.: 1999. Microseismicity and focal mechanisms at the western termination of the North Anatolian Fault and their implications for continental tectonics. *Geophys. J. Int.*, 137, 891-908.
- KARAGIANNI, E.E., PANAGIOTOPOULOS, D.G., PAPAZACHOS, C.B. AND BURTON, P.W.: 1999. A study of shallow crustal structure in the Mygdonian Basin (N.Greece) based on the dispersion curves of Rayleigh waves. *Journal of the Balkan Geophysical Society*, 2,3-14.
- LOUVARI, E., KIRATZI, A. AND PAPAZACHOS, B.: 1999. The Cephalonia Transform Fault and its extension to western Lefkada island (Greece). *Tectonophysics*, 308, 223-236.
- PAPAZACHOS, B., PAPAIOANNOU, CH., PAPAZACHOS, C., AND SAVVAIDIS, A.: 1999. Rupture zones in the Aegean Area. *Tectonophysics*, 308, 205-221.
- PAPAZACHOS, B.C. AND KARAKAISIS, G.F.: 1999. The earthquakes of Macedonia and their macroseismic effects. *1st International Conference: ADVANCES ON NATURAL HAZARDS MITIGATION, 3-4 November 1999*, Athens, pp. 10.
- QIN, CH., PAPADIMITRIOU, E. E., PAPAZACHOS, B. C. AND KARAKAISIS, G. F.: 1999. Spatial distribution of time independent seismicity in China. *Pure Applied Geophysics*, 154, 101-119.
- QIN, CH., PAPADIMITRIOU, E. E., PAPAZACHOS, B. C. AND KARAKAISIS, G. F.: 1999. On the validity of the regional time and magnitude predictable model in China. *Annali di Geofisica*, 42, 939-956.
- RECI, H.: 1999. Study of the crossborder geothermic field in Sarantaporo Konitsa by geoelectrical method. *M.Sc. Thesis*, pp. (advisor: G.N.Tsokas).

- ROUMELIOTI, Z.:1999. Estimation of source parameters and simulation of strong ground motion in Western Greece, *MSc Thesis*, pp. 100, (advisor: A. Kiratzi).
- SAVVAIDIS, A., TSOKAS, G., LIRITZIS, Y., AND APOSTOLOU, M.: 1999. The location and mapping of ancient ruins on the castle of Lefkas (Greece) by resistivity and GPR methods. *Archaeological Prospection*, 6, 63-73.
- SAVVAIDIS, A., TSOKAS, G., SOUPIOS P., VARGEMEZIS, G., MANAKOU, M., TSOURLOS, P., FIKOS, I.:1999. Geophysical Prospecting in the Krousovitis dam (N.Greece) by Seismic and Resistivity geophysical methods. *Journal of the Balkan Geophysical Society*, 2, 128-138.
- SAVVAIDIS, A., TSOKAS, G., VARGEMEZIS, G., AND DIMOPOULOS, G.: 1999. Geophysical prospecting in the Akropotamos dam (N. Greece) by GPR and VLF geophysical methods. *Journal of the Balkan Geophysical Society*, 2/4, 120-127.
- STAMPOLIDIS, A.:1999. Study of the geomagnetic field in Macedonia and Thrace; Its relation to the geological structure of the area. *Ph. D. Thesis*, p. 258, (advisor: E.E. Papadimitriou).
- TRIANTAFYLLIDIS, P., HATZIDIMITRIOU, P.M., THEODULIDIS, N., SUHADOLC, P., PAPAACHOS, C., RAPTAKIS, D. AND LONTZETIDIS, K.: 1999. Site effects in the city of Thessaloniki (Greece) estimated from acceleration data and 1-D local soil profiles. *Bul. Seism. Soc. Am*, 89, 521-537.
- TSAPANOS, T.M. AND PAPADOPOULOU, A.A.: 1999. A discrete Markov model for earthquake occurrences in southern Alaska and Aleutian islands. *J. B. Geophys. Soc.*, 2, 75-83.
- TSAPANOS, TH.: 1999. Geophysical prospecting in the Kristallopigi area (pref. of Florina) for localization of underwater deposits (Scientifically Responsible) Sponsored by Mun. of Kristallopigi.
- TSOKAS, G., SOUPIOS, P., TSOURLOS, P., VARGEMEZIS, G., SAVVAIDIS, A., PALIADELI- SAATSOGLU, C., DROUGOU, S.: 1999. Geophysical investigations in the area between Eukleia's temple and the theater in ancient Aegae (Verghina) using various methods. *Proceedings of the 1st conference on Physics in Culture*, Thessaloniki, Greece, October 20-30.
- TSOURLOS, P., AND OGILVY, R.: 1999. An algorithm for the 3-D Inversion of Tomographic Resistivity and Induced Polarisation data: Preliminary Results. *Journal of the Balkan Geophysical Society*, 2, 2, 30-45.
- TSOURLOS, P., SZYMANSKI, J., AND TSOKAS, G.N.: 1999. The Effect of Terrain Topography on Commonly Used Resistivity Arrays. *Geophysics*, Vol. 64, No 5, p.1357-63.
- BABA, A. B., PAPADIMITRIOU, E. E., PAPAACHOS, B. C., PAPAIOANNOU, CH. A. AND KARAKOSTAS, B. G.: 2000. A unified local magnitude scale for earthquakes of south Balkan area. *Pure Appl. Geoph.*, 157, 765-783.
- BABA, A., PAPADIMITRIOU, E.E. AND PAPAACHOS, B.C.: 2000. Magnitudes of intermediate depth earthquakes in southern Aegean Sea (Greece). *XXVII General Assembly of the European Seismological Commission (ESC), Book of Abstracts and papers, Lisbon Univ.*, 10-15 September 2000, 167-172.
- BRODSKY, E.E., KARAKOSTAS, V. AND KANAMORI HI.: 2000. A new observation of dynamically Triggered regional seismicity: Earthquakes in Greece

following the August, 1999 Izmit, Turkey Earthquake. *Geophysical Res. Let.* 27, No.17, 2741-2744.

- CHRISTOVA, C.V AND TSAPANOS, T.M.: 2000. Depth distribution of stresses in the Hokkaido Wadati-Benioff zone as deduced by inversion of earthquake focal mechanisms. *J. Geodynam.* 30, 557-573.
- FIKOS, I.: 2000. Diacronic study of free aquifers using the method of electric tomography. *M.Sc.Thesis*, pp. 81, (advisor: P.Hatzidimitriou).
- GALANIS, O.:2000. A Bayesian probabilistic estimation of the seismicity of Mexico, middle America and south America areas. *M.Sc.Thesis*, pp. 97. (advisor: T.Tsapanos).
- HATZFELD, D., KARAKOSTAS, V., ZIAZIA, M., LYON-CAEN, H., KASSARAS, I., PAPADIMITRIOU, E., MAKROPOULOS, K. AND VOULGARIS, N. 2000. Microseismicity and faulting geometry in the Gulf of Corinth. *Geophys. J. Intern.*, 141, 438-456.
- KARAKAISIS, G.F.: 2000. Current trends in earthquake prediction research in Greece. *Proc. 1st workshop of seismologists of BSEC Member States, Russian, Krasnodar, May 17-18, 2000*, 43-52.
- KARAKAISIS, G.F.: 2000. Effects of zonation on the results of the application of the regional time predictable seismicity model in Greece and Japan. *Earth Planets Space*, 52, 221-228.
- KHAIR, K., KARAKAISIS, G. F. AND PAPADIMITRIOU, E. E.: 2000. Seismic zonation of the Levant (Dead Sea) Transform Fault area. *Annali di Geofisica*, 43, 61-79.
- KONDOPOULOU, D.:2000. Palaeomagnetism in Greece: Cenozoic and Mesozoic components and their tectonodynamic implications. *Tectonophysics*, 326, 131-151.
- KORAVOS, G.:2000. A seismicity study of the seismogenic areas of the circum-Pacific belt and the evaluation of the seismic hazard in some cities. *M.Sc.Thesis*, pp. 208, (advisor: T.Tsapanos).
- KOVACHEVA, M., SPATHARAS, V. AND LIRITZIS, I. : 2000. New archaeointensity results from Greek materials. *Archaeometry*, 42, 2 415-429.
- LOUVARI, E.K.: 2000. A detailed study of the Aegean and its surroundings based on the fault plane solutions of small earthquakes. *PhD Thesis (advisor: A.Kiratzi)*, Laboratory of Geophysics, Aristotle University of Thessaloniki, 372 pp.
- MANAKOU, M.V. AND TSAPANOS, T.M.: 2000. Seismicity and seismic hazard parameters evaluation in the island of Crete and the surrounding area inferred from mixed data files. *Tectonophysics*, 321, 157-178.
- PAPAACHOS, B., KARAKAISIS, G., HATZIDIMITRIOU, P., KARAKOSTAS, B., KIRATZI, A., LEVENTAKIS, G., MARGARIS, B., PANAGIOTOPOULOS, D., PAPADIMITRIOU, E., PAPAIOANNOU, CH., PAPAACHOS, C., SAVVAIDIS, A., THEODULIDIS, N., TSAPANOS, T., DIMITRIOU, P.: 2000. A procedure to assess the evolution of a seismic sequence. *Bulletin of the Geological Society of Greece*, XXXVIII, 103-112.
- PAPAACHOS, B.C., COMNINAKIS, P.E., KARAKAISIS, G.F., KARAKOSTAS, B.G., PAPAIOANNOU, CH. A., PAPAACHOS, C.B. AND SCORDILIS, E. M.: 2000. A catalogue of earthquakes in Greece and surrounding

area for the period 550 BC - 1999. *Publ. Geoph. Lab., Univ. of Thessaloniki*, pp. 338.

- PAPAZACHOS, B.C., KARAKAISIS, G.F., PAPAZACHOS, C.B. AND SCORDILIS, E.M.: 2000. Triggering of strong earthquakes in the North and East Aegean Plate boundaries by westward motion of the Anatolia Plate. *Annales Geologiques des pays Helleniques*, 1e Serie, T. XXXVIII, FASC, B, 105-117.
- PAPAZACHOS, B.C., KARAKAISIS, G.F., PAPAZACHOS, C.B. AND SCORDILIS, E.M.: 2000. Earthquake Triggering in the North and East Aegean Plate Boundaries due to the Anatolia Westward Motion. *Geophysical Research Letters*, 27, 3957-3960.
- PAPAZACHOS, B.C., KARAKAISIS, G.F., PAPAZACHOS, C.B., SAVVAIDIS, A.S. AND SCORDILIS, E.M.: 2000. Properties of the preshock crustal deformation in regions of the Aegean Area. *XXVII General Assembly of the European Seismological Commission (ESC), Book of Abstracts and papers, Lisbon Univ.*, 10-15 September 2000, 295-300.
- PAPAZACHOS, B.C., KARAKOSTAS, V.G., PAPAZACHOS, C.B. AND SCORDILIS, E.M.: 2000. The geometry of the Wadati-Benioff zone and lithospheric kinematics in the Hellenic arc. *Tectonophysics*, 319, 275-300.
- PAPAZACHOS, C., SOUPIOS, P., SAVVAIDIS, A. AND ROUMELIOTI, Z.: 2000. Identification of small-scale active faults near metropolitan areas: an example from the asvestochori fault near Thessaloniki. *XXVII General Assembly of the European Seismological Commission (ESC), Book of Abstracts and papers, Lisbon Univ.*, 10-15 September 2000, 221-225.
- PAPAZACHOS, C.B. AND PAPAZACHOS, B.C., 2000. Observations of preshock seismic deformation in the Aegean area and earthquake prediction. *XXVII General Assembly of the European Seismological Commission (ESC), Book of Abstracts and papers, Lisbon Univ.*, 10-15 September 2000, 301-305.
- QIN CHANG YUAN.: 2000. Time dependent seismicity in China, *Ph. D. Thesis*, p. 229, (advisor: E.E. Papadimitriou).
- SAVVAIDIS, A., PEDERSEN, L., TSOKAS, G., AND DAWES G.: 2000 Structure of the Mygdonia basin (N. Greece) inferred from MT and gravity data. *Tectonophysics*, 317, 171-186.
- SAVVAIDIS, A., TSOKAS, G., PAPAZACHOS, C., AND KONDOPOULOU, D.: 2000. Geophysical Study of the Ophiolite complex and the Sedimentary basins in the Northwest part of the Chalkidiki Peninsula (N. Greece). *Surveys in Geophysics vol.21*, 567-595.
- SEN, S., KOUFOS, G., KONDOPOULOU, D. AND DE BONIS, L.: 2000. Magnetostratigraphy of late Miocene continental deposits of the Lower Axios valley, Macedonia, Greece. *Proceedings of RCMNS, Geological Society of Greece*, Special Publications, No 9, 197-206.
- SPATHARAS, V., KONDOPOULOU, D., LIRITZIS, I., AND TSOKAS, G. :2000. Archaeointensity results from two ceramic Kiks from N.Greece. *Journal of the Balkan Geoph. Soc.*, vol. 3, No 4, 67-72.
- TRIANTAFILLIDIS, II.: 2000. Numerical study of wave propagation in inhomogeneous media for the estimation of site effects on seismic motion. Ph.D.Thesis, Department of Geology, Aristotle University of Thessaloniki, pp. 180.

- TSAPANOS, T.M. AND CHRISTOVA, C.V.: 2000. Some preliminary results of a worldwide seismicity estimation: a case study of seismic hazard evaluation in south America. *Annali di Geofisica.*, 43, 11-22.
- TSAPANOS, T.M.: 2000. The depth distribution of seismicity parameters estimated for the South American area. *Earth and Planetary Science Let.* 180, 103-115.
- TSOKAS, G. AND HANSEN, R.O.: 2000. On the use of complex attributes and inferred source parameter estimates in the exploration of archaeological sites. *Archaeol. Prospect.* 7, 17-30.
- VLASTOS, S.: 2000. Definition of slip rates on seismic active faults in the area of Greece. *M. Sc. Thesis*, pp. 148, (advisor: E.Papadimitriou).
- ZANANIRI, I.: 2000. Examination of the relationships between the magnetic and mineralogical – histological anisotropy in granitic rocks. *M.Sc.Thesis*, p. 177, (advisor: D. Kondopoulou).
- AIDONA, E., KONDOPOULOU, D., AND GEORGAKOPOULOS, A.: 2001. Paleomagnetic and Rock Magnetic Properties of Sediment Cores from Chalkidiki Greece. *Physics and Ghem of the Earth.* (A), Vol. 26, No. 11-12, pp. 879-884.
- AIDONA, E.V., SARRIS, A., KONDOPOULOU AND I.SANAKIS.: 2001. Application of magnetic and spectrometry methods in the detection of human activity in soils: A case study at the archaeological site of Kitros (Northern Greece). *Archaeological Prospection* 8, 187-198.
- APOSTOLIDIS, P., ROUMELIOTI, Z., RAPTAKIS, D. AND PITILAKIS, K.: 2001. Determination of the shear wave velocities by the method of microtremor on euroseistest. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1277-1284.
- ATZEMOGLU, A., KONDOPOULOU, D. AND ZANANIRI, I. :2001. Palaeomagnetism and magnetic fabrics of the Almopias, Thessaly and Milos Volcanics, implications for the regional deformation. *Bulletin of the Geological Society of Greece*, XXXIV/1, 61-68.
- BECK, E.M., BURMESTER, F.R., KONDOPOULOU, D.P. AND ATZEMOGLU, A.: 2001. The palaeomagnetism of Lesbos, NE Aegean, and the eastern Mediterranean inclination anomaly. *Geophys. J. Int.*, 145, 233-245.
- DIMITRIU, P., THEODULIDIS, N., HATZIDIMITRIOU, P. AND ANASTASIADIS, A.: 2001. Sediment non – linearity and attenuation of seismic waves: a study of accelerograms from Lefkas, western Greece. *Soil Dynamics and Earthquake Engineering*, 21, 63-73.
- DRAKOS, A., STIROS, S. AND KIRATZI, A.: 2001. Fault Parameters of the 1980 ($M_w= 6.5$) Volos, Central Greece, Earthquake from inversion of repeated leveling data. *Bulletin of the Seismological Society of America*, 91, 6, pp. 1673-1684, December 2001.
- FIKOS, I., VARGEMEZIS, G., TSOKAS, G.N., HATZIDIMITRIOU, P. AND DIMOPOULOS, G.: 2001. Diachronic study of free aquifers using the method of electric tomography: a case study in northern Greece. *Environmental and Engineering Geophysical Society European Section*.
- GALANIS, O., TSAPANOS, TH., PAPAPOPOULOS, G. AND KIRATZI, A.A.: 2001. An alternative Bayesian statistics for probabilistic earthquake prediction in Mexico, central and South America. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1485-1491.

- HATZFELD, D., KARAGIANNI, E., KASSARAS, I., KIRATZI, A., LOUVARI, E., LYON-CAEN, H., MAKROPOULOS, K., PAPADIMITRIOU, P., BOCK, G. AND PRIESTLEY, K.: 2001. Shear wave anisotropy in the upper mantle beneath the Aegean related to internal deformation. *Journal of Geophysical Research*, Vol. 106, No. 12, pages 30737-30753, December 10.
- KARAKAISIS, G.F.: 2001. Accelerating seismic crustal deformation prior to the IZMIT earthquake (17.8.1999, M=7.6, NW Turkey) and evolution of its seismic sequence. 2nd Congress of Earthquake Engineering and Engineering Seismology, Thessaloniki, November 28-30, pp 97-106.
- KIRATZI, A.A. AND LOUVARI, E.: 2001. Source parameters of the Izmit-Bolu 1999 (Turkey) earthquake sequences from teleseismic data. *Annali di Geofisica*, 44, 33-47.
- KORAVOS, G., TSAPANOS, T., HATZIDIMITRIOU, P. AND PAPAIOANNOU, CH.: 2001. Quantitative evaluation of the seismicity in seismogenic sources of the circum pacific rim. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1507-1513.
- LOUVARI, E. AND KIRATZI, A.:2001. Source parameters of the September 7, 1999 Athens (Greece) earthquake from teleseismic data. *J. Balkan Geophys. Soc.*, 43(3), 51-60.
- LOUVARI, E., KIRATZI, A., PAPAZACHOS, B. AND HATZIDIMITRIOU, P.: 2001. Fault-plane solutions determined by waveform modeling confirm tectonic collision in the Eastern Adriatic. *Pure and Applied Geophysics*, 158, 1613-1637.
- MARGARIS,B.N., PAPAZACHOS, C.B., PAPAIOANNOU, CH., THEODULIDIS, N., KALOGERAS, I. AND SKARLATOUDIS, A.A.: 2001. Ground motion attenuation relations for shallow earthquakes in Greece.
- MARGARIS,B.N., PAPAZACHOS, C.B., PAPAIOANNOU, CH., THEODULIDIS, N., KALOGERAS, I. AND SKARLATOUDIS, A.A.: 2001. Empirical attenuation relations for the horizontal strong ground motion parameters of shallow earthquakes in Greece. 2nd Congress of Earthquake Engineering and Engineering Seismology, Thessaloniki, November 28-30, pp. 27-35.
- MERTZANIDIS, I.K., TSOKAS, G.N. AND SAHALOS, I. N.: 2001. A direct solution for dielectric and geometric parameters of lossy two-layered media – applications in environmental geology. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1293 - 1299.
- PANAGIOTOU, M.: 2001. Seismic source parameters, focal mechanisms and stress tensor inversions in northern and central Aegean Sea, MSc. Thesis, Aristotle University of Thessaloniki, p. 130.
- PAPADIMITRIOU, E.E. AND L. R. SYKES.: 2001. Evolution of the stress field in the northern Aegean Sea (Greece). *Geophys. J. Int.*, 146, 747-759.
- PAPADIMITRIOU, E.E., KARAKOSTAS, V.G. AND BABA, A.: 2001. Possible triggering of strong earthquakes in a seismic sequence due to Coulomb stress changes generated by the occurrence of previous strong shocks. *Bulletin of the Geological Society of Greece.*, Vol XXXIV/4, 1539-1546.
- PAPADIMITRIOU, E.E., KARAKOSTAS, V.G. AND PAPAZACHOS, B.C.: 2001. Rupture zones in the area of the 17.08.99 Izmit (NW Turkey) large earthquake (M_w 7.4) and stress changes caused by its generation. *Journal of Seismology*, 5, 269-276.

- PAPADIMITRIOU, E.E., PAPAACHOS, C.B. AND TSAPANOS, T.M. : 2001. Test and application of the time- and magnitude predictable-model to the intermediate and deep focus earthquakes in the subduction zones of the circum-Pacific belt. *Tectonophysics*, 330, 45-68.
- PAPAIOANNOU, CH., KOLOGERAS, I., HATZIDIMITRIOU, P. AND MARGARIS, V.: 2001. Determination of k Value and its Correlation with V_{S30} . Based on strong motion records of the Athens Earthquake, September 1999. *Proceedings of 4th Hellenic Conference on Geotechnical and Geoenvironmental Engineering*, 265-272.
- PAPAACHOS, B.C., KARACOSTAS, B.K., KIRATZI, A.A., MARGARIS, B.N., PAPAACHOS, K.B. AND SCORDILIS, E.M.:2001. The appropriateness of magnitude scales which are used for the determination of relations concerning parameters of strong ground motion in Greece. 2nd Congress of Earthquake Engineering and Engineering Seismology, Thessaloniki, November 28-30, pp. 55-64.
- PAPAACHOS, B.C., KARAKAISIS, G.F., PAPAACHOS, C.B., SCORDILIS, E.M. AND SAVVAIDIS, A.S.: 2001. A method for estimating the origin time of an ensuing mainshock by observations of preshock crustal seismic deformation. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1573-1579.
- PAPAACHOS, B.K., MOUNTRAKIS, D.M., PAPAACHOS, C.B., TRANOS, M.D., KARAKAISIS, G.F. AND SAVVAIDIS, A.S.:2001. The faults which have caused the known major earthquakes in Greece and surrounding region between the 5th century BC and today. 2nd Congress of Earthquake Engineering and Engineering Seismology, Thessaloniki, November 28-30, pp. 17-26.
- PAPAACHOS, C.B., KARAKOSTAS, B.G., KARAKAISIS, G.F. AND PAPAIOANNOU, CH.A: 2001. The Athens 1999 mainshock ($M_w=5.9$) and the evolution of its aftershock sequence. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1581-1586.
- PAPAACHOS, C.B., VAMVAKARIS, D.A., VARGEMEZIS, G.N. AND AIDONA, E.V.: 2001. A study of the active tectonics and deformation in the Mygdonia Basin (N. Greece) using seismological and neotectonic data. *Bulletin of the Geological Society of Greece*, Vol XXXIV/1, 303-309.
- PAPAACHOS, C.B.: 2001. An algorithm of intermediate-term prediction using a model of accelerated seismic deformation. 2nd Congress of Earthquake Engineering and Engineering Seismology, Thessaloniki, November 28-30, pp. 107-115.
- PIRO, S., TSOURLOS, P.I. AND TSOKAS, G.N.: 2001. Cavity detection employing advanced geophysical techniques: a case study. *European Journal of Environmental and Engineering Geophysics*, 6, 3-31.
- QIN, CH., PAPADIMITRIOU, E. E., PAPAACHOS, B. C. AND KARAKAISIS, G. F.: 2001. Time dependent seismicity in China. *Journal of Asian Earth Sciences*, 19, 97-128.
- SAVVAIDIS, A., TSOKAS, G., TSOURLOS, P., VARGEMEZIS, A. CHRYSOSTOMOU AND P. CHRYSOSTOMOU.: 2001. A geophysical survey in the archaeological stie of Archontiko, Yannitsa. G. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1277-1284, 2001.
- SKARLATOUDIS, A., ΠΑΠΑΧΑΧΟΣ, Κ. ΚΑΙ ΜΑΡΓΑΡΗΣ Β.:2001. Καθορισμός φασματικού θορύβου από διορθωμένες καταγραφές ισχυρής κίνησης

του Ελληνικού χώρου. 2^ο Πανελλήνιο συνέδριο αντισεισμικής μηχανικής και τεχνικής σεισμολογίας. Τόμος Α'.

- SKARLATOUDIS, A.A., PAPAZACHOS, C.B. AND MARGARIS, B.N.: 2001. Determination of noise spectra from strong motion data recorded in Greece. 12th European Conference on Earthquake Engineering.
- TRIANTAFYLLIDIS, P., HATZIDIMITRIOU, P.M. AND SUHADOLC, P.: 2001. 1-D Theoretical modeling for site effect estimations in Thessaloniki: comparison with observations. *Pure and Applied Geophysics*, 158, 2333-2347.
- TSAPANOS, T.M., GALANIS, O.CH., MAVRIDOU, S.D. AND HELMI, M.P.: 2001. Bayesian probabilities for occurrence of large earthquakes in the seismogenic sources of Japan and Phillipine during the period 1998-2017. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1619-1625.
- TSAPANOS, T.M., KORAVOS, G.CH., PATSIA, C.I. AND KOULARAS, D.TH. : 2001. Spatial distribution of the seismic hazard parameters in the seismogenic sources of Japan. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1627-1633.
- TSAPANOS, T.M.: 2001. The Markov model as a pattern for earthquakes recurrence in South America. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1611-1617.
- TSAPANOS, TH. M.: 2001. Earthquake hazard parameters estimated in Crete Island and the Adjacent area. *Pure appl. Geophys.*, 158, 1961-1718.
- TSAPANOS, TH.M.: 2001. Evaluation of the seismic hazard parameters for selected regions of the world: the maximum regional magnitude. *Annali di Geofisica*, Vol. 44, N.1, Feb. 2001.
- TSOKAS, G.N., VARGEMEZIS, G., SOULIOS, G., MERTZANIDIS, I., AND TSOURLLOS, P. : 2001. Geophysical prospecting for buried antiquities by means of the G.PR. Method in a parking construction area in Lamia. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1351-1355.
- TSOURLLOS, P., VARGEMEZIS, G., TSOKAS, G., ALEXANDROU, K. AND TZELI, P.: 2001. Geophysical prospection for mapping of the Qanat systems: Application to the Qanat system of Agia Paraskeyh-Chortiati of Thessaloniki (N.Greece). *Bulletin of the Geological Society of Greece.*, XXXIV/4, 1385-1391.
- VARGEMEZIS, G., FIKOS, H., MERTZANIDIS, I, ZANANIRI, E, ROUMELIOTI, Z., ZOUROS, N., KONTIS, E. AND VALIAKOS, H.: 2001. Geophysical survey to the petrified forest of sigri in Lesvos Island (North Aegean). *Bulletin of the Geological Society of Greece*, XXXIV/4, 1285-1291.
- ZANANIRI, I.: 2001. The method of anisotropy of magnetic susceptibility: Theory and applications. A case study from the Rhodope Massif. *Bulletin of the Geological Society of Greece*, XXXIV/4, 1393-1401.
- AIDONA, E. AND VARGEMEZIS, G.: 2002. Construction of Geotectonic-Seismic map of Greece in the scale of 1:500.000. Proc. of 6^ο Pan-Hellenic Geographical Conference of the Hellenic Geographical Society, Vol. II, p.p. 9-16.
- AIDONA, E.: 2002. Palaeomagnetic and magnetic properties of core sediments in northern Greece: Contribution to the study of the diagenetic process. *Ph. D. Thesis*, p.253 , (advisor: D.Kontopoulou).
- BENETATOS, CH., ROUMELIOTI, Z., KIRATZI, A. AND MELIS, N.: 2002. Source parameters of the M=6.5 Skyros island (North Aegean Sea) earthquake of July 26, 2001. *Annals of Geophysics*, Vol. 45, N 3/4 513-526.

- BENETATOS, CH.: 2002. Properties of earthquake seismic sources in southern Aegean Sea, with emphasis on intermediate depth earthquakes, and stochastic simulation of ground motion, MSc Thesis, Aristotle University of Thessaloniki, p. 150.
- FIKOS, I., VARGEMEZIS, G., TSOKAS, G., HATZIDIMITRIOU, P. AND DIMOPOULOS, G.: 2002. Diachronic study of free aquifers using the method of electric tomography: A case study in Northern Greece. *Europ. J. Envir. Engineering. Geophys.*, 7, 185-193, 2002.
- GALANIS, O., TSAPANOS, TH., PAPADOPOULOS, G. AND KIRATZI, A.: 2002. Bayesian extreme values distribution for seismicity parameters assessment in South America. *Journal of the Balkan Geophysical Society*, 5(3), 77-86.
- KARAGIANNI, E., PANAGIOTOPOULOS, D., PANZA, G., SUHADOLC, P., PAPAACHOS, C., KIRATZI, A., HATZFELD, D., MAKROPOULOS, K., PRIESTLEY, K. AND VUAN, A.: 2002. Rayleigh wave group velocity tomography in the Aegean area. *Tectonophysics*, 358, 187 - 209.
- KARAGIANNI, E., PANAGIOTOPOULOS, D.G., PANZA, G.F., SUHADOLC, P., PAPAACHOS, C.B., PAPAACHOS, B.C., KIRATZI, A., HATZFELD, D., MAKROPOULOS, K., PRIESTLEY, K. AND VUAN, A.: 2002. Rayleigh wave group velocity tomography in the Aegean area. *Tectonophysics*, 358, 187-209.
- KARAGIANNI, E.: 2002. Dispersion of surface waves in the shallow layers of the crust in the Aegean area., *Ph. D. Thesis*, p. 224, (advisor: D. Panagiotopoulos).
- KARAKAISIS, G.F., PAPAACHOS, C.B., SAVVAIDIS, A.S., AND PAPAACHOS, B.C.: 2002. Accelerating seismic crustal deformation in the North Aegean Trough, Greece. *Geophys. Journal International*, 148, 193-200.
- KIRATZI, A. :2002. Stress tensor inversions along the westernmost North Anatolian Fault Zone and its continuation into the North Aegean Sea. *Geophysical Journal International*, 151, 360-376.
- KOUTRAKIS, S.I., KARAKAISIS, G.F., HATZIDIMITRIOU, P.M., KOLIOPOULOS, P.K. AND MARGARIS, V.N.: 2002. Seismic Hazard in Greece based on different strong ground motion parameters. *Journal of Earthquake Engineering*, 6, 75-109.
- MARGARIS, B. AND HATZIDIMITRIOU, P.: 2002. Source spectral scaling and stress release estimate using strong-motion records in Greece. *Bull. Seism. Soc. Am.* 92, 1040-1059.
- MERTZANIDIS, I. GOUDOS, S. AND SAHALOS, G. : 2002. Direct solution and Monte Carlo simulation of the inverse problem in two-layered half-space. *Electrical Engineering*.
- PANAGIOTOU, M. (2000). Seismic source parameters, focal mechanisms and stress tensor inversions in northern and central Aegean Sea, MSc thesis, Aristotle University of Thessaloniki, p. 130.
- PAPADIMITRIOU, E.:2002. Mode of Strong Earthquake Recurrence in the Central Ionian Islands (Greece): Possible Triggering due to Coulomb Stress Changes Generated by the Occurrence of Previous Strong Shocks. *Bul. Seismol. Soc. Am.*, 92, 3293-3308.
- PAPADOPOULOS, I.: 2002. Robust inversion of time-domain EM sounding data. .Sci.Thesis, Department of Geology, Aristotle University of Thessaloniki, pp. 97, 2002. (in Greek).

- PAPAACHOS, B., KARAKOSTAS, V., KIRATZI, A., MARGARIS, V., PAPAACHOS, C. AND SCORDILIS, E.:2002. The advantage of determination of earthquake magnitudes in Greece in the local scale. Reply on the comment of N. Ambraseys. *Journal of Seismology*, 6, 589-591.
- PAPAACHOS, B.C, KARAKOSTAS, V.G., KIRATZI, A.A., MARGARIS, B.N., PAPAACHOS, C.B. AND SCORDILIS, E.M.: 2002. Uncertainties in the estimation of earthquake magnitudes in Greece. *Journal of Seismology*, 6, 557-570.
- PAPAACHOS, B.C., SAVVAIDIS, A.S., KARAKAISIS, G.F. AND PAPAACHOS, C.B.: 2002. Precursory accelerating seismic crustal deformation in Northwestern Anatolia Fault Zone. *Tectonophysics*, 347, 217-230.
- PAPAACHOS, B.C., SAVVAIDIS, A.S., KARAKAISIS, G.F., PAPAACHOS, C.B., PAPADIMITRIOU, E.E., SCORDILIS, E.M. AND KARAKOSTAS, B.G.: 2002. Premonitory clustering of shocks in critical regions. *XXVIII General Assembly of the European Seismological Commission (ESC), Genova, Italy, 1-6 September 2002*.
- PAPAACHOS, B.C., SAVVAIDIS, A.S., PAPAACHOS, C.B. AND KARAKAISIS, G.F.: 2002. Seismic Precursory seismic crustal deformation in the area of southern Albanides. *Journal of Seismology*, 6, 237-245.
- PAPAACHOS, C.B., KARAKAISIS, G.F. AND SCORDILIS, E.M.: 2002. Results of a retrospective prediction of past strong mainshocks in the broader Aegean area by application of the accelerating seismic deformation method. *Proc. of XXVIII General Assembly of E.S.C., Genoa, Italy, 1-6 September, 14pp*.
- PAPAACHOS, C.B., KARAKAISIS, G.F., SAVVAIDIS, A.S. AND PAPAACHOS, B.C.: 2002. Accelerating seismic crustal deformation in the southwestern Aegean Area. *Bull. Seism. Soc. Am.*, 92, 570-580.
- PANOU, A.:2002. Spectral analysis of acceleration records from the aftershock sequence of Kozani-Grevena 1995 earthquake. M.Sci.Thesis, Department of Geology, Aristotle University of Thessaloniki, pp. 97, 2002. (in Greek).
- QIN CHANGYUAN, PAPAACHOS C., AND PAPADIMITRIOU, E.:2002. Velocity field for crustal deformation in China derived from seismic moment tensor summation of earthquakes. *Tectonophysics*, 359 29-46.
- ROUMELIOTI, Z. AND KIRATZI, A.: 2002. Stochastic Simulation of Strong-Motion Records from the 15 April 1979 (M 7.1) Montenegro (Yugoslavia) Earthquake. *Bulletin of the Seismological Society of America*, 92, 1095-1101.
- ROUMELIOTI, Z., KIRATZI, A., THEODOULIDIS, N. AND PAPAIOANNOU, C. :2002. S-wave spectral analysis to retrieve the source parameters of the 1995 Kozani-Grevena (NW Greece) aftershock sequence. *J. of Seismology*, 6, 219-236.
- SCORDILIS, E.M., PAPAACHOS, C.B., KARAKAISIS, G.F. AND KARAKOSTAS, V.G. : 2002. Accelerating seismic crustal deformation before strong mainshocks in Adriatic and its importance for earthquake prediction. *Proc. Of XXVIII General Assembly of E.S.C., Genoa, Italy, 1-6 September 2002*, 12pp.
- SKARLATOUDIS, A. : 2002. relocation of earthquake hypocentral parameters in Greece using data from local experiments and their influence on strong motion attenuation relations, Ph. D.Thesis, Thessaloniki, 2002, (Supervisor: C.Papazachos)
- TRANOS, M., PAPADIMITRIOU, E. E. AND KILIAS, A.:2002. Thessaloniki-Gerakarou Fault Zone (TGFZ): The western extension of the 1978 Thessaloniki

earthquake fault (Northern Greece) and seismic hazard assessment. A. *Journal of Structural Geology*.

- TRIANTAFYLIDIS, P. HATZIDIMITRIOU, P. AND SUHADOLC, P.: 2002. Influence of source on 2-D site effects. *Geophysical Res. Let.* Vol. 29, No.6, 101029
- TSAPANOS, T.M., GALANIS, OD.CH., KORAVOS, G. AND MUSSON, R.: 2002. A method for Bayesian estimation of the probability of local intensity for some cities in Japan. *Annals of Geophysics*, Vol. 45, No 5, 657-671.
- VLASTOS, S., PAPADIMITRIOU, E., PAPAZACHOS, C. AND KARACOSTAS, V. :2002. Determination of seismic lineaments in the Aegean Area and deformation velocities. *11th Gen. Ass. Wegener Project, Athens 12-14, June 2002.*
- ZANANIRI, I., DIMITRIADIS, S., KONDOPOULOU, D. AND ATZEMOGLOU, A.: 2002. A preliminary AMS study in some tertiary granitoids from Northern Greece: integration of tectonic and paleomagnetic data. *Phys. Chem. Earth*, 1289-1297.

6.3 Hellenic Petroleum S.A.

Reflection and refraction seismology was developed by Hellenic Petroleum S.A During the period 1999-2002 Hellenic Petroleum S.A performed 240 km of reflection and refraction seismic research work in the areas of Epirus (Northwest Greece) and W. Peloponnisos.

Furthermore 16 km of high resolution seismic work was performed in the area of TORRES-VEDRAS in Portugal. The work used as energy source Dynamite (Portugal) and GSI tr-4 Vibroseis. The seismic reflection recording was done by the Sercel 388 SN-SU digital ultra light system. The refraction work performed by the STRATA VIEW 60R system.

7. VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR

7.1 National Observatory of Athens - Institute of Geodynamics

1. Introduction

The Institute of Geodynamics (I.G) is one of the four Institutes comprising the National Observatory of Athens (N.O.A.), which is a National Research Center supervised by the General Secretariat of Research and Technology, Ministry of Development. I.G is one of the oldest research Institutes in Greece operating continuously since 1893. The location of the Head Office of I.G is on the hill of Nymphs, opposite to Acropolis, at the center of Athens.

2. International Research Programs

The I.G participated as Coordinator to the following, 3-yr international project funded by the IST program of the EU:

"Geo-spatial warning systems Nissyros volcano (Greece). An emergency case study" (GEOWARN; www.geowarn.org)

The major result of the project is the development of a new planning tool that includes not only the state-of-the-art of scientific knowledge and advanced monitoring systems but also their easy use for public education to improve awareness of natural hazards. This tool contains European standards (technological norms and quality requirements and formats) and is applicable to all European regions. The new interactive medium, either on CD-ROM and/or on an Internet-platform, will enable the users to actually participate in the evaluation of volcanic and seismic hazards as well as modeling and quantification of risk. The GEOWARN project is a collaborative effort, involving organizations from four European countries. It brings together partners with specialist skills in areas including: Risk Management and Assessment, Logic Programming, Earth Observation and Satellite Image Processing, Environmental Hazard Assessment, Geology and Oceanography, Volcanology and Geochemistry, Cartography, GIS, AIS Multimedia Systems, Seismology, Geothermics.

3. Publications

1. Ganas A., Lagios E., Dietrich J.V., Vassilopoulou S., Hurni L., & Stavrakakis G. Interferometric Mapping of Ground Deformation in Nissyros Volcano, Aegean Sea, during 1995-1996. *6th Hellenic Geographical Congress*, pgs. 135-142, vol. II, 2002.
2. Lagios, E., Dietrich, V., Stavrakakis, G., Parcharides, I., Sakkas V. & Vassilopoulou S. Will Nissyros Volcano (GR) Become Active? Seismic Unrest and Crustal Deformation. *European Geologist*, pgs. 44-50, vol. 12, 2001.
3. Sachpazi M., Kontoes Ch., Voulgaris N., Laigle M., Lepine J. Cl., Sikioti O., Baskoutas I., Kalogeras I., and G. Stavrakakis. Seismological and INSAR signature of unrest at Nissyros caldera, Greece. *Journal of Volcanology and Geothermal Research*, Vol., pgs. 19-33, vol. 116, 2002.