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VOLCANOLOGY AND CHEMISTRY OF THE EARTH'S INTERIOR COMMISSION
OF TURKEY
FOR
1999 - 2003

to be presented at the
XXIII. GENERAL ASSEMBLY
of the
INTERNATIONAL UNION of GEODESY and GEOPHYSICS
JUNE 30 – JULY 11, 2003

ADHERING ORGANIZATION
MINISTRY OF NATIONAL DEFENCE
GENERAL COMMAND OF MAPPING
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TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS
(TNUGG)

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GEODESY COMMISSION OF TURKEY
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1 Introduction

Directing and promoting the scientific studies at the field of Geodesy, ensuring cooperation and communication among its members, organizing scientific meetings and following international developments and consequently representing Turkey; could be listed among the activities of Turkish National Geodesy Commission (TNGC).

Geodesy has not taken its place which it deserved in earth sciences yet and it is left in the area of interest of geology and geophysics. Science aims discovering nature and explaining natural events. Scientific information and products are adapted and promoted as long as they are about explaining natural events and facilitating the social life. For this reason; it is considered that the Turkish scientists of geodesy; along with their solely scientific aims, ought to take place in the studies which will support the social life and also do their best to avail geodesy take its respectful position among geological sciences. The place of geodesy among earth sciences has similarities in the milieu of international earth sciences as for this reason International Association of Geodesy (IAG), had established a research commission which aimed reestablishment and this commission, after having finished its studies, had presented its final report at IAG 2001 council meeting . The studies of the commission were found appropriate by the members of the IAG council and it was decided that IAG will be organized in its new establishment after the general committee meeting which will be held in 2003. The changes made in the structure of IAG include innovations in scientific and technical circumstances as much as in managerial means. Along with the social requirements came into place after the destructive earthquakes of Düzce and Gölcük, happened in 1999 in Turkey and the recorded scientific and technological developments, the regulation of Turkish National Geodesy and Geophysics Association was changed. One of the major changes in the regulation is, creating opportunities to sponsor the projects which will be focused on earth sciences. Although this resource is not used effectively now the studies for availing better conditions are carried on.

It has become inevitable to make fundamental changes in the structure and function of TNGC parallel with national requirements and international developments. In the studies which were resulted as re-establishing TNGC the following criteria were initiated;

a. Ensuring a participating managerial structure for TNGC ,
b. Make it active in national and international levels ,
c. To participate in studies for determining the institutions sponsoring research projects (TNGGU, TUBITAK , DPT , MINISTRIES , etc.) in our country to sponsor geodetic projects ,
d. To develop geodetic joint projects and programs,
e. Helping, obtaining data from national and international centres to be used in the projects.
f. To encourage its members to publish qualified works in the international scientific journals.
g. To encourage Turkish scientists of geodesy to be organized in national levels, to take place in activities and producing joint projects.
h. To ensure the communication among the members of TNGC.
i. To ensure the information change among the members of TNGC by organizing scientific meetings.

TNGC had finished its reestablishment process in a serial meeting and prepared a new inner regulation. In TNGC's new structure; an executive committee, authorized and functioned to implement all sort of organising about the activities of TNGC, a centre office which will be

responsible for application of decisions of the executive committee, a candidate determining commission for determining the candidates to take place in the examination for the personnel who will be employed in the organs of TNGC, were established. Additionally; TNGC working groups (WG) were changed in the parallel of IAG and new working groups were established to work as reference coordinate systems (WG1), Gravity Field (WG2), Geodynamics (WG3) and Positioning and applications (WG4).

In the new term it is decided to organize annual scientific meetings by TNGC and first of them Workshop on Tectonics and Geodetic Networks (TGN) was performed on 19-21 October 2002 in İznik. The works of TNGC for organising year 2003 scientific meeting are carried on and the workshop entitled "Geographic Information Systems and Fundamental Geodetic Networks" will be held in 24-26 September in Selçuk University , Konya. It is among the aims of TNGC to carry these meetings which are now held in national circumstances, to the international platforms.

It is necessary for TNGC to take the appropriate steps and to produce applicable projects along with the National Earthquake Program, which was introduced in the scope of the changes made in the structure of TNGGU. The earthquakes and the geodynamic event are the most destructive and deforming events for geodetic networks along with their important social consequences. As our country is a natural laboratory for the studies on the crust of earth movements; after the earthquakes whose magnitudes are Mw >= 6, the basic Geodetic networks should be upgraded and the geodetic methods should be used for modelling and interpreting the movements of the crust of the earthquake along with determining the area of velocity. The three methods that are used in geodynamic researches are; Geodesy, Geology and Seismology and in particular taking into account that the geodetic methods are one of the indispensable and essential methods for verification of the researches, the joint earth science projects should be used constructed.

The public institutions and foundations, private sector and the universities are the three major elements of mapping so of Geodesy. Producing everything that the country requires, the geodetic contributions for solving the problems of earth sciences, education, contribution to the development of the universal science and technology, competitive and profitable production, application and development of new competences, study for taking place among the worlds scientists of geodesy and ensuring the resources of the country to be used effectively are representing the major aims and their subdivisions of those three major elements of Geodesy. Expanding the cooperation and cooperation opportunities among the private sector, public institutions and the universities; should be one of the major aims of TNGC. For attaining this goal; producing and applying original projects including country requirements should be seen as the basic solution.

TNGC's being successful and attaining its goals in the following term and its being a scientific community which will be found appropriate by the Turkish scientists of Geodesy and in which they would be active is our best wish.

2 Administrative Activities of The Commission

Turkish National Geodesy Commission (TNGC) acts as one of the sub commissions of Turkish National Union of Geodesy and Geophysics (TNUGG). TNGC activities are carried with respect to TNUGG statutes and TNGC By-Laws.

Recent developments and changes in geodesy and geophysics made it necessary to make fundamental reforms in International Union of Geodesy and Geophysics (IUGG) and International Association of Geodesy (IAG). With respect to the international developments and domestic requirements, modification in TNGC and TNUGG structures has come out.

First of all, the statues and by-laws were rearranged, and support possibility was occurred, especially for the projects that will be executed under the responsibility of TNUGG. In the scope of TNGC, an intensive work was initiated in 2001 due to constitute a participating and active structure at national level. These works, started to constitute the new TNGC structure, have been supported in countrywide, and universities, government institutions and organizations, the Association of Survey and Cadastral Engineers (ASCE) have actively participated in these works. Within these works, the first TNGC meeting was held in Yıldız Tecnical University-Istanbul, in November of 2001. The November 2001 meeting of TNGC has the property of beginning of a new era. The resolutions of the meeting are given below briefly.

The results of TNGC November 2001 meeting were published as a brochure, and published also in ASCE bulletin.

TNGC entered the new year with restructuring works and those achieved during the year are given below.

TNGC 2002 Activities

Within the starting works of the new era, TNGC President, TNGC University Representative and TNGC Secretary have begun their duties. The secretariat activities started to be executed in General Command of Mapping, the Adhering Institution of TNGC.

a. TNGC By-laws

As a result of change in TNUGG Statute and also change in the structure and statutes of IUGG and IAG, besides the national requirements, works were started for TNGC By-law to constitute a participating and active structure in TNGC. The Draft By-law was improved due to the proposals of Temporary Executive Committee and other members. The TNGC By-law was approved by unanimous vote, at the TNUGG Council meeting which was held in General Command of Mapping on 5th of April, 2002.

The new TNGC Executive Committee has started to duty since then and the Presidents and Secretaries of the Working Groups were elected between the candidates offered by the Nominating Committee.

The structure after new TNGC By-law is given below.

TNGC Central Bureau
TNGC President
TNGC University Representative
TNGC Secretary

TNGC Executive Committee
TNGC President
TNGC University Representative
TNGC Secretary
TNGC President (former)
TNGC University Representative (former)
Study Group (I) President
Study Group (II) President
Study Group (III) President
Study Group (IV) President
ASCE Representative
TÜBİTAK (The Scientific and Technical Research Council of Turkey) Representative

Nominating Committee (3 members)

TNGC Working Groups
Working Group I : Reference Coordinate Systems
Working Group II : Geodynamics
Working Group III : Gravity Field
Working Group IV : Point Positioning and Applications

b. Nominating Committee Activities

Three members of Nominating Committee were selected by TNGC Executive Committee, determined the President and Secretary candidates of Working Groups. On the other hand, Nominating Committee executes its duty for the other subjects, which will be determined by TNGC Executive Committee.

c. Updating the Membership Information

An announcement was made, by means of universities and government institutions, demanding the TNGC members and who wants to be a TNGC member for updating their membership information. According to responses to this announcement, membership information was updated and new members were registered. TNGC member list was approved by the TNUGG Council meeting held on 5th of April, 2002. There are currently 152 members of TNGC.

d. Maintenance of the TNGC web page

For the sake of maintaining an environment for communication and exchanging knowledge between TNGC members, also for announcing the national and international activities, a web page was established for TNGC. TNGC web page, constructed under General Command of Mapping web page (www.hgk.mil.tr/~TUJK), is being maintained and updated

by TNGC Secretary. The web page is in Turkish at the moment, but it is planned to be in English also.

e. Activities of the Working Groups

With the new TNGC By-laws, four Working Groups were constituted according to the present commissions in IAG and national requirements. These Working Groups began their activities. Afterwards, it was decided to prepare short and long-term study plans for Working Groups and to establish and execute new projects. Also it will be possible to constitute Sub Study Groups under the Working Groups.

f. TNGC 2002 Scientific Meeting (Tectonics and Geodetic Networks, TGN-2002)

It was decided to hold the TNGC 2002 Scientific Meeting as a workshop in Boğaziçi University Kandilli Observatory and Earthquake Research Institute – İznik, at the TNGC Temporary Executive Committee meeting which was held in Istanbul Technical University on 15th of May 2002. The topic of the workshop was determined as Tectonics and Geodetic Networks.

"Tectonics and Geodetic Networks 2002 (TGN-2002) Workshop" was held in İznik in October 10-12, 2002. Works on publication of the presentations presented at workshop are still going on.

g. Preparations for TNGC 2003 Scientific Meeting

The TNGC 2003 Scientific Meeting, which will be held annually due to TNGC By-law, was decided to be held in Geodesy and Photogrammetry Engineering Department of Selçuk University in Konya in September 24-26, 2003.

The main topic of the workshop is "Geodetic Networks Geographical Information Systems". The preparations for the meeting are executed by TNGC and Selcuk University.

General Command of Mapping, the Adhering Organization of TNGC, will publish the presentations of TNGC 2003 Scientific Meeting

h. Preparation of TNGC 1999-2003 Term Report and 2002 Annual Report

An annual report and a TNGC 1999-2003 term report, containing the administrative activities of TNGC Executive Committee and scientific activities of the Working Groups executed during the year, was prepared. The term report will be submitted to IUGG. Each part of the report was prepared by the concerned Working Groups, and combined by an editor.

3 Working Group Activities of The Commission

There are four working groups that are voluntarily working under Turkish National Geodesy Commission. In this section of the report the reader might obtain information about their activities and strategies for next term activities

3.1 Reference Coordinate Systems Working Group

3.1.1 Turkish Fundamental GPS Network 1999A – TUTGA-99A

Turkish National Fundamental GPS Network (TNFGN – TUTGA) has been established in 2001 (Figure 3.1) and some of the stations have been re-surveyed due to the earthquakes happened in 1999. The total number stations are about 600 and for each station 3D Coordinates and their associated velocities have been computed in ITRF96 (Reference Epoch: 1998.0). Positional accuracy of the stations is about 1-3 cm whereas the relative accuracies are in the range of 0.01 ppm. Also, the network has been connected to the Turkish Conventional Horizontal and Vertical Control Networks through some points and time-dependent coordinates of all the stations are being computed in the context of the maintenance of the network with periodic GPS observations. Considering the on-going tectonic feature of the region, second period surveys of the great majority of the points have been completed in 2001, 2002 and 2003 and velocities have been estimated. Also appropriate models for coordinate transformation from ED-50 system into the WGS84 have defined in the context of TNFGN. Detailed information about TNFGN can be found in www.hgk.mil.tr under the name TUTGA in Turkish.

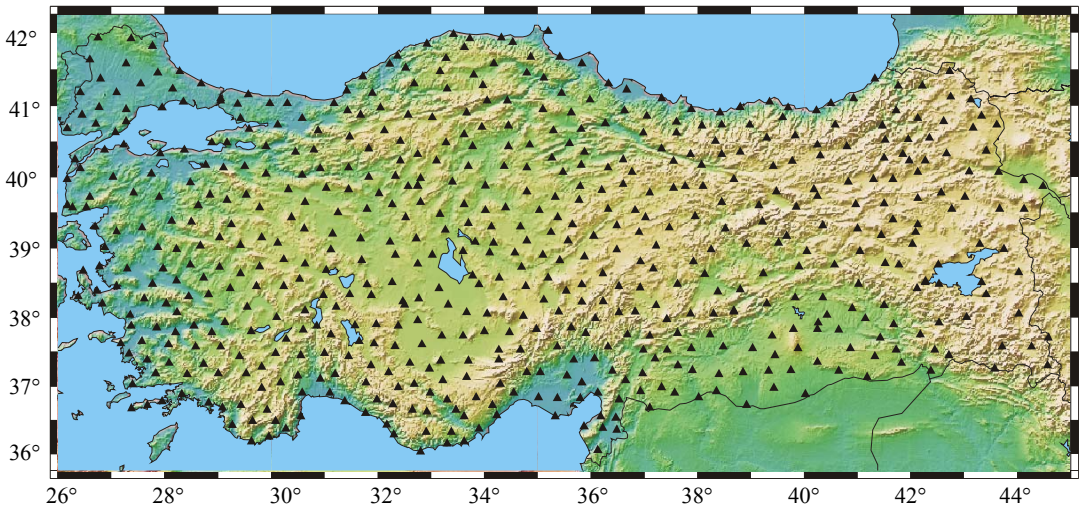


Figure 3.1: Distribution of TNFGN stations.

3.1.2 Turkish National Vertical Control Network - TUDKA99

Turkish National Vertical Control Network (TNVCN-99) was established with the adjustment of 243 lines of 25680 points with total length of 29316 km. This network includes 151 first and 41 second order lines measured between 1970 and 1993, and 7 first and 44 second order lines measured before 1970 (Figure 3.2). Vertical datum for TNVCN-99 is defined with arithmetic mean of instantaneous sea level measurements recorded at Antalya tide gauge between 1936 and 1971. In the adjustment, geopotential numbers were used as observations and geopotential numbers, Helmert orthometric heights and Molodensky normal heights at all points were calculated. Gravity values in modified Potsdam datum were used in calculating geopotential numbers. The adjustment results in precision of point heights varying from 0.3 cm to 9 cm depending on the distance from the datum point. Differences between TNVCN-99 Helmert orthometric heights and currently used Normal orthometric heights were found to be between –14 cm and +36.9 cm and mean value of it was found as +9.5 cm with standard deviation of ±8.4 cm. Correction value between two height systems at any point given with position can be calculated.

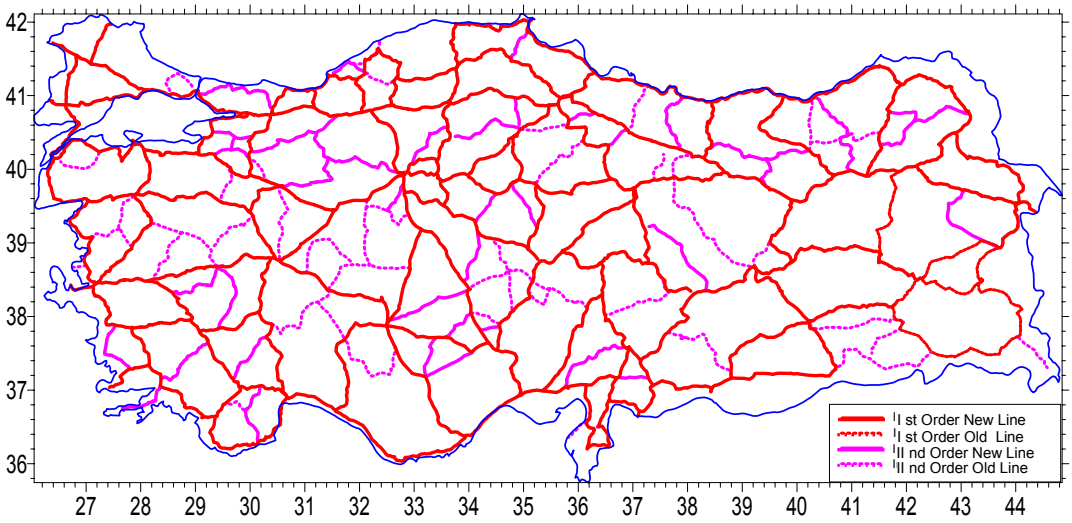
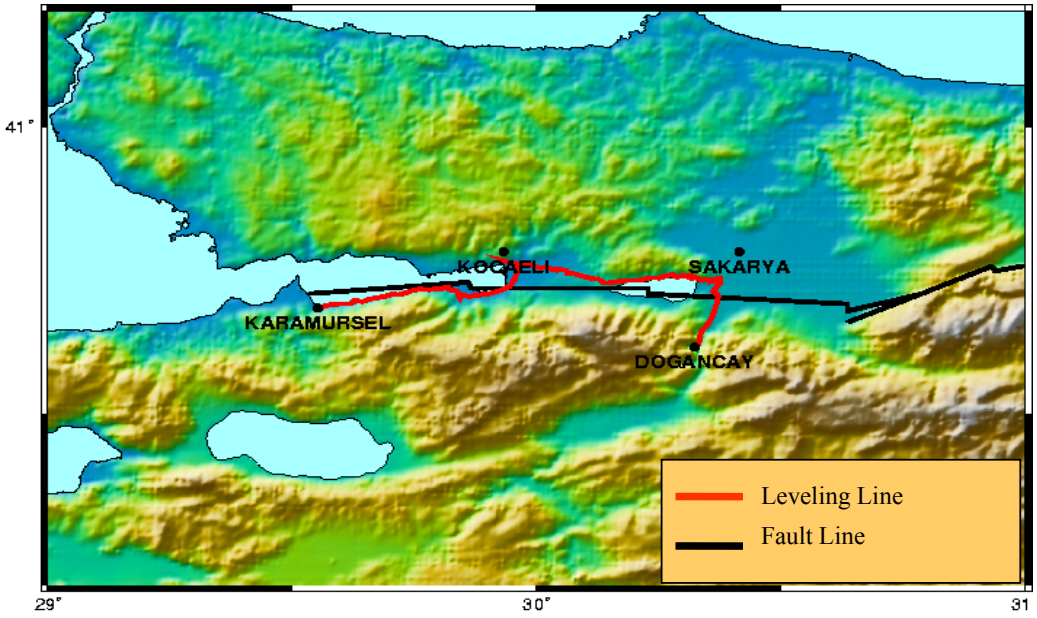


Figure-3.2: Turkish National Vertical Control Network-1999 (TNVCN-99)

Right after 17 August 1999 İzmit earthquake, in November 1999, in order to determine the vertical displacements in TNVCN-99, levelling line of 110 km re-measured in the region; Hersek – Karamürsel – Gölcük – İzmit – Adapazarı - Arifiye and Doğançay (Figure 3.3).

The comparison of geometric levelling heights before and after İzmit earthquake relative to 5-DN-38 benchmark located in west of Hersek results in vertical displacements is varying between -52 cm and +8 cm. It became necessary to re-measure levelling lines in wider region considering the huge amount of vertical deformation due to İzmit and Düzce earthquakes.

Figure-3.3: Re-measured levelling lines in November 1999



In order to determine the vertical displacements in a wider area due to 17 August İzmit and 12 November Düzce earthquakes, 14 first and second order levelling lines of 1300 km re-measured in the region; Bursa - İstanbul – İzmit – Adapazarı - Zonguldak and Bolu during May-September 2000 and 2002 (Figure-3.4). Relative gravity measurements were also carried out at vertical control points.

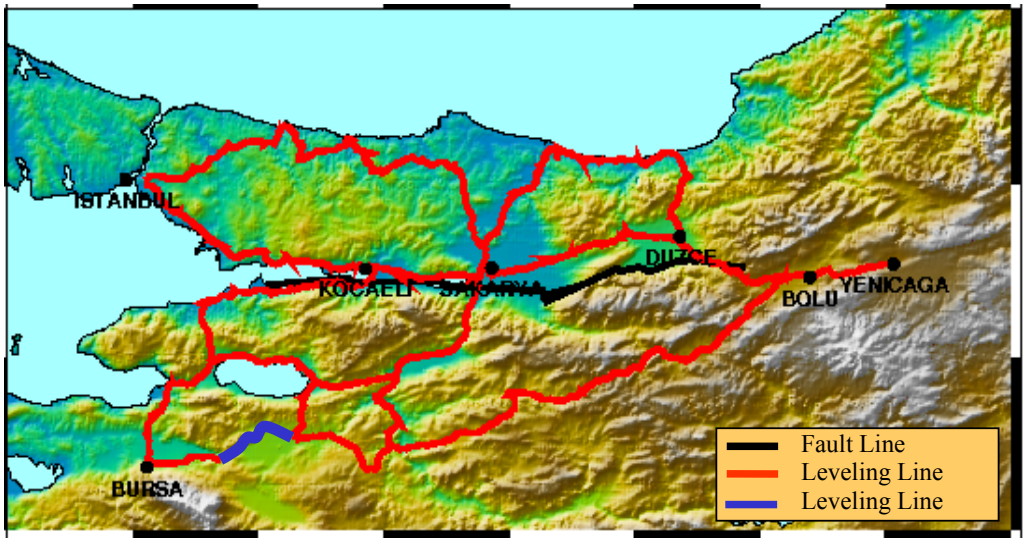


Figure-3.4: TNVCN-99 lines re-measured in 2000 and 2002

3.1.3 Turkish National Permanent GPS Network - TUSAGA

The Turkish National Permanent GPS Network (TPGN) is still in establishment phase with its 7 operational stations of which data can be used (Figure 3.5). In addition to the currently working ANKARA station since 1991 under IGS network, DİCLE (DİYARBAKIR), GEBZE (TÜBİTAK), ERDEMLİ (MERSİN), ERDEK, TRABZON (KTU) and İSTANBUL (ITU) stations were included into the network during the years, 1997, 1998, 1999, 2000 and 2001. Other than that of those stations, the data from 11 stations around Marmara Sea, established under a private project with TÜBİTAK Marmara Research Centre, can be utilized by scientific community. The time-series analyses of TPGN stations are performed at General Command of Mapping on monthly bases. Spectral analyses for the determination of periodical components in the series are performed as well as the work for the co-seismic and post-seismic displacements due to the Marmara earthquakes. TPGN is aimed to consist of about 16 stations in the planning phase of the Network, however, the earthquake prone character of Turkey dictates to increase the number of sites of about 25-76 in future. Besides their usage as master stations for a wide range of surveying activities, TPGN stations are going to be utilized as geodetic control and for monitoring the crustal movements in geodynamical activities within their continuous data collection and analyses cycle.

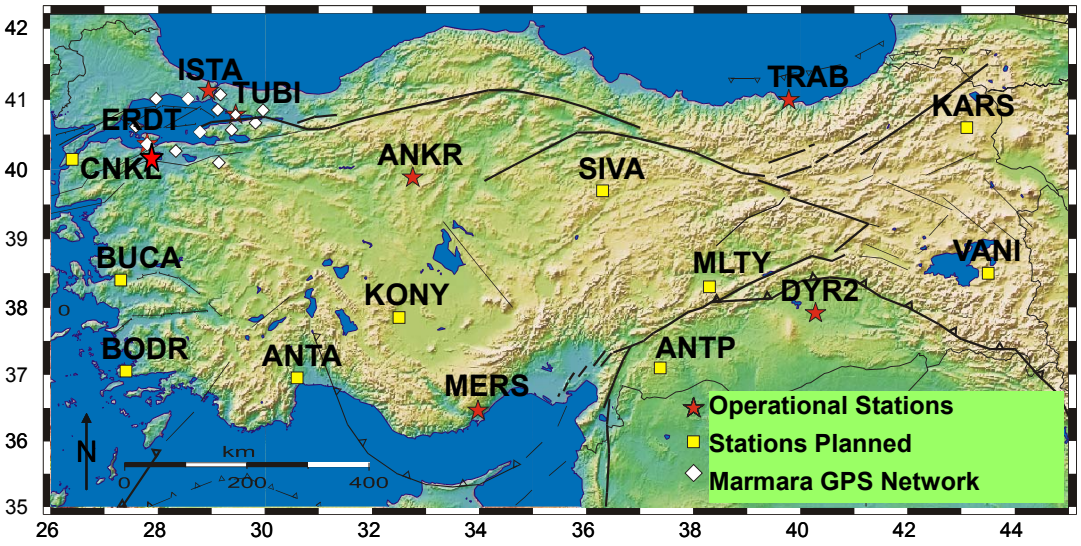


Figure-3.5: Distribution of TPGN stations (as of MAY 2003).

3.1.4 Turkish National Sea Level Monitoring Network (TUDES)

General Command of Mapping (GCM) operates seven tide gauge stations namely Antalya-II, Bodrum-II, Erdek, Mentes, Amasra, İğneada and Trabzon-II located at Mediterranean, Marmara, Agean and Black sea coasts under the frame of Turkish Sea Level Monitoring Network (TUSELS). In 1998 and 1999 in order to fulfil the GLOSS standards, GCM modernised the existing analogous floating type tide gauges in stilling wells with the digital and automatic tide gauges that consist of a measurement and data collection unit with a self-calibrating acoustic ranging sea level sensor and meteorological sensors. The digital and automatic tide gauges, being state of art, are capable of real time monitoring of sea level

and meteorological parameters. The data are collected at the data centre in Ankara via telephone lines and are checked for quality regularly. Distribution of the existing digital and automatic tide gauges and the planned ones are given in Figure-3.6. As an example, self calibrating acoustic sea level sensor and ancillary meteorological sensors at Trabzon-II digital and automatic tide gauge station are shown in Figure-3.7.

Figure-3.6: Locations of the existing and planned digital tide gauge stations of TUSELN

There are 4-6 benchmarks at local levelling networks of tide gauges which are connected to the Turkish Vertical Control Network by at least two levelling benchmarks. One of the benchmarks of the local levelling network is chosen as TG-GPS benchmark on which episodic GPS measurements are carried out to detect the absolute vertical land movements. The periodical first order precise levelling measurements are performed at 1-2 year intervals between tide gauge zero and the primary tide gauge benchmark (PTGBM) and other levelling benchmarks including TG-GPS in order to provide sea level data continuity on a common datum and to monitor the relative land movements.

TUSELS has the capability to provide reliable data for the investigation of local relative sea level changes and determination of vertical crustal movements at Turkish coasts having complex tectonic structures. On the other hand, TUSELS contributes to studies for the improvement of national geodetic vertical datum of Turkey. Its dependable real time sea level and meteorological data have given opportunity to examine sea-air interactions for climate change studies in Turkey. TUSELS offers dependable and accurate relative sea level observations for calibration of satellite altimeters and, also provides the exploration of sea level measurements for navigation purposes. Moreover, TUSELS provides sea level statistics for some engineering purposes such as harbour design and coastal area planning in Turkey.

Figure-3.7: Trabzon digital and automatic tide gauge

3.1.5 Large Scale Map and Map Information Production Regulation

Currently Large Scale Map Making Regulation is used im Turkey. However this does not fit the needs of surveying authorities. It was approved in 1988 and therefore it mostly covers conventional surveying standards rather then modern standards. Therefore new and updated one has been prepared with in last two years, and it is now on the stage of approval. It is called Large Scale Map and Map Information Production Regulation. It is going to bring new and extended technical standards to surveying profession.

Firstly it has been design to cover all current needs of surveying authorities. Moreover its design is suitable to cover coming technologies and technical developments in the profession. Moreover two additional national standards have been developed and integrated as its appendix to the regulation. One of them is XML based "***National Data Exchange Format***" for Digital Maps and the other one is "***Detail and Attribute Catalogue***". Both are prepared to fully compensate the national needs; but compatible with international standards.

It might be the most advantages of this regulation against the previous one is its approval authority. It is going to be approved by the Cabinet. The meaning of this is: It is going to be a regulation for all kind of large scale map making and map information collection. Therefore all will be in a single standard.

3.2 Gravity Field Working Group

3.2.1 Turkish Geoid 1999A (TG99A)

Currently the need for precise geoid heights, which are to be used in obtaining the orthometric heights directly from GPS ellipsoidal heights, has still been continuing. This

problem may be solved by the combination of existing gravimetric geoid and GPS/Levelling geoid. Turkish Gravimetric Geoid (TG-91) (Figure 3.8) was computed by Least Squares Collocation method using point gravity observations, digital terrain model and earth geopotential model in a remove-restore procedure.

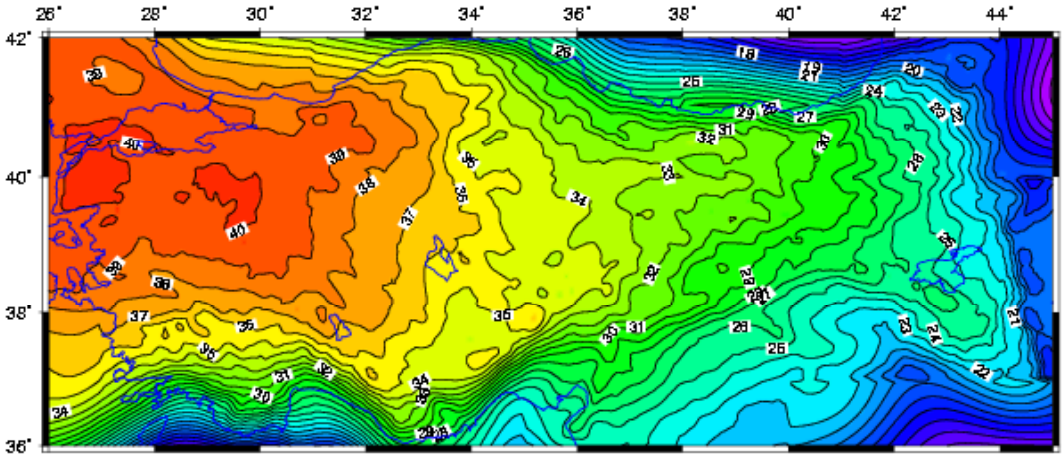


Figure-3.8: Turkish Geoid – 1991 (TG-91)

The ellipsoidal heights of the points referred to ITRF96 have been made available by the establishment of the Turkish Fundamental National GPS Network – 1999A. Precise and homogeneous Helmert orthometric heights all over Turkey can be computed after the re-adjustment of Turkish National Vertical Control Network - 1999. Helmert orthometric and ellipsoidal heights (TUTGA-99A) were determined at 197 points scattered over Turkey. TG-91 geoid heights at those points were interpolated.

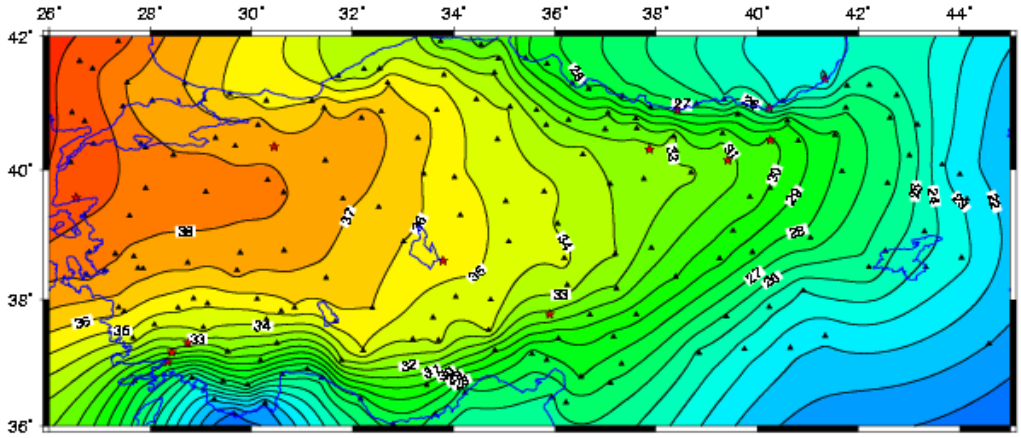


Figure-3.8: GPS/Levelling geoid model

The differences between GPS/Levelling (Figure 3.8) and TG-91 geoid heights, as TG-91 being the reference surface, were computed at 197 points. In the modelling of the differences, first, the deterministic part (trend) was determined by a 6-parameter polynomial surface, and subtracted from the differences in order to obtain the residual differences. The residual differences have stochastic properties, and have been modelled and girded by using adjustable tension continuous curvature surface girding algorithm. The Updated Turkish Geoid-1999A (TG-99A) (Figure 3.9) for Turkey were computed by summing up known TG-91 geoid heights, computed trend values and girded residual differences at 3'x3' grid nodes.

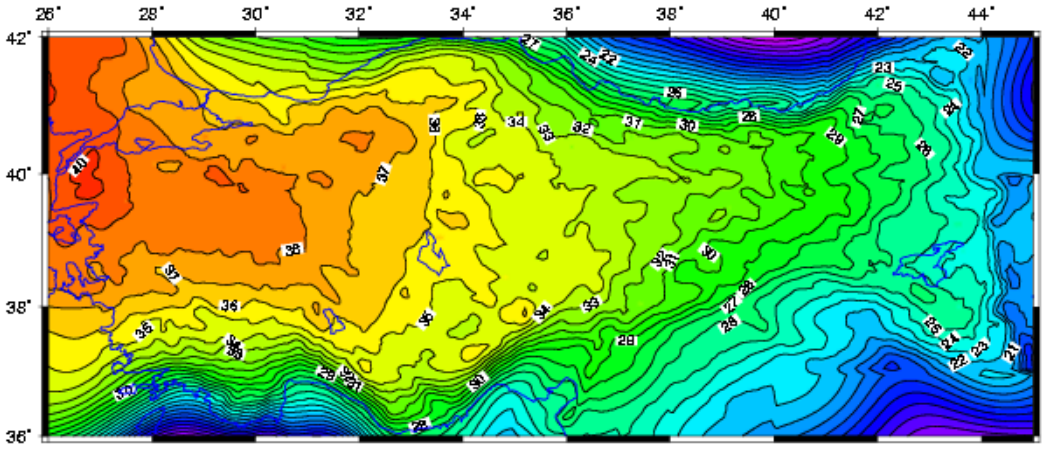


Figure-3.9: Updated Turkish Geoid – 1999A (TG-99A)

The mean and standard deviation of the residuals between computed and observed values at 197 control points used in the computation of TG-99A are found to be 1.4 cm and 9.1 cm respectively. TG-99A geoid heights (computed) were interpolated at 122 co-located check points of which the GPS/Levelling geoid heights (observed) too were determined in some engineering projects in order to observe the differences between computed and observed values (c-o). The mean and standard deviation of the differences 'c-o' are found to be –0.1 cm and 14.5 cm respectively. It is evaluated that TG-99A has an internal precision of 10 cm and accuracy of 15 cm according to the statistics of 'c-o' differences at 197 control points and 122 check points respectively. TG-99A may directly be used in small and middle scale map production. It is anticipated that TG-99A can be used in large scale map production after local modifications is made by observing GPS/Levelling geoid heights at such 4 or 6 different stations.

3.2.2 Update of TG99A to TG03

The geoid model referring to a global geocentric datum is essential in the determination of orthometric heights by GPS/levelling. The new Turkish Geoid-2003 (TG03) was computed as new and more data were available.

Heterogeneous data (gravity, topography and geoid heights) were used by Least Squares Collocation (LSC) in a remove-restore procedure. EGM96 was used as the reference model of the earth's geopotential. The data used consist of surface gravity anomalies, gravity anomalies derived from ERS1, ERS2 and TOPEX/POSEIDON altimetry data, GPS/levelling geoid heights, and topographic heights. Surface gravity values are in Modified Potsdam Datum, and the free air anomalies were computed in GRS80. No surface gravity data were used outside the Turkish border while topographic heights were obtained from GTOPO30 global topography.

The RTM effect of the topography was computed using a high-resolution Digital Terrain Model (450x450 m). The DTM used consist of high-resolution topographic heights within the borders, and dense bathymetry near the shoreline. Evenly distributed GPS/levelling

geoid heights were introduced so as to compute the final geoid in agreement with GPS ellipsoidal heights. Ellipsoidal heights of the GPS/levelling points refer to well-established Turkish National GPS Network (aligned to ITRF96), while orthometric heights refer to Turkish National Vertical Datum (fixed to mean sea level).

The gravity and geoid prediction at the observation points gave an internal precision below 3 mGal and 10 cm respectively. The geoid heights at 3'x3' grid points within Turkey (25E-46E, 35N-43N) were computed to be further interpolated in practical use. The final geoid was tested at GPS/levelling stations, which were not used in the computations, and the external accuracy was found to be within a decimetre as varying with respect to the data distribution and density.

3.3 Geodynamic Working Group

3.3.1 Determination of Velocity Field of Turkey and Displacements After Marmara Earthquakes

Anatolia, which takes place among major plates Africa, Arabia and Eurasia is an ideal place to study both inter-plate tectonic and the deformation. GPS studies in Turkey which date back to late 1980's, have revealed the current northward motion of Arabia with respect to Eurasia and eastward escape of Anatolian Plate due to compression along East Anatolian Fault where the two plates collide. This rigid body rotation gives an upper bound of 24 mm/yr along North Anatolian Fault with an Euler pole near Sina, Egypt as well as compression in Marmara region which was implication of the catastrophic earthquake sequence (17 Aug 1999 M_w=7.5 İzmit and 12 Nov 1999 M_w=7.5 Düzce Earthquakes) in 1999. Figure-3.10 shows a recent velocity field of Anatolia in a Eurasia-fixed frame. Survey-type GPS observation campaigns initiated just after the earthquakes enabled the precise determination of co-seismic displacements reaching up to a few meters. While the post-seismic phenomena is still under investigation by survey-type campaigns and a continuous network, current results have not proved any significant change in the inter-seismic velocity field after the earthquakes possibly due to the on-going post-seismic signals.

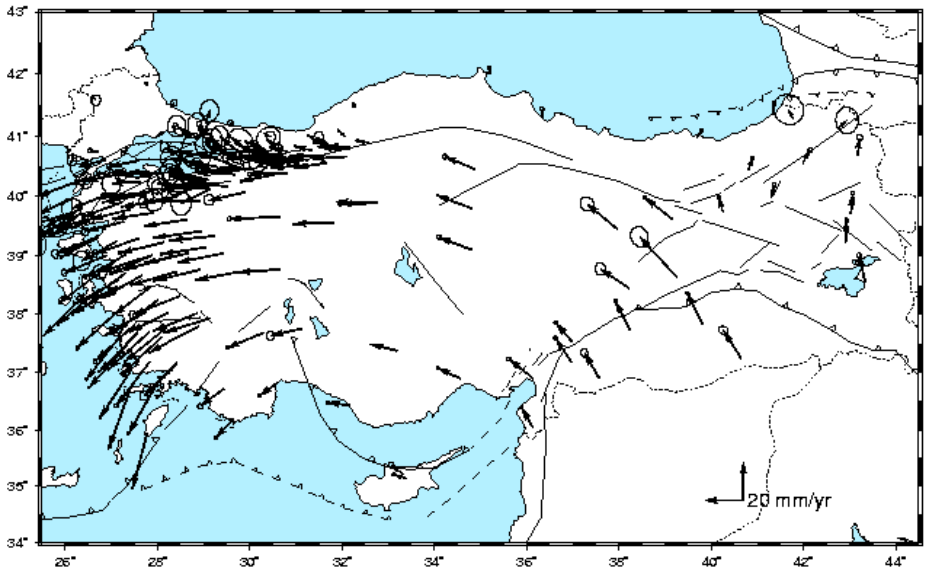


Figure-3.10. Horizontal Velocity Map of Turkey acquired from inter-seismic data before the earthquakes (Eurasia Fixed)

3.3.2 Vertical deformation in National Vertical Control Network – 1999 after Marmara Earthquakes

To determine the vertical displacements (co-seismic) due to 17 August Izmit and 12 November Duzce earthquakes, Helmert orthometric heights of 623 points before and after earthquakes were compared. Since TNVCN-99 measurements were carried out at four different epochs; 1974, 1977, 1980 and 1987, and because of lack of knowledge about vertical inter-seismic velocity of points, they were neglected while comparing the orthometric heights. This comparison results in vertical displacements with total of 82 cm, varying between -54.4 and +27.3 cm (Figure-3.11). After Izmit and Düzce earthquakes, we observed vertical displacements in west part of North Anatolian Fault; +20 cm in Golcuk region, -20 cm on northern part of the fault in the east of that region where the Izmit bay begins, -32 cm in vicinity of Adapazarı and -40 cm. on the fault trace between Adapazarı and Hendek.

The most evident vertical displacement on the fault reaches up to -54 cm in the vicinity of Melen Lake, southeast of Düzce. In general, there is subsidence in northern side of the fault and vertical movement towards downwards in the corridor of 30 km north and south from the fault. Outside of that region, as go far from fault line, vertical movements become less and towards upwards.

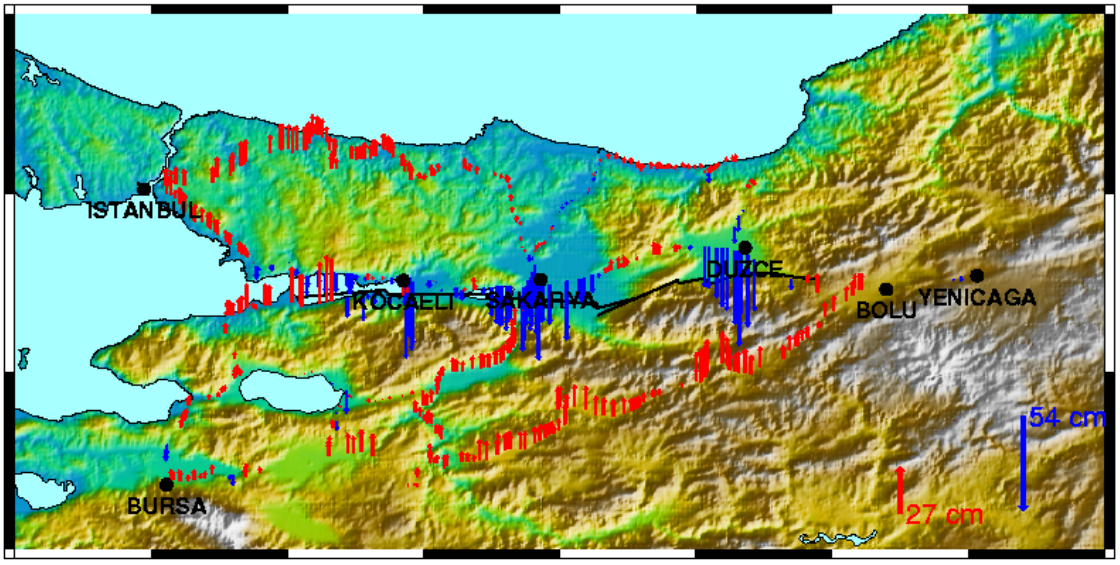


Figure-3.11: Vertical displacement due to Izmit ve Duzce earthquakes. Blue colored vectors indicate subsidence, red colored vectors indicate rising in the region..

3.4 Positioning and Applications Working Group

Positioning and Application Working group is mainly concentrating on collecting information from the institutions and private sectors to identify their technical problems and needs to create a specific project that will compensate their needs and solve for their problems. In order to realise this, the group has determined some subjects and list their titles to get some contribution to turn them back with a real project benefiting to the institutions and professionals. The main titles that are exploded are as follows,

- Providing Geodetic Infrastructure knowledge to the GIS users. As a result, they are agreed to actively participate to Konya event in September 2003 and encourage their group member to present their experiences in the event
- Following contributions are going to be made by the group member for understanding of professionals who are directly practicing Large Scale Map and Map Information Production Regulation.
    - Educational support
    - More explanations and comments will be made to clarify some of the articles (especial on new technologies related ones) of the regulation
    - Alternative solutions will be advised on statistical test
    - Determining local geoid models
    - Way of improving existing local geoid models and also TG99A
    - Monitoring problems of the regulation in practice and recommending solutions
- Supporting groups who develops standard on engineering surveying and engineering geodesy.

4 Contribution To Educational Activities

One of the main philosophies of Turkish National Geodesy Commission is to contribute and organise educational activities for professional surveyors and students in Geodesy and Photogrammetry departments. Therefore it organises annual scientific workshops and encourages institutions and private firms to provide quality training periods for undergraduate students who might have found a chance to observe both practical and theory combination on real professional applications.

More on to that, encourage working groups to concentrate on some educational based projects that are generally drawn as follows

- Supporting researchers such as providing data, information and etc.
- Contributing course programs for updating and/or extending their coverage
- Supporting national and international accreditation works at the universities
- Encouraging researchers and surveying engineers to publish or present their works on quality national and international journals and symposiums
- Organising activities that professionals can discuss and criticise technical problems
- Contributing to develop common terminology for surveying profession
- Establishing data base to distribute and share commissions' paper works such as minutes, publications, technical reports and etc.

5 The Commission's Scientific Projects Supported By TNUGG

So far one of the submitted projects of TNGC has been supported by THUGG and its brief description is as follows

Project: ***Investigation of Sea Level Variation and Vertical Crustal Motions in the Marmara Sea Region***

The project aims at the investigation of relative and absolute sea level variations in the Marmara Sea and vertical crustal movements in the northern and southern coasts and their relation to the tectonic structure in the area as it is situated in the western extension of the North Anatolian Fault (NAF) system. The project is mainly based on two components. The first component includes existing Erdek tide gauge in the southern coast, operational since 1985 and a newly established Erdek permanent GPS (CGPS) site. The other component includes existing Marmara Ereğlisi permanent GPS site in the northern coast operated since 1999 and a new tide gauge to be established nearby CGPS within the project. The basic data available and to be collected within the project are sea level and meteorological observations from tide gauges and continuous GPS data. In addition, satellite altimetry, episodic GPS and levelling observations will also be used. In order to determine mean sea level and its secular changes, sea level observations from tide gauges and satellite altimetry will be combined and the effect of atmospheric parameters on sea level variations will be investigated. The project will provide information about sea level variations and the factors causing these variations as well as assessment of potential future changes in the mean sea level and extreme sea levels. Fault systems in the area will be investigated and all data available will be combined to derive information on the tectonic structure in the area.

6 Annual Scientific Meetings of The Commission

6.1 Tectonics and Geodetic Networks Workshop – İznik 2002

Commission was agreed to organise periodically annual scientific workshops; and then decided to start last year. Therefore in 2002 a workshop was organised under the directive of TNGC by Department of Geodesy at Bosporus University Kandilli Observatory and Earthquake Research Institute. It has been held in İznik, in between 10th to 12th October 2002. The workshop was on "Tectonic and Geodetic Networks". National scientist from geodesy, geology and geophysics disciplines, graduate and undergraduate students and professionals are participated in that workshop. Invited and selected submitted papers are presented, discussed and knowledge is shared by different professional disciplines.

6.2 GIS and Geodetic Networks Workshop – Konya 2003

2003 annual scientific workshop will be organised under the directives of TNGU by Department of Geodesy and Photogrammetry at Selçuk University, Konya, in September 2003. The workshop will be on Geographic Information Systems and Fundamental Geodetic Networks.

7 Publications

7.1 List and Abstracts of Publications in The Annual Meetings

In this section only title of the publications are given. Authors and detail information about the published articles and their copies might be obtained by applying the Commission secretariat or directly via Commissions web site. Full text of these articles is in Turkish. However English abstracts exist for all of them.

7.1.1 Tectonic and Fundamental Geodetic Networks – İznik 2002

- Determinations of Co-seismic, Inter-seismic And Post-seismic Deformations Using Geodetic Techniques
- Contribution of Geodesy To Countywide Tectonic Purposeful Works From Past To Today
- Monitoring Nonlinear Crustal Deformations in Marmara Regions Using MAGNET
- Scientific Works That Run By General Command of Mapping
- Turkish National Permanent GPS Network (TUSAGA)
- Turkish National Fundamental GPS Network-1999A (TUTGA-99A)
- Turkish National Vertical Control Network (TUDKA-99)
- Turkish National Sea Level Monitoring System (TUDES)
- Turkish National Gravity Network
- Turkish National Fundamental GPS Network-1999A (TUTGA-99A) Combination of GPS Measurements of 1992-2001 Years
- Transformation Between Turkish National Fundamental GPS Network-1999A (TUTGA-99A) And European Datum 1950 (ED-50)
- Updated Turkish Geoid-1999 (TG-99A)
- Current Status of Marmara Continuous GPS Reference Network (MAGNET)
- Deformation Parameter Estimation of 17th August 1999 İzmit Earthquake
- TUTGA, Earthquakes And Large Scale Works
- Using Suitable Atmospheric Modelling For GPS Data Processing
- Geodetic Local GPS Networks
- Importance of GPS Strategies To Realise Geodetic and Geophysics Experiments
- Micro-geodetic Networks Established By Department of Geodesy At Bosporus University And The Works Carried out
- Land Sliding Monitoring And Its Results In Ambarlı Port Region
- Determination of GPS Time Series At IGS Stations Located On Anatolian Plate And Its Neighbourhood Plates
- Effects of Earth Rotation Parameters On Geodetic Values Determined By GPS
- Determining Kinematic Movements And Movement Surfaces In Deformation Networks Monitored By GPS

7.2 List of Publications in The Other National Meetings

In this section only title of the publications are given. Authors and detail information about the published papers and their copies might be obtained by applying the Chamber of Surveying and Cadastre Engineering secretariat or directly via Chamber's web site http://www.hkmo.org.tr. Full text of these articles is in Turkish.

7.2.1 8th Turkish Scientific and Technical Assembly

Proceedings of 8th Turkish Scientific and Technical Assembly
19th -23th March 2001, Ankara

- Special Approach To Migration And Shanties In Our Country
- Geodesy and Photogrammetry Engineering From Past To Today
- Selective Availability And Effects on DGPS
- New Equation To Divide Parcels With A Line

- Women On Geodesy And Photogrammetry Platform At The End of The 20th Century
- Deformation Analysis Using θ^2 Measures and Generalisation Methods
- Application of Digital Photogrammetry Techniques Onto Historical Architectural Buildings
- Effects of Determination of Mapping Activities To Urban Development Region: Trabzon Sample
- Investigation on Possibility of Covering DOP of Fundamental Education Fields
- Cadastral Dimension In The Process of Harmonisations to EU
- Cadastral Problems in North Black Sea Region and Densification of Villages That Are Related With Forest
- Fundamentals of Estate Property In Turkish Law System And Its Effects On Cadastre
- Financial Feasibility Investigation On Cadastral Map Production
- Standardizing Non-graphical Data To Provide Source to GIS
- General Evaluation On Under Water Mapping
- Delegating 2/B Regions Parcel Dividing Mapping to Private Sector
- Digital Municipality Application To Konyaaltı Municipality – Intergraph Antalya
- Design And Application In Neighbourhood Scale Based While Transition To Urban Information System
- An Example For Mountain Map Design: Aladağlar, Niğde
- Cartographic Animations
- Availability of Using GIS On Natural Gas Works
- Preparing A 3D City Modelling, An Example: İTÜ Campus
- Making Geomorphologic and Elevation Maps Using Digital Terrain Model
- Precise Positioned SLR Satellites and Their Missions
- Total Quality Managements On Geodesy and Photogrammetry Engineering

7.2.2 9th Turkish Scientific and Technical Assembly

Proceedings of 9th Turkish Scientific and Technical Assembly
31st March-4th April 2003 Ankara

- Quality Assurance, Continuous Program Improvement
- Tendencies In The Future And The Orientations of Surveying
- Cadastre 2014 – A Vision for Future Cadastral System
- Comparing Turkish Cadastral System With The EU Member Countries In Point of Content
- North Cyprus Cadastral System
- Real Property Acquisition of Foreigners in Turkey During Adaptation To The European Union
- Third Dimension of The Property, Vertical Property or Sky
- Fundamental Geodetic Networks
- Design of Real Estate Valuation System
- New Developments And Re-Engineering In Land Arrangement Works
- Preparing Urban Real Estate Valuation Maps
- Photogrammetry and Laser Scanning
- Geometric Correction Accuracy of IRS 1-D Pan Imagery Using Map Versus GPS Control Points
- Monitoring Modelling of Water Basin And Water Quality Around Istanbul Using GIS And Remote Sensing Techniques

- Monitoring Changes In Opencast Mines Using Temporal Satellite Images
- Results and Critics of International Symposium GIS 2002
- Design of High-Resolution Spatial Information Systems
- Works on Cadastre and Land Registry Information System - TAKBIS
- An Analysis of BKBS And Possible Problems And Their Solutions Facing TAKBIS
- e-Government Concept Applications In The World And Turkey
- Legal Structure Investigation for Addressing Systems for Urban Information Systems
- Internet GIS Applications With The Example of Trabzon City
- GIS Supported Historical Structures Information System on The Internet
- Data Modelling In The Frame of Spatial Data Technology
- Network Topology And Generalisation In Geographic Information Systems
- Design Considerations of Web Maps
- Technical Regulations, Expectations And Proposals In Surveying And Cadastre Sector
- Fuzzy logic And Application Fields In Geodesy
- Developing A dynamic Movement Surface Model For Landslides
- Simulation of GPS Observables
- Application of Engineering Surveying And Current Problems In Turkey
- New Strategies In GPS Data Processing
- An Investigation On Precision Analysis of Real Time Kinematic GPS Positions And A Case Study
- An Example of Using Inclination Sensors In Measurements With Geodetic Aims
- High Accuracy Bathymetric Survey And A Case Study: Haliç Application
- Measurements of Shoreline Position At Kilyos
- Application of Geographic Information System To The Campus Area of Çukurova University
- The Planning of Numerating Process In Geographic Information Systems Through CPM-Pert Technique
- Geodetic Contribution To The Archaeological Excavation Project In Tarsus Gözlükule Mound
- Analysis of GPS Deformation Networks By q^2-Criteration: A Program List And Application of It
- Digital Camera Geometric Calibration With Modified DLT (Direct Linear Transformation) Method Comparing
- An Investigation On Accuracy Analysis of Real Time Kinematic GPS Positions and A Case Study
- Investigation Into Applicability of Photogrammetric Purpose For Non-Metric Digital Cameras
- Different Solution of Resection Problem of Geodesy
- Vehicle Tracking Systems In Cities And The Reliability of GPS Measurements
- Database Design And Sample GPS Database
- The Historical Development of Cadastre of Turkey
- Dictionary of Professional Terminology
- Some Problems And Solutions In Mathematical Cartography
- Program For Property Investment Technician
- Cultural History of Cartography Or Is There A Necessity For Cultural History Courses In The Education of Cartographical Engineering
- Whose Is The Map?: Social Sciences and Land Surveying
- The Role of Cadastre In Supporting Agricultural Activities In Turkey

- An Examining On Problems And Solutions of Urban Information Systems Studies of Turkey
- The Changes In Planning Policies And Their Effects On Land Ownership In Trabzon
- Costal Zone Management
- A New System For The Real Estate Taxing Reis: Real Estate Information System
- Ground Settlements Estimation and Comparison With Measured Values in Konak-Basmane EPBM Tunnel of İzmir Underground
- Future extraction of Water Bodies From Landsat Multi-spectral Images

7.2.3 Young Surveyors Days – 2001

Proceedings of Young Surveyors' Days
18th- 20th May, İstanbul

- Changes and Perspectives in Academic Surveying Education in Middle Europe.
- Surveying Vision in 2000s
- Perspective for Profession, Marketing and Institutions in surveying,
- Surveying and Surveying Education in Turkey

7.2.4 Young Surveyors Days 2003

Proceedings of Young Surveyors' Days
16th- 19th May, Trabzon

- On The significance And The Present Status of The ITRF, ETRF
- International Organisations In Surveying
- Towards Spatial Data Infrastructure (SDIs) In Germany And Europe.
- New Duties For Surveyors

7.3 List of Articles Published in The National Scientific Journals

7.3.1 Surveying Journal

In this section only title of the publications are given. Authors and detail information about the published articles and their copies might be obtained by applying the Commission secretariat or directly via General Command of Mapping web site, http://www.hgk.mil.tr. This journal is an official journal of General Command of Mapping and published twice a year. Full text of these articles is in Turkish. However English Abstracts exist for all of them.

1998 Issue: 120

- Geographic Data Quality
- Effectiveness of Orthopoto Maps That Are Made Using Satellite Images In GIS
- Processing Results of European Vertical GPS Reference Network Measurements: Turkish Sub Network
- Mathematical And Statistical Analysis of İstanbul Triangulation Network Within Its Historical Development
- Robinson Projection

- Developments In Photogrammetric Triangulation Techniques And Status In General Command of Mapping

1999 Issue: 121

- Numeric Integration Method Solution of Fundamental Geodetic Problems
- Fundamental Mathematical Approaches To Identify Pattern In Raster Images
- Map Information System Development And Realising
- 2000 Year Problem Ad GPS
- Accuracy Research On Digital Terrain Models
- Quality Assurance System TS-EN-ISO 9001 That Setup In General Command of Mapping

1999 Issue: 122

- Using Auxiliary Data Techniques To Classify Remote Sensing Images
- Problems of Conventional Positional Data Exchange And Possibilities of FME Software.
- Infrared CCD Cameras And Their Technical Specs
- Object Based GPS Concept And Support GIS Software
- Testing RTK GPS Positions With Static GPS

2000 Issue: 123

- Long Period Coordinate Changes (Secular Velocities) Estimation At Control Stations of Turkish Fundamental GPS Network
- Data Collection Using DGPS For GIS
- A General Approach For Calculating Klotoid Curve
- Video Systems And Their Technical Specs Using In Photogrammetry And Remote Sensing Applications
- OEEPE Year 1999 Science and Steering Committee Meetings
- Prof. Dr. Ahmet Aksoy Was Retired

2000 Issue: 124

- Generalisation And Multi Visualisation In GIS Environment
- Comparison of 1:50000 Map Making Methods Using Arial Photographs And SPOT Stereo Satellite Images
- Building Generalisation In Large Scaled Structured Data
- Determination of Updated Crustal Movements
- ISPRS XX Is Going To Be Organised In Turkey
- Software (SAHADASU) of Digital Map Supported Military Applications

2001 Issue: 125

- Road Objects In Digital Cartographic Models
- Location of Land Surveying During Urban Planning Process
- Digital Elevation Model Data Collection For Marmara Earthquake Region
- Numerical Approach On Franz Mayr Projection Example To Projections That Have Not Reflecting Reality
- GIS – Is The Main Component of Military Information System
- Remote Sensing Purposeful Satellite Imaging Systems

2001 Issue: 126

- Cartographic Signs With Semiotic View
- Magnifying Glass Effect On A Map Projection
- Determination of Horizontal Movements Using Relative Error Ellipse And Separating Cholesky Product Components
- LANSAT Satellite Images And Their Use To Automatically Identify 17 August 1999 Gölcük Earthquake Damages
- HILL Projection
- Triangulation Method In Surface Modelling

2002 Issue: 127

- Establishment of The National Gravity Network-2001 of Turkish Republic of Northern Cyprus
- Investigation of Vertical Crustal Motion At Erdek Tide Gauge And Surrounding Region Using Sea Level And Geodetic Data
- The Effects Causing Sea Level Changes
- GINZBURG IV Projection
- Interpolation With Direction And Inverse Distance Weighted Average
- Investigation of Effects of The Digital Elevation Models Generated From Different Sources On The Orthophoto Accuracy

2002 Special Issue

- Turkish Fundamental GPS Network-1999A (TFGN-99A)

2002 Issue: 128

- Main Component Conversion In Digital Images
- High Resolution Film Scanners – Investigation For Photogrammetry and Remote Sensing Applications
- Height Interpolation In Digital Terrain Models
- Graphical Semiology And Signs And Colours Used On Maps
- Design of Inhabitants Data Base of Turkey Using Relational Model

2003 Issue: 129

- Elastic Half-space Models And A Dynamic Approach To Seismic Displacements
- Network Analysis And Transportation Problems In GIS
- Using Digital Maps On Internet/Intranet Environment
- Computational Geometry
- Interrupted World Maps

7.3.2 Surveying and Cadastre Engineering *Geodesy, Geoinformation and Land Management* Journal

In this section only title of the publications are given. Authors and detail information about the published articles and their copies might be obtained by applying the Commission secretariat or directly via Chamber of Surveying and Cadastre Engineers web site, http://www.hkmo.org.tr. This journal is an official journal of Chamber of Surveying and

Cadastre Engineers and published twice a year. Full text of these articles is in Turkish. However English Abstracts exist for all of them.

1999 Issue: 86

- First Generation Surveyor Prof. Dr. Kasım Yaşar's Life Story With His Own Words
- Kasım Yaşar Past Away
- Atmospheric Effects On GPS
- Using GPS In Boundary Determination Works
- Processing Techniques II Using For Deformation Analysis
- Relations Between Horizontal, Vertical And Space Angles
- Changes In Geodesy
- Structure of Raster Images, Fundamentals of Visualisation Techniques And Bitmap Format
- Village And Countryside Improvement In Pilot Project Example Kadıköy (Bergama)
- An Investigation On Problems That Are Faced During Land And Parcel Arrangements Applications
- National Laws From Past To Today About Costal Zones In Turkey
- It Is On Engineering And Architect Education

2001 Issue: 87

- Fuzzy Logic And Its Place In Geodetic Applications
- Determination of WGS84 Geoid Heights By Means of GPS (For A Region In Konya)
- Potential of GPS In Terrestrial Deformation Works
- Using RTK GPS In Improvement Plan Applications
- Coordinate Transformations Among Zones
- Applying Operational Research Techniques In Rural Area Arrangements
- Type Changes of State Properties
- Choice of Land Arrangement In Illegally Urbanized Areas

2003 Issue: 88

- Interactive Usage of The Basic Geodetic Applications Via Internet
- Real Estate Valuation Expertise And Surveying Engineering
- Pseudolites
- Tracking of Kinematic Objects Through GPS: A Vector Data Based Navigation System
- A Detail Measurement Method By GPS Supported Free Station Technique (GPS-SIT)

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF

GEOMAGNETISM AND AERONOMY COMMISSION

OF TURKEY

FOR

1999 – 2003

to be presented at the
XXIII. GENERAL ASSEMBLY
of the
INTERNATIONAL UNION of GEODESY and GEOPHYSICS
JUNE 30 – JULY 11, 2003

GEOMAGNETISM AND AERONOMY COMMISSION OF TURKEY
(www.mta.gov.tr)

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1. INTRODUCTION

National Geomagnetism and Aeronomy Commission of Turkey (TUJAK) works on and encourages studies on the subjects such as geomagnetism, paleomagnetism, magnetotelluric, magnetic induction and aeronomy. This National Report has been prepared for the XXIII General Assembly of IUGG to present newly and/or developed scientific researches of Turkish geoscientists. The National Report represents homage to our scientists and their colleagues.

2. WORKS

a. Prospecting By Magnetic Methods

General Directorate of Mineral Research and Exploration has carried out studies on magnetic prospection for the purposes of geothermal energy and mining. The Turkish Petroleum Corporation works in some regions in Turkey for petroleum exploration.

In East and West Anatolia alteration zones and magnetic fault intrusions in geothermal energy and in the Central Anatolia iron ore potential have been detected by magnetic studies. Petroleum researches are at East and South Anatolia, North Aegean (on land) and East Black Sea (off shore) regions.

b. Geomagnetic Researches

Kandilli Geomagnetism Laboratory of The Boğaziçi University observes and records regional magnetic variations in Turkey. Furthermore, components of the magnetic field (X, Y, and Z), declination (D) and total magnetic field are recorded for every minute. These data are sent to INTERMAGNET (International Real-Time Magnetic Observatory Network) by e-mail. On the other hand in Earthquake Forecasting Project, at the west part of the North Anatolian Fault Zone, around İznik – Mekece Fault, total magnetic measurements have been recorded since 1986 at 9 stations.

General Directorate of Mineral Research and Exploration has another project; it is "Curie-Depth Project". In this project, Curie Depth Map has been prepared from the digitized airborne magnetic data, which were gathered previous years.

c. Magnetotelluric And Conductivity Researches

Since 1995 General Directorate of Mineral Research and Exploration has cooperated with Turkish Scientific and Technical Research Association and the related universities have carried out two distinct projects: "The Research of The Earth's Crust and Heat Conduction". In these projects, magnetotelluric measurements have been taken on four profiles running at N-S direction in Turkey. Thus, the deep structure of the earth's crust will be tried to explain. Additionally, under the "Heat Conductivity Project", the thermic logging data obtained from drilling wells and heat conductivity measurements accomplished on cores. The data processing studies are still continuing to produce heat conductivity map.

On the profiles crossing the south and north branches of North Anatolian Fault, Kandilli Geomagnetism Laboratory of The Boğaziçi University applied magnetotelluric method to reveal deep resistivity basement and obtained valuable information about the earthquake mechanism in 1999 July. Addition to these, After earthquake 17th, August 1999, at the south

part of the Marmara Region, magnetotelluric profile measurements have been continued to form an opinion about the deep resistivity basement.

3. PUBLICATIONS

a. Book

Özçep, F. and Orbay, N. 2002, Geophysics And Its Historical Development, Istanbul University Press. P.500, Istanbul.

b. International Publications

O.N. Uçan, S. Şeker, A. M. Albora & A. Özmen, "Separation of Magnetic Field Data Using 2-D Wavelet approach" Journal of The Balkan Geophysical Society, 3, 53-58 (2000).

Bayrak, M., "Exploration Of Chrome Ore In Southwestern Turkey By VLF-EM", Journal of the Balkan Geophysical Society, (in press)

O.N. Uçan, E. Bilgili & A.M. Albora, "Magnetic Anomaly Separation Using Genetic Cellular Neural Networks" Journal Of The Balkan Geophysical Society. 5, 65-70 (2002).

Ucan, O., Albora, M., Hisarli, M., 2001, "Comments on the gravity and magnetic anomalies of Saros Bay using wavelet approach, Marine Geophysical Researches", 22 (4), 251-2001

Bayrak, M., and Nalbant, S.S., "Conductive Crust Imaged In Western Turkey By MT", Geophys. Res. Lett*, 28,*3521-3524, 2001.

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(2) Organizations Active in TUJAK Interests

1 – General Directorate of Mineral Research and Exploration – Ankara
2 – General Command of Mapping – Ankara
3 – Turkish Petroleum Corporation – Ankara
4 – University of Istanbul – İstanbul
5 – Boğaziçi University Kandilli Observatory – İstanbul
6 – Istanbul Technical University – İstanbul
7 – Middle East Technical University – Ankara
8 – University of Dokuz Eylül – İzmir
9 – Turkish Scientific and Technical Research Association – Ankara

(3) International Activities in TUJAK Interests of The Chamber of Geophysical Engineers of Turkey

2nd Balkan Geophysical Congress and Exhibition. July 05 – 09 1999 Istanbul

Archeology and Geophysics. Workshop, September, 22 – 25 1999 İzmir

Turkish International Oil and Gas Congress and Exhibition. November, 16 – 18 2000 Istanbul

13th International Petroleum Congress and Exhibition of Turkey. June 04 – 06 2001 Ankara

14th Geophysical Congress and Exhibition of Turkey. October, 8 – 11 2001 Ankara

2nd Turkish International Upstream & Downstream Oil & Gas Exhibition & Congress.
28 February – 2 March 2002 Istanbul

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OF

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1. INTRODUCTION

Among the hydrology related organizations in Turkey are the General Directorates of the State Hydraulic Works (DSI), Electrical Power Resources Survey and Development Administration (EIE), State Meteorological Affairs (DMI), Rural Services (GDRS), and the universities namely Middle East Technical University (METU) and Hacettepe University, Gazi University, Istanbul Technical University (ITU), all who are major contributing members of Turkish hydrological community.

In Turkey, General Directorate of State Hydraulic Works (DSI) is actively engaged in coordinating all hydrology-related organizations including private sector, newly emerging institutions, water-related establishments and universities.

During the last four years, it can be generally stated that the educational and technological capacities of the hydrometeorological services, and organizational abilities as well at the national level have been improved. In order to achieve the function of coordination in a more efficient manner, DSI has the principle responsibility of the hydrometeorological organizations, as being the focal point of national committees, covering the provision of advice to the Government on all related research, training, educational and practical matters in hydrology and giving the increased responsibility to DSI having more power in shaping national water resources policies.

2. HYDROLOGICAL ACTIVITIES IN TURKEY

Turkish involvement in the international regional projects has been rather limited. However, The support to the international postgraduate hydrological course of UNESCO "*Sediment Transport Technology*", preferably for the specialists from the developing countries, is the main activity organized by DSI in this framework.

As a concrete improvement**,** it can be stated herewith that a forum page, with the e-mail address of hidroloji@egroups.com, linked to the DSI's Web Site (http://www.dsi.gov.tr) to inform and to discuss the related issues of hydrology has been found quite effective. This report, with the extra information with respect to the IAHS activities in the Country and other details, can be available in the related page of above given Web address.

Moreover, there has been some improvements regarding to Hydrologic Archive established in DSI. In this regard, all available hydrological documents, including IAHS publications are stored in an archive, and introduced to the hydrological community in the Internet environment.

a. Ongoing projects:

The following projects are currently being studied by DSI:

(1). Dynamics of the Ground-water Flow in the Regional Closed Basin Aquifer Located in an Arid Zone

(2). Determination of Coastal Erosion Caused by Sea and Sea-water Intrusion in an Alluvial Aquifers Nearby the Black Sea Coast by using Hydro-Dynamic Modeling

(3). Investigation of the Water Balance of the Lake Van using Isotope, Hydro-chemical and Hydrological Techniques

Regarding to the ground-water studies, there are some additional hydrologic projects that could be realized by DSI, with the technical support of Hacettepe University and the financial support of UNESCO, namely:

(1). The modeling of ground-water hydrology and management in the Akarçay interior (closed) basin

(2). The modeling of optimal water resources management in Burhaniye plain area, western Anatolia, where there are existing some problems of sea-water (salt water) intrusion and aquifer pollution.

(3). Water resources management studies and the quantitative determination of ground-water discharge into the sea in the area located between Silifke and Erdemli, the southern Anatolia.

In addition to the efforts in maintaining relations with regional and international organizations such as WMO, UNESCO, UNEP, UNDP, ICOLD; DSI, over the past four years, has focused on the improvement of good relations with the neighboring countries in the framework of MED-HYCOS Project which is successfully conducted at the regional level.

Since the end of 1994, Turkey is also involved in the activities of the FRIEND group. In this regard, Turkish experts and scientists regularly attend the annual meetings.

b. Other initiatives

The celebration of World Day of Water, March 22nd, with the themes of

2002, "Water for Development",
2001, “Water and Health”,
2000, “Water for the Twenty-first Century”,
1999, “Everyone Lives Downstream”,

has been celebrated in Turkey with a series of activities carried out to increase public awareness of water in the country. In order to promote extensive public awareness in water use and the role of water for development, the day was a great opportunity to raise the discussion on this matter and make it known as much as possible.

For the purpose of celebrating World Day of Water, General Directorate of State Hydraulic Works (DSI) arranged a number of activities such as competition of composition, picture, photo and placard, celebration of the day and exhibition display.

c. International training courses

Turkey is among the countries to respond to the UNESCO call in 1970’s for the promotion of hydrological training on an international extent. For this purpose, the Department of Technical Research and Quality Control of DSI has announced her first UNESCO sponsored International Post-Graduate Course on Hydrology as early as 1970s. Since then, DSI has been organizing a one month-long training course on the issue of sediment technology. In this course, the lectures on both theory and experiments are given to the participators.

d. Organization of specific courses and seminars

The General Directorates of DSI, GDRS and EIE, and the Universities of METU, ITU and 9 Eylul have organised some local cources on the subject of operational hydrology. Most of them are related to the various hydrology-related practices including snow measurement, gauging of water level, project hydrology and hydrological evaluation of the major basins.

- The Seminar on Operational Hydrology, organized by General Directorate of State Hydraulic Works (DSI), 10/2001, (in Turkish)
- The Introduction to Hydrologic Models, organized by the Research Institute of GRDS, 6/2000, (in Turkish), Ankara
- Agricultural Meteorology Course, organized by Regional Meteorological Training Center of DMI (General Directorate of Meteorological Services) and WMO, 11/2001, Ankara (in English)
- Introduction to the GIS / RS Systems, Lecturers: Usul, N., Akyurek, Z. (METU), organized by The Ministry of Public Works, Ankara, 2/2002 (in Turkish)
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- The Course on the Introduction to GIS, Lecturers: Usul, N., Akyurek, Z. (METU), organized by TURK TELEKOM Co., Ankara, 8/2000 (in Turkish)
- The Course on the Relationships Between Plant and Atmosphere, organized by The Research Institute of GRDS (General Directorate of Rural Services), 6/2000, Ankara (in Turkish)
- The Seminar on Hydro-meteorology, organized by The Research Institute of GRDS (General Directorate of Rural Services), 5/2001, Erzurum (a national activity in Turkish)
- The Panel on Snow and Avalanche, organized by The Research Institute of GRDS (General Directorate of Rural Services), 2/2002, Erzurum (a national activity in Turkish)
- The Seminar on Numerical Flood Models and A Flood Warning System, given in Turkish by Prof. Levent Kavvas, California University (Davis, ABD), organized by Civil Engineering Department, 9 Eylul University, 8/2001, Izmir
- The Seminar on the Use of GIS in Water Resources Management, Dr.Ir. Rolf A. De By, ITC (International Institute for Aerospace Survey and Earth Sciences, The Netherlands), Organized by Civil Engineering Department, 9 Eylul University, 12/2001, Izmir

e. National scientific and technical meetings

The important activities as a part of the hydrological program carried out by different institutions in Turkey, in the period of 1999-2002 are listed as following:

- 7th Culture-techniques Congress, October 1999, Nevsehir, (organized by GRDC, 14 person participated)
- 2nd National Snow Congress, February 2000, Erzurum, (about 100 participation from Turkish hydrology community)
- 2nd National Hydro-meteorology Symposium, 18-20 November 1998, Ankara (jointly organized by Istanbul Technical University and State Meteorological Service, about 120 participation from the hydrology community)
- 2nd National Hydrology Congress, Istanbul, 22-24 June 1998 (organized by Istanbul Technical University, Civil Engineering Faculty, about 150 engineers, scientists and researchers from the hydrology community of the country.
- 3rd National Hydrology Congress, İzmir, 16-21 June 2001 (organized by 9 Eylül University, Civil Engineering Faculty, more than 150 engineers, scientists and researchers from the hydrology community of the country.

- 2nd National Symposium on Izotope Techniques in Hydrology, Adana, 16-21 October 2002, (organized by DSI)

f. TEFER (Turkey Earthquake and Flood Emergency Recovery) Project:

The effects of the floods combined with the landslides experienced by Turkey on May 21, 1998, caused deaths, suffering and extensive damage to both public and private property and costly social and economic disruption for a time after disaster in the West Black Sea Region. The floods occurred in daytime and resulted in the minimum loss of lives.

In response to these floods, The Government of Turkey with assistance from the World Bank has identified a work programme to develop flood management and to reduce or eliminate long-term risk and damage to people and their property from natural hazards and their effects and to repair, rehabilitate and to reconstruct various structures and infrastructure components lost or damaged in these floods and to carry out some technical training and studies.

The project will provide technical assistance to perform hydrometric network review and design and automated weather and hydrometric system design. In addition, the project will support the installation of about 129 automatic real-time hydrometric, 206 automatic real-time meteorological and 3 Doppler radar stations so that real-time data will be available in order to run the operational flood forecasting models.

Data integration is one of the highest concerns. Connectivity and integration of the rainfall-runoff routing model to incorporate hydrometric and automatic weather data, and real-time quantitative radar data, in real time, is required.

g. Flow Measuring Stations

During 1999-2002 in Turkey, some improvements have been achieved regarding the hydro-meteorological observing stations. To the most of the hydrometric observing stations, the electronic gauges have been installed. This improvement improved the station conditions, removing the observation errors and failures. Additionally, the measurements now are conducted in a more sensitive way and the observed data are transferred by modern telemetry technology. Using the modem facilities, it is now possible also to read, evaluate and store the real time data at the office.

h. Snow Observation

Seasonal snow-melt runoff estimates are extremely important in mountainous regions with semi-arid climatic conditions, like eastern part of Turkey. For that reason, automated snow and meteorological stations are established at higher altitudes since 1996, in the upper Euphrates River from the jointly research project sponsored by the State Planning Organization. It is still ongoing research in order to run near real time operational melt model to forecast runoff (rate / volume) melting from snow and rain on snow during early spring season.

Knowing the seasonal discharge volume in advance increases the flexibility in planning and operational of water resources systems as well as various water management decisions. For that purpose, RS techniques to trace the snow cover areas are used in the project.

Broad area observation systems are capable of monitoring macro-scale atmospheric and terrestrial features at varying spatial and temporal resolutions. spatial and temporal requirements are important factors governing choice of satellite retrieval method.

During the last decade, besides to the classic snow observations, new technologies in snow studies have been imported by Turkey to improve the classical methods in use. Starting from 1998, the model studies using the available snow network observations have been applied. Application of remote sensing techniques in snow monitoring was initiated in 1996, through the NATO SfS fund support in the east part of Turkey. In the scope of these studies utilizing the Snow Routing Model has started the project for estimation of snow-water equivalent potential of Karasu basin. In that study, remotely sensed snow cover data obtained by the NOAA (AVHRR) system were used to estimate the runoff from snowmelt. One of the major contributors of water to the Keban Dam is the Karasu River, which joins the Euphrates River at Keban Dam. Snowmelt from mid March to June contributes 65-70 % of the total annual runoff. NOAA images of the region are obtained, processed and combined with GIS in order to monitor time and spatial distribution of snow-covered areas. Real time snow depths are measured and received regularly from the field using six snow measuring stations using the Inmarsat Mini M systems. Two satellite-receiving stations (Meteosat and NOAA) are installed in DSI

Since the traditional point measurements are not representative enough from the point of "distribution in elevation" and cannot fully meet the necessary data requirements. Satellite remote sensing is expected to be a potential solution to this problem because broad area observation systems are capable of monitoring macro-scale atmospheric and terrestrial features at varying spatial and temporal resolutions. Spatial and temporal requirements are also important factors governing choice of satellite retrieval method.

Starting from 1996 winter, 5 snow pillows were put in Euphrates River basin to collect snow depth and water equivalent data automatically. Two of them had to be closed in 1998 but the rest continues to operate at elevations above 2250 m. It is intended that the data collected at prescribed dates are recorded electronically and the data can be read from the computer at operation room at EIE regional offices. Each station is equipped with data recording unit, Snow depth measurement by sound sensors, Snow pillow, and Air temperature and Pressure sensors. At these stations snow is also measured manually to cross check the data collected.

With the data obtained from these stations and other snow courses where snow depth and water equivalent are measured manually and density is computed, the following snow parameters are determined: Percentage of spatial snow cover, snow depth, snow water equivalent, snow density, temperature profile of snow pack.

The research Institutes of GDRS runs many projects on rainfall-runoff relations in small representative basins, with the purpose to improve the water supply estimates to small earth dams for irrigation and water supply at rural communities. In this connection they collects the necessary data within these basins. GDRS Erzurum Research Institute has two projects; "Investigation of the Rainfall-Runoff Relation of Erzurum Ilica-Sinirbasi Creek Representative Basin" and "Mapping of Areal Snow Distribution of Palandoken-Konakli Basin Using Remote Sensing And Geographic Information Techniques (GIS)".

i. Institutional relations and cooperations

The members of the Turkish hydrologic community are cooperated with many other institutions listed as following:

- IAEA, International Atomic Energy Agency
- JIIHP, Joint International Isotops in Hydrology Program
- IAH, International Association of Hydro-geologists
- IAH, Karst Commission
- IAHS, International Association of Hydrological Sciences
- TUBITAK, Scientific and Technical Research Council of Turkey
- U.S. National Committee for Scientific Hydrology
- NIMH, Bulgarian National Hydrology and Meteorological Institute
- UNESCO, Division of Water Sciences, International Hydrology Program
- UNESCO, FRIEND
- WMO, World Meteorological Organization

j. Completed and ongoing scientific projects

In the period of 1999-2002, at national level, following projects have been completed by General Directorates of DSI, EIE and GDRS, and Universities:

- "*Water Resources and Water use planning in Gediz Basin*", collaborative research with IWMI, (Completed)
- "*Yield response to climate and management of cotton, maize and wheat*", collaborative research with Regional Meteorology Center, Israel, (Ongoing)
- *The Completition of Software for Irrigiation Water Requirements*, which was prepared in the WINDOWS environment by DSI stuff,
- *The dispoisition report of the hydrologic design studies for the small dams* was completed by DSI stuff
- *Reorganization of Stream Gauging Stations Network Operated by EIE* (ongoing), planned and realised by EIE
- *Biological Researches in Lakes and Rivers* (ongoing), planned and realised by EIE
- *Study on Hydrological Budget of Mogan and Eymür Lakes* (completed), planned and realised by EIE
- *Entegrated Water Resources Management and Pollution Control in Agean River Basins* (ongoing), planned and realised by EIE
- *Calculation of Water Budget of Van Lake by using Remote Sensing Techniques* (completed), planned and realised by EIE
- *Determination of Snow – Water Equvalent by using Remote Sensing Data* (completed), planned and realised by EIE
- *Hydrological Drought Analysis of Turkish Rivers* (completed), planned and realised by EIE
- *Trends in Turkish Rivers,* (completed) realised by EIE with the support of Istanbul Technical University
- *The Determination of Rainfall and Runoff Characteristics of Guvenc Basin*, Yenimahalle, Studied by The Research Institute of GDRS, Ankara
- *The Determination of Rainfall and Runoff Characteristics of Catalkaya Basin*, Haymana, Studied by The Research Institute of GDRS, Ankara
- *The Determination of Rainfall and Runoff Characteristics of Agalin Basin*, Haymana, Studied by The Research Institute of GDRS, Ankara

- *The Application of SWRRBWQ (Simulator for Water Resources in Rural Basins - Water Quality) Model on Guvenc Basin*, Applied by The Research Institute of GDRS
- *The Observation of Sediment Yield by Echo-Sounder System in Guvenc Basin*, Managed by The Research Institute of GDRS, Ankara
- *The Use of Isotope Techniques in Separation of Runoff Hydrographs observed in Guvenc Basin*, Completed by The Research Institute of GDRS, Ankara
- *The Determination of Rainfall and Runoff Characteristics of Mahmuthacili Basin, Cankiri*, Studied by The Research Institute of GDRS, Ankara
- *Hydrological Drought Analysis of Turkish Rivers*, completed by EIE, (in Turkish)
- *The Impacts of Major Soil Groups on Erosion*, organized by The Research Institute of GDRS, Erzurum, (a local activity in Turkish)
- *The Determination of Rainfall and Runoff Characteristics of Sinirbasi Basin*, Ilica, Erzurum (in Turkish), Studied by The Research Institute of GDRS, Erzurum
- *The Preparation of Erosion Risk Map Using the GIS and RS Systems in Turtum Lake Basin*, Erzurum, (in Turkish), Studied by The Research Institute of GDRS, Erzurum
- *The Classification of Pasturage Areas Using the GIS and RS Systems*, Erzurum, (in Turkish), Studied by The Research Institute of GDRS, Erzurum
- *The Realisiation of Areal Snow Distribution Map Using the GIS and RS Systems in Palandoken-Konakli Basin*, Erzurum, (in Turkish), Studied by The Research Institute of GDRS, Erzurum

It is kindly informed that the other details, mostly related to the studies done by universities, can be available in the related pages of the Web site of www.dsi.gov.tr , in which the secretariat works of IAHS are introduced also.

k. Activities foreseen for the future

By DSI:

- Improvement of functional capabilities of the Bureau of UNESCO/WMO related issues, established in Investigation and Planning Department of DSI in order to serve as focal point also for various international hydrological activities,
- Publication of a newsletter on Web Site on Internet, in order to disseminate information on national and regional IHP activities to the members in the country, members of the hydrologic community in the country,
- The Completion of the report "The Status of Turkish Water Resources", being prepared by General Directorate of State Hydraulic Works (DSI), as a contribution of the national celebration of International Freshwater Year,
- The preparation of a disposition report for the hydrological studies inside the dams projects, to be prepared by Hydrology Division in General Directorate of State Hydraulic Works (DSI),
- The preparation of a guide book for flood studies, to be prepared by Hydrology Division in DSI, Ankara
- The preparation of a guide book for determining the factor of "degree-day" in estimating the snow-melt water potential, to be prepared by Hydrology Division in DSI, Ankara

By GDRS:

- The organization of an international symposium on hydrology, planned by The Research Institute of GDRS, Ankara

- The improvement of existing facilities of GIS / RS Center, planned by The Research Institute of GDRS, Ankara
- The Development of projects and activities in water management at the basin scale
- The organization of 3rd National Congress of Snow (planned by The Research Institute of GDRS, Erzurum

In the long term, it is proposed to be more effective in finding a way that the national community, under the leadership of DSI, has a real impact on all hydrologic activities and water related politics in the Country.

3. PUBLICATIONS PUBLISHED BY NATIONAL / INTERNATIONAL INSTITUTES, JOURNALS, PROCEEDINGS

It can be firstly indicated that the flood yearbooks, prepared by DSI's hydrologists, includes the preliminary information used for strategic and socio-economic planning in the basins. The valuable information in this publication, together with the maps showing the flooded areas at the scale of 1/800 000, will be main input for the studies by European Natural Disasters Training Center (AFEM), established by Turkey in 1988 under the responsibility of the Ministry of Public Works and Settlement.

The other publication would be given in a classified form as following:

a. International Publications

(1) International Journal

- H.K.Cigizoglu, M.Bayazıt. Application of Gamma Auto-regressive Model to Analysis of Dry Periods, J. of Hydrologic Eng., ASCE, 3(3), 218-221, 1998.
- B.Önöz, M.Bayazit. GEV-PWM Model for Distribution of Minimum Flows, J. of Hydrologic Eng., ASCE, 4(3), 289-292, 1999.
- Akyurek, Z. and Sorman, A.U. Monitoring Snow Covered Areas in the Eastern Part of Turkey from NOAA / AVHRR Data, The Hydrological Science Journal, v.47, no.2, IAHS press, Ed.:Z.W.Kundzewicz, UK, 4/2002

(2) International Proceedings / Symposium / Conference

Proceedings:

- Sorman, A.Ü., Uzunoglu,E. and Kaya, I. Application of SRM and Slurp Model in Eastern Turkey Using RS/GIS, Remote Sensing and Hydrology 2000, V.269, IAHS, Al Rango, USA, 4/2000
- Akyurek, Z. and Sorman, A.U. Snow Depth Monitoring at Regional Scale , 20th Annual ESRI International User Conference, ESRI International Cooperation, USA, 6/2000
- Erdogan, N. and Akyurek, Z. and Ozgenoglu, A. Monitoring the Overburden Excavation Stripping in the Open Cast Mines using GIS, Proceedings of 2nd ICGESA 2000 International Conference on GIS for Earth Science Applications, Izmir, 9/2000
- Sorman, A.U., Application of the SRM and SLURP Models, RS and Hydrology IAHS, v.267, International Association of Hydrological Sciences, UK, p.81-86, 8/2001

Seminar – Symposium

- Doganoglu, V., Sorman, A.U. Inundation of Flooded Areas in Western Lack Sea Region Using RS/GIS Techniques, International Seminar on Hydrology of the Mediterranean Regions, Institute de Recherche pour le Developpement, France, 10/2000
- Doganoglu, V., Akyurek, Z. and Sorman, A.U. Inundation of Flooded Areas in Black Sea Region, International Hydrological Program Seminar, IHP-V P1, UNESCO, Paris, France, p.373-380, 10/2001
- Sorman, A.U., Doganoglu, V. and Merzi, N. Coupling of GIS within a Hydraulic Model for Flood Hazards, International Symposium and Seminar on Present State and Future Trends of Karst, Hacettepe University Karst Research Center, Ed.:G.Günay, Turkey, 9/2000
- Sorman, A.U., Application of the SRM and SLURP Models, RS and Hydrology IAHS, v.267, International Association of Hydrological Sciences, UK, p.81-86, 8/2001

Congress / Conference

- M.Bayazıt, B.Önöz, B.Oğuz. Regional Analysis of Low Flows in Gediz and B.Menderes River Basins, Rapport Annual No. 6, Group AMHY de Friend, UNESCO, Paris, 1998.
- Sensoy, A. and Sorman, A.U. Hydrologic Model Application Using GIS, 4th International Congress on Advances in Civil Engineering, East Mediterranean University, Y.C. Toklu, F. Erbatur, Cyprus, p.1779-1800, 11/2000
- Akyurek, Z. and Sorman, A.U. Monitoring the Snow Area Covers in the Eastern Part of Turkey, 4th International Congress on Advances in Civil Engineering, v.4, p. 1023-1032, 11/2000
- Sorman, A.U., Uzunoglu, E. and Kaya, I. Application of Hydrologic Models (SRM and Slurp) in Turkey, 4th International Congress on Advances in Civil Engineering, East Mediterranean University, Y.C. Toklu, F. Erbatur, Cyprus, p.1751-1760, 11/2000
- Sorman, A.A. and Sorman, A.U. RS/GIS Approach in Hydrologic Modelling, 4th International Congress on Advances in Civil Engineering, East Mediterranean University, Y.C. Toklu, F. Erbatur, Cyprus, p.1779-1790, 11/2000

Workshop

- Sensoy, A. and Sorman, A.U. Coupling of RS / GIS in Hydrologic Models, International Workshop on the Application of RS in Hydrology, National Water Resources Institute, Canada, p.15-25, 10/2001
- Sorman, A.U. and Akyurek, Z. Detection of Seasonal Land Cover Changes Using Multi-temporal images, International Workshop on the Application of RS in Hydrology, National Water Resources Institute, Canada, p.1-14, 10/2001

- Gurer, I. Ozguler, H., Eryılmaz, A., Dorum, A., Gurbuz, A., Bakir, H., Ozlu, A., Sevim, Z. Snow Observation Programme And Snow Data Analysis In Turkey During The Period Of 1964 –2002 Winter Seasons, An International Workshop On Snow Hydrology In Medıterranean Regıons, December 16-17, 2002, Beyrouth - Liban

b. National Publications

(1) National Journal

- Doganoglu, V. and Sorman, A.U. Determination of Flood Inundated Areas Using RS Techniques in the Western Black Sea Region, Turkish Journal of Engineering and Environmental Sciences, v.25, TUBITAK, Turkey, p.379-389, 6/2001
- Akyurek, Z. "Turkiye'de Kar Ortulu Alanların Pasif Mikrodalga Uydu Verileriyle Izlenmesi", The Journal of Turkish Chamber of Civil Engineers, Turkey (in Turkish)

(2) National Proceedings / Symposium / Conference

Congress / Conference

- Aksoy, H, Bayazıt, M. Markov Chains Applied to Stream-flow Simulation Models, II. National Hydrology Congress, Istanbul, 1998(in Turkish)
- Bayazıt, M., Önöz, B. Conditional Probability Distributions of Storage Variables, II. National Hydrology Congress, Istanbul, 1998 (in Turkish)
- Z.Kulga, M.Hatipoğlu, H.Ozguler; The Evaluation of Flooding of 19-21 May 1998 in Bartin River Basin by GIS/RS Technologies, The Seminar on "Use of Space Techniques in Disaster Mitigation and Physical Planning Activities", 1998, Ankara
- Doganoglu, V.,Merzi, N.,Sorman, A.U. and Usul, N. Coupling of GIS with HEC-2 Model, EMEA ESRI User Conference, ISLEM Co and ESRI, Turkey, 10/2000
- Sorman, A.U. and Sorman, A.A.GIS Approach in Hydrologic Modelling, EMEA ESRI User Conference, Turkey, 10/2000
- Oz, S., Akturek, Z. and Sorman, A.U. GIS Application for Daily Meteorological Data, EMEA ESRI User Conference, Turkey, 10/2000
- Sensoy, A. and Sorman, A.U. Hydrologic Modelling of Karasu Basin Using GIS, EMEA ESRI User Conference, Turkey, 10/2000
- Pala, A., Akyurek, Z. The Determination of the Climate Change Impacts at the Basin Scale, 3rd National Congress of Hydrology, Turkey, 6/2001 (in Turkish)
- Uzunoglu, E., Sorman, A.U. and Sensoy, A. The Application of the New Techniques in Hydrologic Modelling, 2nd National Congress of Snow, Research Institute of Rural Services, Erzurum, Turkey, 2/2000
- Sorman, A.U. The Importance of Data in River Basin Modeling with RS - GIS Techniques, 3rd National Congress of Hydrology, Turkey, p.79-92, 6/2001 (published in Turkish)
- Tombul, M., Sorman, A.U. and Akyurek, Z. The Determination of Similarity Parameters in the Hydrologic Basins, 3rd National Congress of Hydrology, Turkey, p.329-336, 6/2001 (published in Turkish)
- Ozguler, H. The Use of Principal Component Analysis in Determining the Relationships Between the Flow and Water Quality Parameters, 3rd National Congress of Hydrology, Turkey, p.193-201, 6/2001 (published in Turkish)

Workshop

- Sorman, A.U., Regional Stream-flow Network Analysis Using GLS Method, NATO Advanced Research Workshop, NATO-ASI, Turkey, 9/2001

Seminar – Symposium

- Sorman, A.U. and Akyurek, Z. The Importance of Meteorological Data in River Basin Modeling and Applications in Turkey, Planning Seminar, State Meteorological Service, Ankara, Turkey, p.1-10, 5/2001 (published in Turkish)
- Keskin, E. and Sorman, A.U. The processing of Hydro-meteorological Data of The Egirdir Lake, 1st Symposium of Egirdir, The Suleyman Demiral University, Turkey, 9/2001

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF

METEOROLOGICAL AND ATMOSPHERE SCIENCES

COMMISION

OF TURKEY

FOR

1999 - 2003

to be presented at the

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METEOROLOGICAL AND ATMOSPHERE COMMISION

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(www.meteor.gov.tr)

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1. INTRODUCTION:

The Turkish National Commission for Meteorological and Atmosphere , had coordinated in the 1999-2002 period the scientific studies on Turkey. The commission is mainly supported by the General Directorate of Turkish State Meteorological Service (TSMS) and scientists from the Meteorology and Hydrologi Departments of the leading universities such as İstanbul Univ., İstanbul Technical Univ., Black Sea Univ., Selçuk Univ., Middle East Technical Univ., Hacettepe Univ., 9 Eylül Univ.,

2. ACTIVITY :

Turkish State Meteorological Service (TSMS) started in 1997 the modernization studies of meteorological systems, prepared investments projects of great importance and got down to execution of them at a very high speed with a view to rendering the best service to all users who demand meteorological support, and furnish the users with more reliable data continually and to put to the service of the domestic and international users the products and innovations developed by modern technology in the field of meteorology. One of those modernization studies is the renovation of the existing observation network and establishment of automated measuring and reporting systems. Within the scope of those studies, TSMS has established the followings as a part of observation network:

- Automated Weather Observing Systems (AWOS) (25),
- Electronic Wind Measuring Systems (46),
- C-Band Doppler Meteorological Radar (1),
- Meteorological Satellite Receiving System (1),
- Message Switching System (MSS) (1),

After the flood disaster of 21 May, 1998 in the western Black Sea Region, and the earthquake of 27 June, 1998 in Adana, the government of the Turkish Republic put a project into force, and to finance this project, it obtained some loans from the World Bank with the purpose of repairing the damages caused by the disaster as soon as possible and developing as well an early warning system against any possible disasters afterwards. While TSMS was executing its investments project prepared by itself before, this new project referred to as “TEFER” (abbreviation of Turkish Emergency Flood and Earthquake Recovery Project) was brought up as a result of a disaster and upon this, TSMS decided to carry out the TEFER project along with its own project and to integrate them with each other.

In this project, purchase of goods and services of various institutions, construction buildings, roads and bridges and modernization of the existing systems are proposed.

- TSMS is involved in this project to establish early warning systems for MODERNISATION OF MONITORING, FORECASTING and WARNING CAPABILITIES
- TSMS has completed the following investments successfully within the scope of TEFER Project,
  - C-Band Doppler Meteorological Radars (3)
  - Automated Weather Observing Systems (206)
  - Satellite based communication systems (VSAT) (224)

3. EDICATION

Turkish State Meteorological Service was designated as a WMO RMTC in Region-VI to organize courses to meet regional needs in education and training in Meteorology and Atmospheric Sciences. A formal agreement was signed between Turkish State Meteorological Service WMO representatives in Geneva on 18 May 2000. Three short courses have been organized until now in the last two years at the various RMTC locations, including Ankara and Alanya. The first training activity of the Centre was a short course in " Meteorological Telecommunication: Data Processing and Interpretation" which took place in May of 2001in RMTC in Ankara. The second training activity was also held in WMO RMTC facilities in Ankara in November 2001 on the subject of "Agricultural Meteorology". The last training activity organized was a specialized course in "Meteorological Telecommunication" which took place in October of 2002 in Turkish WMO RMTC Alanya Facilities.

Training Activities

~ 1999 ~

	Date	Topic	Number of Participants	Place
1	24 – 28/05/1999	Observer Course on Climatology	33	Training Centre
2	04/10 – 03/11/1999	Seminar on Aviation and Marine Meteorology	18	Training Centre

~ 2000 ~

	Date	Topic	Number of Participants	Place
1	31/01 – 11/02/2000	Course on Basic Computer Operation	75	Training Centre
2	04 – 22/12/2000	Course on Basic UNIX Operation System	18	Training Centre

~ 2001 ~

	Date	Topic	Number of Participants	Place
1	08 – 26/01/2001	Observer Course on Synoptic and Aviation	21	Training Centre
2	26/03 – 13/04/2001	Observer Course on Climatology	30	Training Centre
3	24/04 – 04/05/2001	Course on Basic UNIX Operation System	15	Training Centre
4	07 – 18/05/2001	Course on SQL Operation Systems	15	Training Centre
5	28/05 – 05/06/2001	Course on Weather Forecasting	26	Training Centre
6	04 – 22/06/2001	Course on Meteorological Telecommunication, Data Processing and Interpretation (International)	15	RMTC-Ankara
7	03 – 07/09/2001	Course on Weather Forecasting	30	Training Centre
8	10/09 – 05/10/2001	Basic Meteorology Course	14	Training Centre
9	15 – 26/10/2001	Practical Training Course on Electronic and Meteorological Instruments	20	Training Centre
10	30/10 – 02/11/2001	Course on Data Input and Preparation of Observation Schedule for Climatologic Stations	22	Training Centre
11	05 – 16/11/2001	Agricultural Meteorology (International)	18	RMTC-Ankara

~ 2002 ~

	Date	Topic	Number of Participants	Place
1	01 – 12/04/2002	Course on Weather Forecasting	24	Training Centre
2	29/04 – 10/05/2002	Aviation and Synoptic Meteorology Course	23	Training Centre
3	25/05 – 07/06/2002	Course on Synoptic Observation	28	RMTC-Alanya
4	14 - 19/10/2002	Meteorological Telecommunication and Turk METCAP Course (International)	16	RMTC-Alanya

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Aksoy, B. 1999. '**Analysis of Changes in Sunshine Duration Data for Ankara, Turkey,**' *Theoretical and Applied Climatology*, Vol.64 , No.3-4.

Dalgün, C. 1999 '**Application of Metu3 Third Generation Wave Model for The Black Sea using Ecmwf Wind Products:A Case Study of The Storm of 4-9 November 1994,'** Proceedings of the Third International Symposium on Assimilation of Observations in Meteorology and Oceanography , Québec City, Canada.

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Türkeş, M. 1999. '**Vulnerability of Turkey to desertification with respect to precipitation and aridity conditions**,' *Turkish Journal of Engineering and Environmental Science*, **23**, 363-380.

Hirsch-Eshkol, T. R., Kutiel, H. and Türkeş, M. 2000. '**Pressure patterns characterizing dry and wet rainfall conditions in Turkey**', in The Mediterranean: Cultures, Environment and Society, Synoptic Climatology in the Mediterranean, Proceedings of the International Colloquium (CD-R), Haifa, 22-24 May 2000, University of Haifa, pp. 175-192.

Kömüşçü, A.Ü. 2000. '**Potential use of NOAA/AVHHR Satellite Data for Monitoring Environmental Change in Turkey**, ' *Drought Network News*, (12) 5-9.

Türkes, M. 2000. '**Climate change studies and activities in Turkey**', Participant's Presentations for the Advanced Seminar on: Climatic change: Effects on agriculture in the

Mediterranean region, Mediterranean Agronomic Institute of Zaragoza, 25-29 September 2000.

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Dalgün, C. 2001 **'A Major Marine Accident in the Black Sea on 20 May 2000: Wind And Wave Analysis'** Proceedings of International Workshop on Operational Marine Forecasting: Halifax, Nova Scotia, Canada. *(in press)*

Kutiel, H., Hirsch-Eshkol, T. R. and Türkeţ, M. 2001. '**Sea level pressure patterns associated with dry or wet monthly rainfall conditions in Turkey**', *Theor. Appl. Climatol*., **69**, 39-67.

Türkeş, M. 2001. '**Spatial and temporal variations in precipitation and aridity index series of Turkey**', presented in the Workshop on the 'Assessment, assimilation and validation of data for "Global Change" related research in the Mediterranean area', Casablanca-Morocco, 21-24 February 2001.

Ecevit, A., Akınoğlu, B.G. and Aksoy, B. 2002. '**Generating TMY2 using bright sunshine duration instead of global solar radiation**'. *Energy*, 27(2002), 947-954.

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Türkeş, M., Sümer, U. M. ve Çetiner, G. 2002. '**Persistence and periodicity in the precipitation series of Turkey and associations with 500 hPa geopotential heights**,' *Climate Research*, **Vol. 21**: 59-81.

Türkeş. M., Sümer, U. M. and Demir, İ. 2002. '**Re-evaluation of trends and changes in**

mean, maximum and minimum temperatures of Turkey, for the period 1929-1999', *Int. J. Climatol.*, **22**: 947-977.

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Türkeş, M. and Sümer, U. M. 2003. '**Spatial and temporal patterns of trends and variability in Diurnal temperature ranges of Turkey**'. Submitted to *Theoretical and Applied Climatology*.

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No	Publication No	Book's Name	Author	Number of unit
1	2000/01	Adana's Climate According to Koppen Method.	Fırat Çukurçayır and Hüseyin Arabacı	50 (Printed)
2	2000/02	Antalya's Climate According to Koppen Method.	Fırat Çukurçayır and Hüseyin Arabacı	50 (Printed)
3	2000/03	Elazığ's Climate According to Koppen Method.	Fırat Çukurçayır and Hüseyin Arabacı	50 (Printed)
4	2000/04	Konya's Climate According to Thorntwaite Method.	Yalçın Ün	50 (Printed)
5	2000/05	Southeastern Anatolia Project (GAP):Plant -Water Consumption and Plant-Water Requirement.	Melahat Utku Ali İhsan İlhan	200 (Printed)
6	2000/06	Aviation Meteorology-II	Military Meteorology Division of Weather Analysis and Forecasting Department.	100 (Printed)
7	2000/07	Turkey's Climatological Analysis of Precipitation, Temperature, and Humidity.	Serap Akgündüz.	1000 (Printed)
8	2001/01	Turkey Fenology Atlas.	Agricultural Meteorology Division.	125 (Printed)
9	2002/01	Turkey Frost Calendar.	Mücahit Karaoğlu.	75 (Printed)
10	2002/02	Atatürk and Meteorology.	Dr. Mithat Atabay.	50 (Printed)
11	2002/03	Military Meteorological Service Established During World War I In The Ottoman Empire by Germans.	Dr. Mithat Atabay.	50 (Printed)
12	2002/04	Writing Rules.	Commission.	150 (Printed)
13	2002/05	Meteorological Dictionary.	Ali Demirel.	100 (Printed)
14	2002/06	Radar Meteorology.	Weather Analysis and Forecasting Department.	60 (Printed)

TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

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OCEANOGRAPHIC COMMISSION OF TURKEY
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1. INTRODUCTION

Turkey is located on two peninsulas called “Thrace” and “Anatolia” and is surrounded by the Black Sea at the North, Aegean Sea at the west and Levantine Sea at the South.

The oceanographic studies carried out in Turkey date back to a long past extending over the beginning of the 20th century. Preliminary studies were characterized by hydrographic and hydrobiologic activities and these studies have been maintained a long time.

1960s brought a new point of view to the oceanographic studies and surveys. Besides the geographical position of the country which renders compulsory to be involved in the sea; Straits system which was put on the agenda during international relations has been effective for concentrating the activities in this way.

The Law of Navigational, Hydrographic Services numbered 1738 which was promulgated in 1973, accelerated the marine research and the whole Navigational, Hydrographic and Oceanographic Investigations which were conducted in Turkey were begun to be coordinated by DNHO (Department of Navigation, Hydrography and Oceanography of the Turkish Navy).

2. OCEANOGRAPHIC RESEARCH POTENTIAL OF TURKEY

A programme called “National Marine Research and Monitoring Programme” is still in force Turkey and the purpose of this program is collecting oceanographic and environmental data along the Turkish Coasts (nearly 8500 km) and in off-shore areas. All research vessels belong to the Marine Research Institutes work in this program actively. The program is carried out in the Black Sea, Sea of Marmara (including the Straits), Aegean Sea and the Mediterranean Sea.

Institutes of the Marine Research are available in Turkey which give B.S. degree on marine sciences and fishery. Besides the academic institutes, some organizations are also available which belong to some ministries such as “Ministry of Energy and Natural Resurces, General Directorate of Mineral Research and Exploration.” Recently, five oceanographic research vessels and a number of small boats and vessels which were equipped suitable to be used in oceanographic surveys in the coastal waters.

Table.1. Some organizations which are involved in oceanography and study areas of these organizations.

Table.2. List of the oceanographic research vessels and boats.

Table.1. Marine Research Institutes/Organizations in Turkey :
P : Physical Oceanography, C : Chemical Oceanography.
G : Geological and Geophysical Oceanography.
B : Biological Oceanography.

List of the Institutes/Organizations	Fields of Interest
1. METU, Institute of Marine Sciences P.O.B.28 Erdemli/İÇEL 33770 (IMS)	PCGB
2. University of 9 Eylül, Institute of Marine Sciences and Technology; (IMST) S.S.K. Tesisleri D Blok Kat 2 Konak/İZMİR	PCGB
3. Aegean University, College of Science, Biology Department; Bornova/İZMİR	PCB
4. Aegean University; Hydrobiological and Sea Food Research and Application Center;	PCB
University of Istanbul, Institute (IMSA) of Marine Sciences and Management; Müşküle Sokak Vefa/ISTANBUL	PCGB
5. University of Karadeniz, Faculty of the Marine Sciences and Technology of Sürmene/TRABZON 61080	CB
6. University of Çukurova, Group of Underwater Exploration, College of Sea Food; ADANA	PCGB
7. TUBITAK, Scientific and Industrial Research Center of Marmara; P.O.B. 74 Gebze/KOCAELİ	PCB
8. TUBITAK, Marine Sciences and Group of Environmental Researches; Kavaklıdere/ANKARA	PCBG
9. Group of the Atomic Energy of Turkey, Nuclear Research Training Center of Cekmece; P.O.B. 55 Sefakoy/ISTANBUL	B
10. Ministry of Energy and Natural Resources, General Directorate of Mineral Research And Exploration; ANKARA	G
11. Ministry of Defense, General Command of Mapping, Cebeci/ANKARA 06100	PG
12. Department of Navigation, Hydrography and Oceanography of the Turkish Navy. Çubuklu/İSTANBUL 34805	PGB
13. Istanbul Technical University, Faculty of Ship Engineering and Marine Sciences Maslak/ISTANBUL	PCB

Table.2. Technical Characteristics of the Research Vessels and Boats in Turkey and related organizations.

Marine Research Organizations	Research Vessels	Length	Width	Draft	Tonnage
1. University of Istanbul Institute of Marine Sciences and Geography	R/V ARAR	30.7	6.30		173 GT
2. University of 9 Eylul Institute of Marine Sciences and Technology	R/V K.PİRİ REİS	36.0	8.10	2.30 2.80	300 GT
3. General Directorate of Mineral Research and Exploration	MTA SİSMİK-1	56.45	8.30	3.90	300 GT
4. METU, Institute of Marine Sciences	R/V BİLİM R/V LAMAS R/V ERDEMLİ R/V KUĞU	40.36 16.0 15.48 12.00	9.47 5.05 4.102. 5	3.80 1.46 1.48 -	633 GT 286 GT 296 GT -
5. Department of Navigation, Hydrography and Oceanography of the Turkish Navy	TCG CESME TCG ÇUBUKLU TCG MSH-I TCG MSH-II	87 40.35	14.5 9.41	4.6 3.65	2500 GT 608 GT
6. Aegean University, Hydrobiological and Water Resources Research and Application Center	R/V HİPPOCOMPUS R/V NERES	16.5 8.0	4.0 1.7	1.50 -	286 GT -

3. MARINE OBSERVATIONS CARRIED OUT BY MARINE RESEARCH INSTITUTES AND ORGANIZATIONS IN TURKEY BETWEEN 1999 AND 2003

1. MIDDLE EAST TECHNICAL UNIVERSITY, METU INSTITUTE OF MARINE SCIENCES.

a. Marine and Environmental Measurements between various public organizations.

b. Periodic Oceanographic Studies in the Black Sea and Eastern Mediterranean.

c. "MED-POL 2" (National Marine Pollution Monitoring and Survey Studies in the Northeastern Mediterranean (Levantine Sea)).

d. Physical Oceanography of Eastern Mediterranean Project (POEM).

e. Field measurements on the Turkish Straits System (The Strait of Çanakkale, Sea of Marmara, Strait of İstanbul) and analysis of collected data.

f. Marine pollution monitoring studies in the Sea of Marmara.

g. Ecological Management of surrounding seas, Turkish Strait System and the coastal areas.

RESEARCH ACTIVITIES OF METU

Projects With National Support :

- National Monitoring Program : North-Eastern Mediterranean Sea Sub-Project;

- National Monitoring Program : Sea of Marmara Sub-Project;

- National Monitoring Program : Eastern Black Sea Sub-Project;

- National Monitoring Program : Investigation of Transport Routes of Atmospheric Pollutants to the Eastern Mediterranean Sea;

- Investigation of Post Operational Oceanographic and Atmospheric Factors of Seka-Taşucu Paper Plant;

- Determination of heavy metal pollution by land based sources on the Central and Eastern Black Sea Coasts;

- The Carcinogenic Effects of Polyaromatic Hydrocarbons on fish and aromatic product formation on DNA;

- Productivity and significance of the microbial loop for the cycling of matter within the upper layers of surrounding seas;

PROJECTS SUPPORTED BY INTERNATIONAL AGENCIES :

- Physical/Biological/Chemical Oceanography of the Eastern Mediterranean Sea (POEM BC);

- Measurements of selected tracers, modeling the exchanges, transport and mixing processes in the Back Sea and Marmara Sea;

A comparative study of primary productivity, transport and coastal-open sea interactions in the Black Sea, based on the seawifs and CZCS Data;

- Physical Oceanography of the Eastern Mediterranean (POEM) Phase I Studies;

- Monitoring Via Direct Measurements of the Modes of Mixing and transport of Wastewater Discharges into the Bosphorus Underflow.

2. UNIVERSITY OF 9 EYLÜL, INSTITUTE OF MARINE SCIENCES AND TECHNOLOGY

a. MEDPOL II Long Term Monitoring, (Aegean Part)

b. 3D Mathematical Modelling of the Aegean Sea.

c. Annual and Seasonal Change of the Particle Sedimentation in the Southwestern Basin of the Black Sea and Marmara.

d. Pollution Monitoring in the Bay of Izmir.

e. Marine Researches within the Frame of Didim Environmental Project.

f. Geo Thermal Researches in the Bay of Izmir.

g. Artificial Reef Researches in the Bay of Izmir.

h. The Modelling of the Hydrodynamics and Pollutant Dispersion of the Bay of Izmir.

ı. Marine Research at the Aliağa Arap Çiftliği

i. Site Survey to Visualize the Ocean Bottom.

j. Eastern Black Sea Sewage Outlet Projects.

k. Digital Visualization.

l. Data Processing and GIS Applications.

m. Coastal Engineering.

n. Naval Architecture Software Development.

PROJECTS SUPPORTED BY THE TURKISH SCIENCE AND TECHNICAL COUNSEL (TUBITAK) UNDER THE FRAME OF MARINE RESEARCH PROGRAM

1. PROJECT: 101Y079
   PROJECT NAME: National Oceanographic Data Base Inventory Building Application.
   RESPONSIBLE ORG.: METU-IMS/ERDEMLI

2. PROJECT: 101Y080
   PROJECT NAME: Study and Real Time Modeling of Bio-geochemical Cycles in the Black Sea,
   Marmara, Aegean and the Mediterranean.
   RESPONSIBLE ORG.: METU-IMS/ERDEMLI

3. PROJECT: 101Y081
   PROJECT NAME: Lower and Upper Nutrient Layer Dynamics in the Strait of Çanakkale and Saros bay.
   RESPONSIBLE ORG.: University of 18 Mart/CANAKKALE

4. PROJECT: 101Y083
   PROJECT NAME: Pollution Measurements after the Izmit Earthquake.
   RESPONSIBLE ORG.: TUBITAK Marmara Research Center

5. PROJECT: 101Y084
   PROJECT NAME: Aquaculture Data Base Management System.
   RESPONSIBLE ORG.: University of Mersin

6. PROJECT: 101Y085
   PROJECT NAME: Artificial Production of Penaeus Semisulcatus.
   RESPONSIBLE ORG.: Beymelek Aquaculture Center

7. PROJECT: 102Y037
   PROJECT NAME: Pikoplankton content of the Turkish Seas.
   RESPONSIBLE ORG.: METU-IMS/ERDEMLI

8. PROJECT: 102Y056
   PROJECT NAME: Modeling of the Kilikya Basin.
   RESPONSIBLE ORG.: METU-IMS/ERDEMLI

9. PROJECT: 102Y058
   PROJECT NAME: Study of the efefcts of Aquaculture in Mugla Coasts .
   RESPONSIBLE ORG.: METU-IMS/ERDEMLI

10. PROJECT: 102Y068
    PROJECT NAME: Study of the Morfoteknik and Geologic Properties of the Armutlu Peninsula.
    RESPONSIBLE ORG.: Istanbul Technical University (ITU)/ISTANBUL

11. PROJECT: 102Y069
    PROJECT NAME: Study of the Micro Earthquakes with Ocean Bottom Seismographs and Broadband Land Seismographes.
    RESPONSIBLE ORG.: ITU/ISTANBUL

12. PROJECT: 102Y070
PROJECT NAME: The Effect of a Possible Earthquake along the Coasts of Marmara.
RESPONSIBLE ORG.: ITU/ISTANBUL

13. PROJECT: 102Y071
PROJECT NAME: Sediment Mass Flow on the Tekirdag Basin.
RESPONSIBLE ORG.: University of Ankara

14. PROJECT: 102Y072
PROJECT NAME: The Geological Evolution of the Sea of Marmara.
RESPONSIBLE ORG.: ITU/ISTANBUL

15. PROJECT: 102Y073
PROJECT NAME: Sedimentalogic Properties of the Southern Shelf of the Sea of Marmara.
RESPONSIBLE ORG.: MTA/ANKARA

16. PROJECT: 102Y074
PROJECT NAME: Study of the Faults at the Northern Coasts of the Sea of Marmara by Electric and Electro magnetic Methods.
RESPONSIBLE ORG.: ITUANKARA

17. PROJECT: 102Y075
PROJECT NAME: Study of the Northern Anatolian Fault at Hersek Plain by Geodesic Methods in Micro Scale.
RESPONSIBLE ORG.: Gebze High Technology Institute

18. PROJECT: 102Y076
PROJECT NAME: Risk of Tsunami in the Sea of Marmara.
RESPONSIBLE ORG.: TUBITAK Marmara Research Center

19. PROJECT: 102Y077
PROJECT NAME: Joint Franco – Turkish Marmara Research Project.
RESPONSIBLE ORG.: TUBITAK Marmara Research Center

19. PROJECT: 102Y078
PROJECT NAME: Paleomagnetisma of the Sediments of the Sea of Marmara.
RESPONSIBLE ORG.: TUBITAK Marmara Research Center

20. PROJECT: 102Y104
PROJECT NAME: Assimilation of the Microearthquakes in the Sea of Marmara.
RESPONSIBLE ORG.: ITU/ISTANBUL

21. PROJECT: 102Y105
PROJECT NAME: Main Fault Line at the Mid basin of the Sea of Marmara.
RESPONSIBLE ORG.: ITU/ISTANBUL

22. PROJECT: 102Y106
PROJECT NAME: Geomorphology and the Geomechanic Properties of the Sediments between Çekmece and Silivri.
RESPONSIBLE ORG.: TUBITAK Marmara Research Center

23. PROJECT: 102Y107
PROJECT NAME: Sedimentology of the Southern Shelf of the the Sea of Marmara.
RESPONSIBLE ORG.: MTA/ANKARA

24. PROJECT: 102Y108
PROJECT NAME: Water Transfer between the Black Sea and Marmara in the 40.000 Years.
RESPONSIBLE ORG.: ITU/ISTANBUL

25. PROJECT: 102Y109
PROJECT NAME: Paleoseismology of the Iznik Lake.
RESPONSIBLE ORG.: University of Istanbul

26. PROJECT: 102Y110
PROJECT NAME: Geological and Geophsysical data Base of the Turkish Seas.
RESPONSIBLE ORG.: DNHO/ISTANBUL

27. PROJECT: 102Y111
PROJECT NAME: Bathymetric and Morphological Stady of the Kilikya Basin.
RESPONSIBLE ORG.: METU-IMS/ERDEMLI

28. PROJECT: 102Y112
PROJECT NAME: Study of the Evolution of Strait of Istanbul and Black Sea Exit.
RESPONSIBLE ORG.: Istanbul University

29. PROJECT: 102Y113
PROJECT NAME: Techtonisma and the Sea Level Variance at the Şarköy Undersea Canyon.
RESPONSIBLE ORG.: Ankara University

30. PROJECT: 102Y114
PROJECT NAME: Determination of the Formation of the Sea of Marmara.
RESPONSIBLE ORG.: TUBITAK Marmara Research Center

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TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

NATIONAL REPORT

OF

SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR

COMMISSION

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COMMISSION OF TURKEY

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1. INTRODUCTION

The Turkish National Commission for the Seismology and Physics of the Earth's interior, being one of the commission of Turkish National Union of Geodesy and Geophysics, is authorized to coordinate the research activities on related topics as well as participate for improvement of activities in these fields. The commission composed of personel and institutional members coming from the public research organizations and universities.

The chairmanship and the secretariat of the commission, in accordance with the organisatonal and operational by-laws of Turkish Geodesy-Geophysics Union, are carried out by the Earthquake Research Department of General Directorate of Disaster Affairs belonging to the Ministry of Public Works and Settlement.

At the commission, there are several working groups established for spesific purpose and functions.

This report includes summary of the activities of the organisations which provide members to the commission for the years between 1999 and 2003.

2. ACTIVITIES OF THE RESEARCH INSTITUTIONS AND UNIVERSITIES

a. Ministry of Public Works and Settlement, General Directorate of Disaster Affairs, Earthquake Research Department, Ankara (http://www.deprem.gov.tr).

(1) National Earthquake Observation Network Project (TURKNET): Seismological data of 19 (short period vertical component and analog) remote stations deployed mainly along The North Anatolian Fault are transmitted on real time basis to data procesing center located in Ankara via dedicated telephone lines, and also five digital stations (vertical component) installed in 2002 **(Fig-1)**.

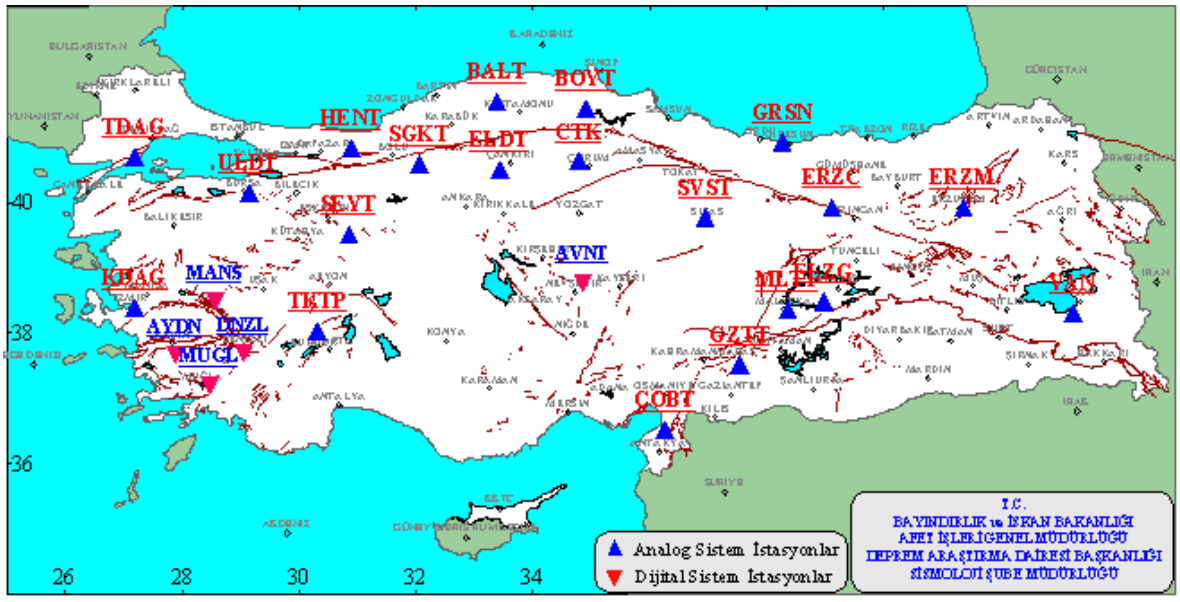

Figure-1. The map of active faults of TURKEY including TÜRKNET Seismological Stations.

There is locating the earthquakes, doing earthquake research, and putting them on web site http://sismo.deprem.gov.tr.

(2) The Turkish-German Joint Earthquake Research Project (Seismological Group) (SABONET): Since 1984, a project having 10 MLR (Magnetic Line Recorder) sismological stations had been installed area between Bolu and Sakarya Provinces at the Western part of the North Anatolian Fault Zone. By the 1996, 13 digital and 3 component seismological stations run at the same area.

After the damaging earthquakes of 1999 in TURKEY (Bay of İzmit and Düzce), we deployed 20 additionnal and temporary REFTEK stations together with Task Force group at GeoForsungsZentrum (GFZ) in Germany to observe aftershocks of those earthquakes **(Fig-2)**.

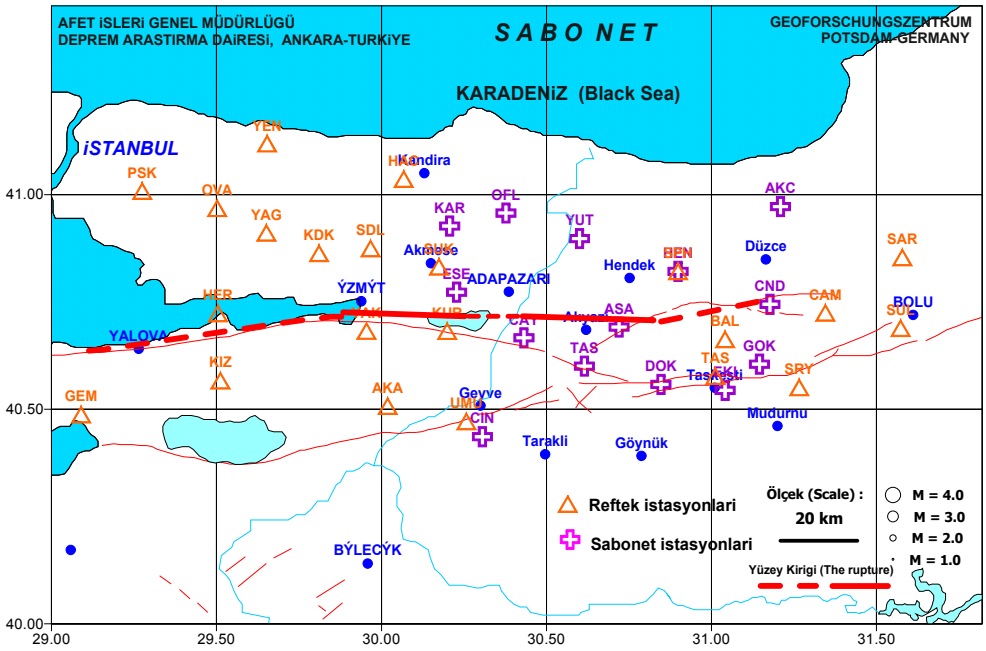

Figure 2. The map of SABONET and REFTEK Stations

We had observed and studied with Task Force of GFZ in Germany aftershocks of Sultandağı earthquake February 3, 2002, Afyon-TURKEY, **(Fig.-3)**.

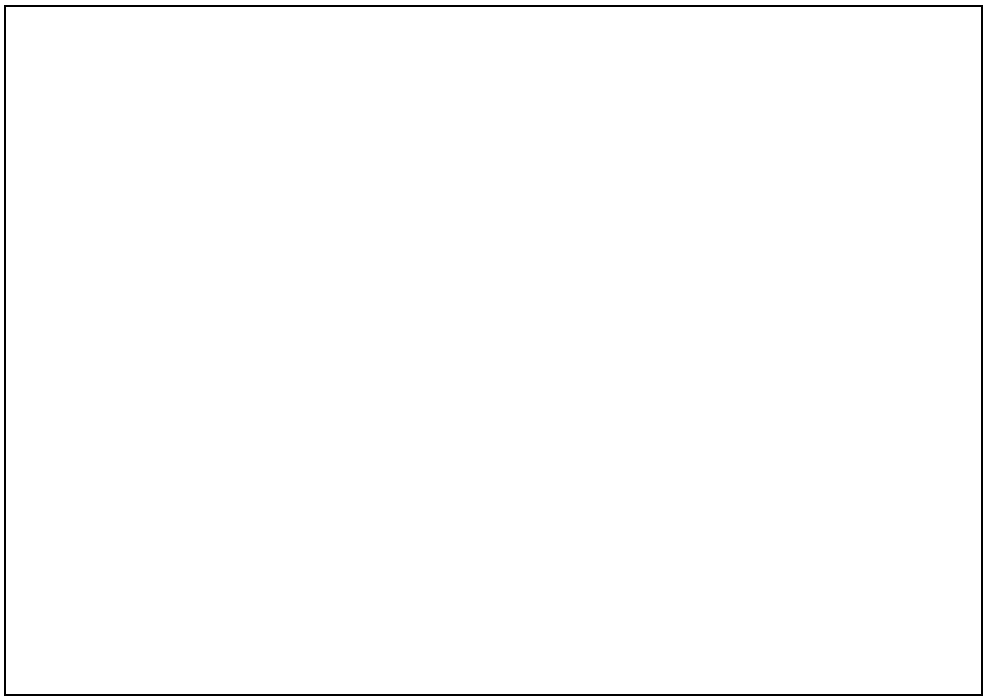

Figure 3.The seismological stations for aftershocks of Sultandağı earthquake of February 3, 2002

(3) The activities of the Research Group of Active Tectonic: This group was formed under the Seismology division after the Ceyhan-Adana earthquake in 1998. Activities of this group are on web site: http://sismo.deprem.gov.tr and are below:

1. Preparing the report for İzmit Bay earthquake of August of 17, 1999,
2. Making the surface rupture map for Düzce earthquake of November 12, 1999 in scale: 1/25.000 and 1/100.000.
3. Preparing the report for Orta (Çankırı) earthquake of June of 6, 2000,
4. Preparing the reports for Uruş-Güdül (Ankara) earthquake of August of 22, 2000 and for Karadere (Akyazı-Hendek) earthquake of August of 23, 2000,
5. Publishing the book of Earthquake and Geology,

(4) The National Strong Motion Network of Turkey: Strong Motion Network of Turkey was established in 1973 at Earthquake Research Department under the Ministry of Public Works and Settlement General Directorate of Disaster Affairs. The aim of the Network is not only to develop the methods of constructing earthquake resistant structures by measuring the forces that causes damage to the buildings, but also to collect the recorded data under catalogues for database that could be useful for engineering applications and scientific studies. According to the aim of the project and distribution of the instruments with limited number of accelerometer, they are installed on the North Anatolian Fault Zone (NAFZ), East Anatolian Fault Zone (EAFZ) and Aegean Graben System where the big earthquakes occurred or the expected active areas with a distance about 50-80 km. These instruments are mostly installed inside the public buildings or at free fields. Firstly, the Network was operated with analog accelerometers. But after 1993, also digital accelerometers are added to the Network. Up to 2001, the total number of the instruments which are operated in this project were 120 where 67 instruments are analog and 53 of them are digital (Figure 1). But since 2001, with the financial support of NATO, 20 digital accelerometer instruments were bought and so the local Network of Bursa-Yalova **(BYTNet)** and Aydın-

Denizli **(DATNet)** were established to bring the number of total instruments to 140. In addition to this, with the support of TUBITAK, 18 digital instruments are bought and the local Network of Hatay-Kahramanmaraş **(MATNet)** will be established. So at the end of 2003, the total station number will be 158.

Since the establishment of the Network, acceleration data of earthquake, which is, occurred in Turkey are collected, stored and always updated. The received data's are presented through Internet (http://angora.deprem.gov.tr) to all researchers and science area.

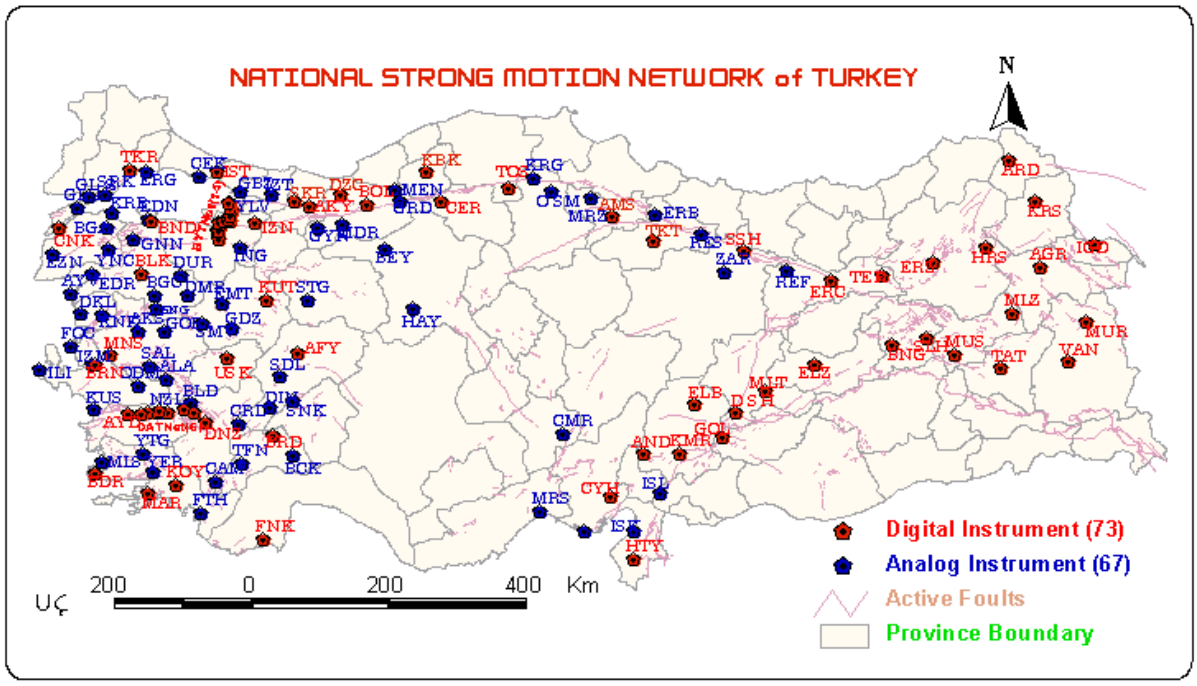

Figure-4. The Stations Distribution Map of National Strong Motion Network of Turkey

(5) Turkish - Japanese Project: Establishment of an Earthquake Disaster Prevention Research Center Project: In order to mitigate earthquake effects, a project has been set up by the General Directorate of Disaster Affairs, Istanbul Technical University and Japan International Cooperation Agency. The project consists of three subcenters, namely Earthquake Data Collection and Vulnerability Evaluation Subcenter (EDCVE), Earthquake Engineering Subcenter and Subcenter for Training. The EDCVE has 10 stations that monitoring strong earthquakes for early damage estimation. This network has installed on the central part of NAFZ. Since the installation in last year the system is working as an experimental tool for disaster prevention. http://www.deprem.gov.tr.

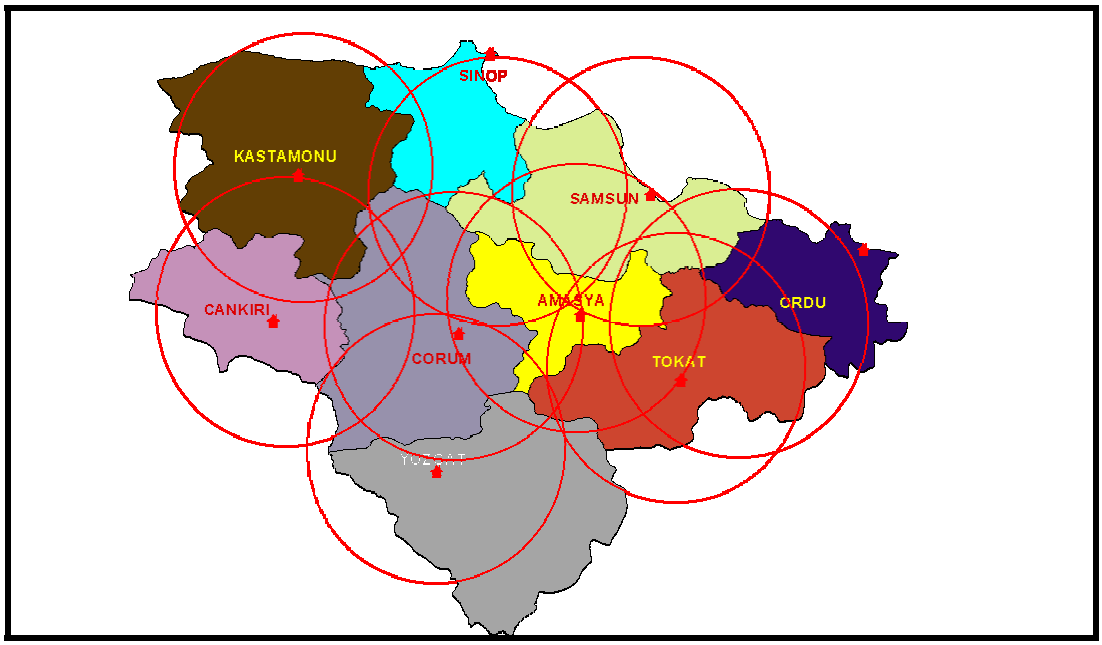

Figure-5. The Stations Map of Turkish – Japanese Project

b. Atatürk University, Earthquake Research Center, Erzurum (http://www.ataturk.edu.tr):

The projects

1. The project of Active Tectonics of plain of Posof - Ahıska.
2. The project of the geotechnical mapping of city of Erzincan and its neighbour.
3. The project of the geotechnical mapping of city of Erzurum.
4. The project of earthquake prediction of Eastern Anatolian.
5. The researh project of continental velocity structure of Eastern Anatolian.

c. Cumhuriyet University, Geophsycal Engineering Depertment, Sivas (http://www.cumhuriyet.edu.tr):

The projects

1. The seismicity and kinematics of Hatay Province. Supported by research fon of Cumhuriyet University, project no: M-121, (1997-1999).
2. The seismicity and kinematics of Adana and Kahramanmaraş Provinces. Supported by research fon of Cumhuriyet University, project no: M-153, (1999-2001).
3. The status of tensiles of the area between Erbaa and Reşadiye (a part of NAFZ), from neogen to present. Supported by research fon of Cumhuriyet University, project no: M-148, (1999-2001).
4. The seismicity and kinematics of between Adana and Kahramanmaraş Provinces after Miosen, Supported by TUBITAK, project no: YDABAG-100Y095, (2001-2003).

d. İstanbul Technical University, Faculty of Mines, Geophysical Engineering Department, İstanbul
www.geop.itu.edu.tr

- The role of Ganos fault in the formation of the Marmara Sea financially supported by Turkish Scientific and Technical Research Council (TÜBITAK Project No: 592/G).
- Investigation of the formation of the Dardanelles by means of shallow seismic data financially supported by Turkish Scientific and Technical Research Council (TÜBITAK Project No: 432/G).
- Active tectonics and earthquake risk research in the Sea of Marmara in a jointly performed research project with the TÜBITAK, CNRS-INSU, ITÜ, Ecole Normale Superieure and College De France.
- Mapping and evaluation of active faults in the gulfs of İzmir, Alaçatı and Doğanbey by means of high resolution seismic reflection method supported by Turkish Scientific and Technical Research Council (TÜBITAK Project No: 100Y084).
- Investigation of the relation of deep-seated main fault zone and the response of this zone on the sea bed and the uppermost sediments in the Central Basin of the Sea of Marmara supported by Turkish Scientific and Technical Research Council (TÜBITAK Project No: 102Y105
- *Symposia on Seismotectonics of the North-Western Anatolia-Aegean and Recent Turkish Earthquakes*, Scientific Activities 2001, Istanbul Technical University, the Faculty of Mines, May 8, 2001, Istanbul, Turkey, Symposia Book 113 pages, ISBN 975-97518-0-1.
- Real-time field evaluation of Surface wave tomography for application to environ-mental problems: Grant No: DEFG07-96ER14706, Environmental Management Science Program,Office of Science and Technology, Office of Environmental Management, United States Department of Energy (DOE), 1997-1999.
- Seismotectonics of Marmara Sea region, ITU-TUBITAK-MAM, BU Kandilli Rasathanesi, IPG Strasbourg joint project, YDABCAG 61, 1999-2000.
- Induced seismicity of SIR ve BERKE dams, souteastern Turkey, ITU AR-GE, Project No: 66, 1997-2003.
- Seismic Properties of the Aegean Continental Shelf between Izmir and Saros Bays: TUBITAK-YDABCAG-198Y079- Project, 1999.
- Investigations of Large-Amplitude Moho Reflections (SmS) from Aftershocks of 17th of August 1999 Izmit Earthquake: KOERI-ITU-00HT201-Project, 2001.
- Seismological Investigations in Turkey - The Crustal Structure of Western Turkey: ITU-Geophysics / Cambridge University, U.K The British Council Academic Link Programme Project
- Investigations of Microearthquake Activity within the Sea of Marmara and Surrounding Regions by using Ocean Bottom Seismometers (OBS) and Broad-Band Land Seismographs:. TUBITAK-YDABAG 101Y069 Project, 2001 – 2002.
- Microzonation of Bakirkoy Municipality District, ITU Development Foundation Project, 2000.
- Microzonation of AKSA Chemical Company, Yalova, Istanbul, Turkey
- Editorial work, Journal of Seismology
- Consultant, PARK AS Construction Inspection Company

e. Bosforus University, Kandilli Observatory and Earthquake Research Center, İstanbul

http://www.koeri.boun.edu.tr

Pojects:

Eastern Turkey Seismic Experiment. Supported by NSP (USA).

A Stable Regional Magnitude Methodology: Application to IMS Stations in the Eastern Mediterranean Region.

Calibration of Regional Seismic Stations in the Middle East with shots in Turkey supported by Ministry of Energy (USA) and MIT.

Improvement in Detection, Location and Identification of Small Events Throıgh Joint Data Analysis by Seismic Observatories in the Middle East / Eastern Mediterranean Region

Microtremor studies for ground conditions of İstanbul and surrounding area.

Installation of digital broadband seismic stations whole Turkey.

Application and development of EARTHWORM system.

Making Automatic Regional Moment Tensor Inversion for earthquakes M>=4.0 in Turkey

3-D velocity structure of Marmara region

Earthquake prediction studies on İznik-Mekece fault and surrounding area.

(1) The activities of Seismology Laboratory

1- 4 new seismic stations with wide broad-band (BB) are installed
2- 15 on-line seismic stations with vertical component are installed.
3- 8 conventional seismic stations are updated to on-line stations
4- 2 earthquake catalogues are made by the seismology laboratuvary
5- Digital data has placed at address of ftp:// ftp.koeri.boun.edu.tr/pub/seismo/waveform/
6- All of data are collected and archieved in digital forms since 2001 years.
7- About 10 students have came to laboratory until now for probation
8- The software is made for analysis of digital data in a determined form.
9- The joint projects are developed with MIT, LLNL(USA) and KOERI (Turkey).
10- The monitoring the seismic activity in the Marmara Sea, 6 seismic stations are located by İBB and JICA and it gave usefully information about the determining of the regions that have the sesimic activity.
11- Students have came to the laboratory that had information about seismological activities in Turkey by every week on wednesday (about 4 class).
12- Many information about earthquakes are given to many insurance agencies and trials.
13- Earthquake information is disseminated to govermental agencies and media regularly by fax and e-mail after earthquake.
14- Immediately, all of earthquakes are placed at internet web page of the laboratory for people

15- The laboratory staff has attendanced at many meetings and congresses about earth science and earthquake education.

f. İstanbul University, Engineering Faculty, Geophysical Engineering Department, İstanbul (http://www.istanbul.edu.tr):

Projects

Altinok,Y., (Principal investigator) Ersoy, Ş.,Yalçıner, A.C., Alpar,B., (1999-2001) Historical tsunami catolog Turkey and vicinity, Supported by the Research Fund of the University of the Istanbul Proje No.12687050599.

Altinok, Y., (Principal investigator) The potential of tsunami and affected areas in the Marmara Sea , supported by the Research Fund of the University of the Istanbul Proje No: Ö-947/01022001.

Yalçıner, A.C., (Principal investigator) Kuran, U., Altinok, Y., Alpar, B., Ersoy, Ş (1998-2000) Historical Earthquakes on Turkish Coasts and Research for Evidence of Tsunamis Related to Those Earthquakes, supported by the TUBİTAK INTAG 827.

Yalçiner, A.C., (Principal investigator), Imamura, F., Kuran, U., Durmuşoğlu, Ö., Çakıroğlu, Y., Özbay, I., Erdinç, E., Altinok, Y., Alpar, B., (1994-2001) Establishing Model for Tsunami Movements in the Seas Around Turkey , supported by the Scientific and Technical Research Coulncil of Turkiye-TUBITAK YDABCAG-60.

Gündoğdu, O., (Principal Investigator), Özer, N., Akkargan, Ş., 1999, Macroseismic and Field Obsevations on Adana-Ceyhan Earthquake, Supported by the Research Fund of the University of the Istanbul, Proje No: GP-12, Turkey.

Gündoğdu, O., (Principal Investigator), Altinok, Y., Akkargan, Ş., Sayın, N., Ozcep, F., Hısarlı, M., Ozcep, T., Ozer, N., 2002, Gölcük (Izmit) 1999 Earthquake and Macro-Seismic Investigations, Supported by the Research Fund of the University of the Istanbul, Turkey.

Ozer, N. (Principal İnvestigator)**,** D. Kolçak, R. Çakır, S.S. Alexander, E. Yiğitbaş, A. Elmas, 1999, Investigation of the Active Fault System Directed on NE-SW at the Northern Part of NAFZ-Adapazari and Its Elongation into the Black Sea, supported by Research Fund of the University of the Istanbul, Project ID: B-155/250599**.**

Ozer, N. (Principal İnvestigator), R. Çakır, S. S.Alexander, D. Kolçak, M. Tankut, Y. Altinok, O. Gündoğdu, E. Yiğitbaş, 1997-2000, Estimation os Potential Seismic Risk Areas by Using Geographical Information System in Adapazari-Bolu Region and Its Contribution to to the City Planning, supported by the Scientific and Technical Research Coulncil of Turkiye-TÜBİTAK İNTAG-556.

Yiğitbaş, E.(Principal Investigator), N. Ozer (CO-Investigator**)**, A. Elmas, D. Kolçak, R. Çakır, S.S.Alexander, M. Hisarli, S. Zünbül, A. Sefunç, M. Tankut, 2000, Neotectonic Aspect of the Area between Adapazari-Kandira-Akçakoca Bounded by North Anatolia Fault Zone and the Black Sea Continental Shelf, supported by the Scientific and Technical Research Coulncil of Turkiye-TÜBİTAK YDABÇAG-594/G

Pınar, A., Alptekin, Ö., Yalçınkaya, E., and Utkucu, M., (2001), Monitoring the Seismic Activity in the Vicinity of Avcılar Campus, supported by Research Fund of the University of the Istanbul.

Yalçın, N. (Principal investigator) Division of Applied Geology of Istanbul University and Altinok, Y. and Özer. N., (2002 - 2005) Principal Geological Properties and Natural Monuments Inventory , supported by TUBA (Turkish Academy of Sciences)**.**

Book chapters:

Altinok, Y. and Ersoy, S., 2000, Tsunamis observed on and near Turkish coast, Natural Hazards, State-of-the Art at the End of the Second Millennium, Kluwer Academic Publishers, 185-205. The Netherlands.

Gündoğdu, O., 2000, The Earthquakes as a Natural Disaster and their effects on the Industry, Çevre Seminerleri Notları'nda, İstanbul Sanayi Odası, Yayın No: 2000/8, Sayfa: 9-39, Istanbul, Turkey (**in Turkish)**.

Seeber L. , Armbruster J.G., Ozer N., Aktar M., Baris S., Okaya D., Ben-Zion Y., Field N., 2000, The 1999 Earthquake Sequence Along the North Anatolian Transform at the Juncture between the two main ruptures, in "The 1999 İzmit and Duzce Earthquakes: preliminary results" (eds. Barka A., Kozaci O., Akyuz S. ve Altunel E.), ISBN 975-561-182-7, p.209-223, ITU, Maslak, Istanbul.

g. Dokuz Eylül University, Engineering Fakulty, Geophsycal Engineering Department, İzmir. (http://www.deu.edu.tr)

h. General Directorate of Mineral research and Exploration (MTA), Ankara. http://www.mta.gov.tr

MTA, supplies geological data for earthquakes since its established. For the years between 1935 and 1975 the research activities were carried out as field studies. Since 1975 the neotectonic research related to earthquakes and active faults which are the earthquakes sources carried out as research projects and the map of active faults of Turkey was published in 1992. The erathquakes of 1999 (İzmit and Düzce) occurred along the active faults shown on the map of active faults of Turkey.

The Research Activities at the Area of 1999 earthquakes

The studies carried after the earthquakes at the region by MTA can be classified as land and sea research activities.

(1) Land Studies

1) Mapping of the surface faulting and determination of kinematics and paleoseismicity of the faults.
2) Site selection for the temporary and permenant settlement by producing necessary geological information
3) For military areas site selection and engineering geology studies.
4) The evaluation of the industrial establishments regardind the active faults and probable earthquakes
5) Landslide mapping of the Marmara sea and surrounding region in the scale of 1:25 000

These studies were realized by the cooperation of TÜBİTAK, METU and Ankara University.

The recent activities

Because of the increased of the earthquake risk in Marmara region after 1999 earthquakes a specific research programme has been started since 2000. The aime of this programme is to find out earthquake souces and produce geological information.

In the frame of this programme studies carried out in land:

1) Active faults and paleoseismicity
2) Geological mapping of İstanbul
3) Producing of geological data related to the west corridor of İstanbul for the urban development
4) Landslide mapping of İstanbul in the scale of 1:500 000
5) Earthquake segments and paleoseismicity of the part of NAFZ.

(2) Sea Activities

In 1999 in the cooperation of ITU around the bay of İzmit by MTA-Sismik-1 research ship studies were carried out in the western and central parts of Marmara Sea.

In the frame of this research, seismic and bathymetric records were obtained in 2000 with the cooperation Berlin Freie University.

Also In the frame of the project by ITU shallow seismic studies were carried out along the bay of İzmir, Sığacık and Kuşadası in August 2000.

In 2001, researchers from America (L&DEO) - Italy (IGM) and Turkey (ITU, MTA) were made a research via two italian research ship.

In 2001 some simples from Marmara sea around Tuzla region were taken to test Tsunami affect.

i. Seismologycal activities of Department of Navigation Hydrography and Oceanography. http://www. shodp.gov.tr

TN-DNHO EARTHQUAKE RELATED SURVEYS

WORKİNG DATES	WORKİNG AREA	SHIP/BOAT
22-26 AUGUST 1999	Multi beam bathymetry, shallow seismic and Side Scan Sonar surveys in İzmit Gulf	TCG ÇUBUKLU
23-28 AUGUST 1999	Single Beam Bathimetry, Shallow seismic and Side Scan Sonar surveys in İzmit Gulf	TCG MESAHA-II
14-19 DECEMER 1999	Multi beam Bathimetry, shallow seismic and Side Scan Sonar surveys in İzmit Gulf	TCG ÇUBUKLU
28-30 DECEMBER 1999	Multi beam Bathymetry, shallow seismic and Side Scan Sonar surveys in İzmit Gulf	TCG ÇUBUKLU
12-23 JANUARY 2000	Multi beam Bathimetry, Shallow seismic and Side scan sonar surveys between Bozburun and Altınova	TCG ÇUBUKLU
14-21 FEBRUARY 2000	Multibeam Bathimetry, surveys in Çınarcık Depression	TCG ÇUBUKLU
21-23 AUGUST 2000	Multi beam Bathimetry, surveys off Tekirdağ	TCG ÇUBUKLU
24-25 AUGUST 2000	Multi beam Bathimetry, surveys off Büyük Çekmece	TCG ÇUBUKLU
26-28 AUGUST 2000	Multi beam bathimetry and shallow seismic surveys in Gemlik Gulf	TCG ÇUBUKLU
31OCT.-21 NOV. 2000	Multi beam Bathimetry, surveys in between Pendik and Princes Islands	TCG MESAHA-II
14-19 APRIL2002	Multi beam Bathimetry, surveys off Çınarcık	TCG ÇEŞME
15-17 JULLY 2002	Multi beam Bathimetry, surveys in mid. Marmara Sea	TCG ÇEŞME
24-26 AUGUST 2002	Multibeam Bathimetry, surveys in mid. Marmara Sea	TCG ÇEŞME
02-05 OCTOBER 2001	Multibeam Bathimetry and shallow seismic surveys off Çınarcık and Yalova	TCG MESAHA-II

j. Turkish Atomic Energy Agency (TAEA), Ankara. http://www.taek.gov.tr

Projects

1. The importence of the earthquakes which are near to area of power plants. Supported by IAEA and EC.
2.TR-2 The reevaluation of seismic risk of the Research Reactor. Supported by IAEA.
3. Geotchecnical investigations of the site of reactors.

k. General Directorate of State Hydraulic Works, Ankara. http://www.dsi.gov.tr

Observation of the seismic activity at the dam sites and evaluation of the seismic risk around the dams.

3. PUBLICATIONS

a. PAPERS

A. Pınar, Över, S., Kalafat, D., Işıkkara, A.M. and Barka, A. 1999. Tectonics acting to the west of Cyprus, Eastern Mediterranean. *Proceeding of the international conference on earthquake hazard and seismic risk in the Eastern Mediterranean region, Vol. 1, 145-156.*

Akinci, A. and Eyidoğan, H., 2000, Scattering and anelastic attenuation of seismic energy in the vicinity of North Anatolian Fault zone, eastern Turkey, Physics of the Earth and Planetary Interiors (122) 3-4, 229-239.

Akinci, A., Malagnini, L., Herrmann, R.B., Alessandro, P., Scognamiglio and Eyidoğan, H., 2001. High frequency ground motion in the Erzincan region, Turkey:Inferences from small earthquakes, Bull. Seism.Soc. Amer., 91, 6, 1446-1455.

Aktar, M., Ergin, M. and Özalaybey, S. A lower-cruıstal event in northeastern Mediterranean: The 1998 Adana earthqıake (Mw=6.3) and its aftershocks. Geophys. Res. Lett. Vol. 27, No 16, pp 2361-2364, 2000.

Aktar, M., Örgülü, G., Özalaybey, S., Ergin, M. and H. Karabulut. Study of the aftershock sequence of 17 th August Izmit earthquake, NATO Advenced Study Seminar, May 14-17, Istanbul, 2000.

Aktar, M., Özalaybey, S., Ergin, M., Tapırdamaz, C., Biçmen. F., and Yörük, A., Study of the aftershock sequence of 17 th August Izmit earthquake. ITU-IAHS Int. Conf. on the Kocaeli Erthquake of 17 August 1999, Istanbul, 1999.

Aktar, M., Özalaybey, S., Selvi, O., Ergin, M., Tapırdamaz, C., Biçmen. F., and Yörük, A. Seismicity parameters of the aftershock cluster zones of 17 th August İzmit earthquake, AGU Fall Meeting, December 13-17, 1999. San Francisco, 1999.

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TURKISH NATIONAL UNION of GEODESY and GEOPHYSICS

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1. INTRODUCTION

The Turkish National Commission for Volcanology and Chemistry of the Earth's Interior (TAVCEI) had coordinated in the 1999-2002 period the scientific studies on volcanic and plutonic rocks in Turkey. The commission is mainly supported by the General Directorate of Mineral Research and Exploration (MTA) and scientists from the Geology Departments of the leading universities such as İstanbul Univ., İstanbul Technical Univ., Black Sea Univ., Selçuk Univ., Middle East Technical Univ., Hacettepe Univ., 9 Eylül Univ., Çukurova Univ. etc.

The main goal of the commission is the coordinate the studies and realize a database on the geochemical analyses, geochronological age data on volcanic rocks and systematically collect the published documents on related topics. A web-page *(http://www.mta.gov.tr/tuvak/tuvak.htm)* is constructed to make these data available for the international community.

2. ACTIVITIES

- 1 / 2.500.000 scaled maps on the Tertiary and Quaternary volcanic rocks in Turkey has been prepared and will be published soon by MTA.
- The geochemical analyses of igneous and metamorphic rocks has been systematically collected and saved in computer media.
- Special session on volcanology and geochemistry has been encouraged and supported within National and International Scientific Meetings.
- All published papers on the related topics have been collected. An online bibliography will be published.
- The membership of various committees and commissions of (TAVCEI) has been renewed.
- Working groups on the volcanic rocks in Central Anatolia, East Anatolia (Erzurum-Kars) and Central Western Anatolia (Afyon-Isparta) has been coordinated.
- The announcements of the International Meetings on Volcanology and Geochemistry has been distributed to the national institutions.
- The committees and Working Groups of the Commission are re-organized.
- A summer school for graduate students on Volcanic Landforms and Volcanology (by Prof. Dr. R.A. Cas (Victoria, Australia) and Igneous Petrology (by Turkish lecturers) has been organised. A textbook on the second activity (with 26 contributions) on different aspect of igneous petrology has been printed.

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