

**TURKISH NATIONAL UNION OF GEODESY AND GEOPHYSICS
(TNUGG)**

**NATIONAL REPORT
OF
COMMISSION FOR THE SEISMOLOGY AND
PHYSICS OF THE EARTH'S INTERIOR**

**GENERAL DIRECTORATE OF
DISASTER AFFAIRS**

**ANKARA
2007**

NATIONAL UNION OF GEODESY AND GEOPHYSICS OF TURKEY

**THE REPORT OF
COMMISSION FOR THE SEISMOLOGY AND PHYSICS OF THE EARTH'S INTERIOR**

MAY 2007

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 organisational 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 2003 and 2007.

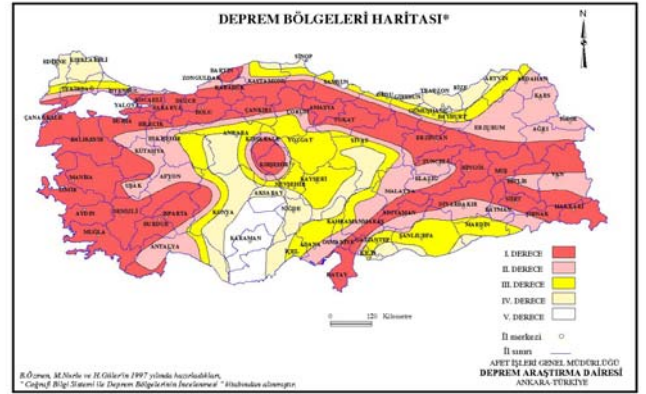
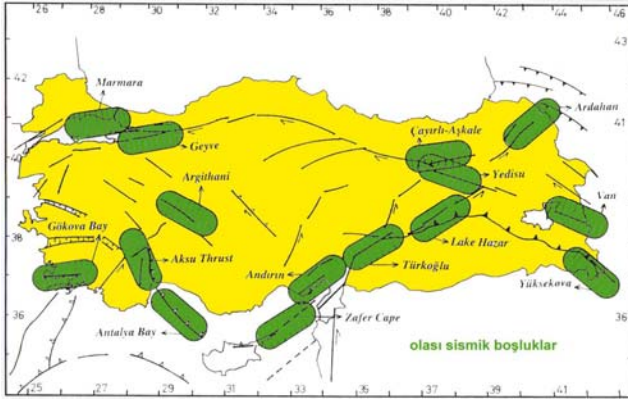
ACTIVITIES OF THE RESEARCH INSTITUTIONS AND UNIVERSITIES

DUTIES OF GENERAL DIRECTORATE OF DISASTER AFFAIRS

(<http://www.deprem.gov.tr>)

- Investigate and determine all necessary measures to mitigate and prevent disaster losses, identify base necessities and politics
- Investigate and determine all necessary measures to mitigate and prevent disaster losses, identify base necessities and politics
- Constitute national and international collabrations , mutual projects and programmes on disaster reduction, present the country on this projects, put into practice the results of these studies.
- Perform studies on earthquake disaster reduction, investigate earthquake and their effects, according to the results of these studies, prepare earthquake catalogs and seismic hazard maps and improve Establishment of the National Seismic Network and operate, prepare buildings codes, improve earthquake resistant building techniques and identify the principles of the projects, develop methodologies on maintenance and reinforcement for damaged buildings.
- Investigate and study disaster prone areas determining the potential disaster areas, perform damage assessment studies after disasters, site selection for resettlement areas, perform and assist to land use planning studies, beneficiary and loaning studies, maintain temporary and permanent housing taking the necessary precautions in short and long term, for this purpose to perform studies for the production and stock of the necessary structural elements.

EARTHQUAKE RESEARCH DEPARTMENT

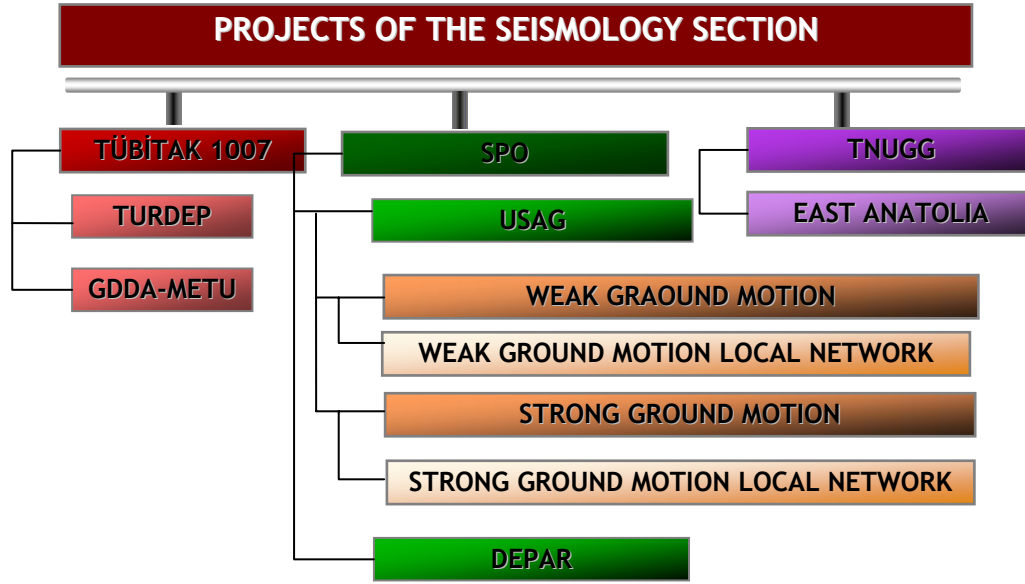


DUTIES OF SEISMOLOGY SECTION

In order to mitigate disaster losses, it is necessary to establish an effective disaster management and risk system. The first step of the management is continued by preparedness studies before the earthquake (disaster). For the disaster and risk determination it is necessary to have an seismological observation network.

For this purpose, in the frame of National Seismic Network,

- To install and operate the seismic stations,
- To evaluate and archive earthquake data,
- To inform the public and scientific institutions,
- To provide the establishment of the early warning systems and emergency Aid networks in the country wide scale.
- To establish and operate local earthquake recording systems and to evaluate the earthquake records.
- To carry out geological and geophysical investigations,
- To study on earthquake prediction research.



PALEOSEISMOLOGY OF EAST ANATOLIAN FAULT PROJECT

It is required to the paleoseismological studies on East Anatolian Fault Zone which has an earthquake risk . This research project includes the studies related to the on tectonics –morfotectonics, remote sensing-CBS Studies, pleoseismological studies by trench methods (research on the traces East Anatolian Fault System (EAFS)- Gölbaşı- Türkoğlu Fault Segment (GTFS), to introduce the structural properties of the fault and to define the main characateristics of the tectonic regime in a wide area of historical earthquakes.

PALEOSEISMOLOGY OF EAST ANATOLIAN EXTENSIONAL PROVINCE PROJECT

It is required to the paleoseismological studies on West Anatolian Extensional Province which has an earthquake risk . This research project includes the studies related on tectonics –morfotectonics, remote sensing-CBS Studies, pleoseismological studies by trench methods (research on the traces of Big Menderes and Gediz Graben Systems) to introduce the structural properties of the fault and to define the main characateristics of the tectonic regime in a wide area of historical earthquakes.



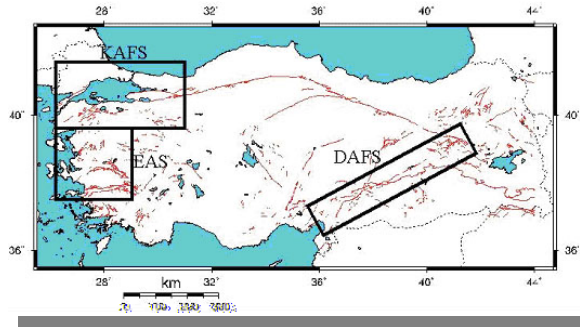
TÜBİTAK - MRC and GDDA - ERD PROJECT

TURDEP: The Research Project on The Earthquake Behavior of The Regions with High Seismic Risk (Geo-Strategic) but Different Tectonic Regimes by a Multidisciplinary Approach

14 universities participate in this project which is supported by Tubitak- Marmara Research Center.

PURPOSE: For the earthquake hazard reduction, it is aimed to observe earthquake activity and earthquake precursors by multidisciplinary studies related to the three main fault zones in our country and to introduce the earthquake hazard seriously in the regions under risk .

Thus, a data base information will be obtained for a disaster management system in the international standards.



TO COMPILE THE DATA BASE OF THE NATIONAL STRONG MOTION DATA IN THE INTERNATIONAL SCALE GDDA - METU PROJECT

PURPOSE: Compilation of the information about the stations of the National Strong Ground Motion Network operated since 1973 by ERD and the recorded data by determining the ground conditions, seismic velocity profiles and other parameters, to present the data to the users via internet in the international via internet in the international standards, besides that to provide the data transmission automatically from the stations to the data center.



GDDA-ERD - TÜBİTAK-MRC

IMMEDIATE OBSERVATION INVESTIGATIONS AFTER EARTHQUAKE (DEPAR)

PURPOSE: For the cases given below which effect the settled ares in our country

- Earthquakes with magnitudes 6.0 or greater than 6.0 causing loss of lives and damage
- Earthquakes with magnitudes smaller than 6.0 and occurs often in the same region which is called earthquake swarm and causes inconvenience in public as an unusual situation.
- After the earthquake, to investigate the reasons of the damages in the buildings caused by the ground conditions.

to determine the characteristics and behavior of earthquakes delicately and for the epicentral determination of the destructive aftershocks constitute necessary measurements and immediate earthquake observation Research Group (DEPAR) consists of four subgroups.

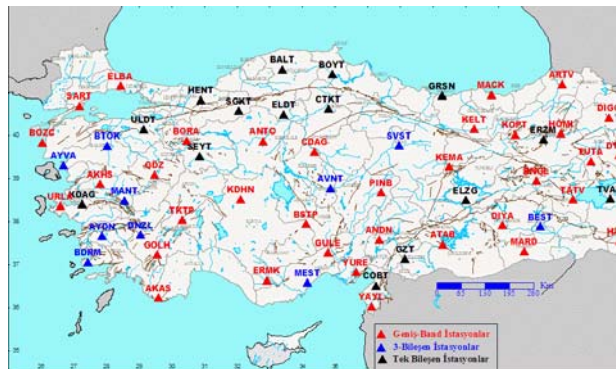
- Group for Earthquake Seismology
- Group for GPS Deformation
- Group for Accelerometers
- Group for Remote Sensing and Geological Mapping

to inform the authorities and public about the preliminary determinations and results.

DEVELOPMENT OF THE NATIONAL SEISMIC NETWORK (USAG)

In the declaration of the Council of Earthquake it was concluded that “the monitoring of the earthquakes in the country-wide scale, recording, evaluation, to archieve and to inform public has to be carried out under a developed Nation Earthquake Observation Network” In this scope “Development of the National Seismic Network Project” has been carried out by our Ministry, under the National Seismic Network System, National Weak Motion Observation Network (USAG) and National Strong Ground Motion Network (KYH) has been operated by our Ministry.

WEAK GROUND MOTION



PURPOSE: Investigate the causes of earthquake and determine reliable earthquake parameters by tracing active faults perform studies on earthquake hazard and risk analysis, determine the reoccurrence period of the earthquake prediction research are the purposes of the project.

OPERATION OF THE LOCAL NETWORKS IN THE SCOPE OF THE USAG PROJECT

1- SABONET PROJECT

2- SEISMICITY OF THE DAM REGIONS

3- COOPERATION WITH LOCAL AUTHORITIES

STRONG GROUND MOTION

PURPOSE: To measure the acceleration and the forces that cause damage to the buildings to develop the methods of constructing earthquake resistant structures, to collect the data intended for the preparation of the microzoning map and the constitution of the data base also for the studies of the earthquake hazard and risk, earthquake master plans and earthquake scenarios of the provinces. At present 200 accelerometers have been operated in our network. It is necessary to increase the number of accelerometers at least 1000. This network has been operated only by our Ministry in the county-wide scale.

OPERATION OF THE LOCAL NETWORK IN THE SCOPE OF THE TKYH

1- NATO PROJECT

2- ANATOLIAN UNIVERSITY PROJECT- ANANET

3- DÜZCE MUNICIPALITY PROJECT- DÜZNET

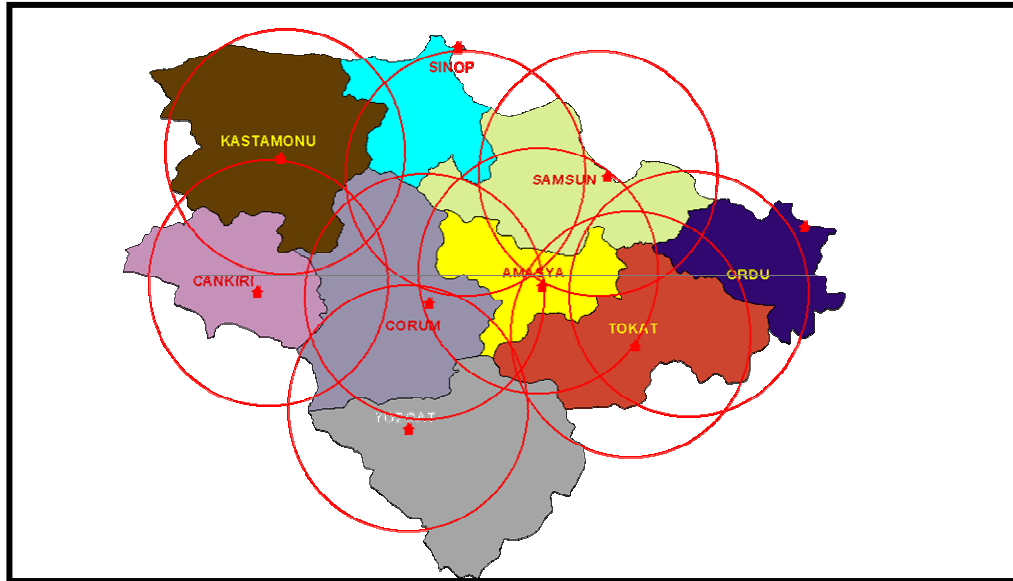


BENEFITS OF THE USAG PROJECT

- Investigate the causes of earthquakes
- Determine the origin time, magnitude, location and depth of the earthquakes
- Observe all active faults
- Study on earthquake hazard and risk analysis
- Determine the reoccurrence period of the earthquakes
- Study on the earthquake prediction research
- Prepare the hazard maps and to direct the Emergent Aid System
- Prepare bulletins, earthquake catalogs and archive data
- Constitute data base for the earthquake information system
- Inform immediately scientific institutions, press, public and national-local Crisis Center.
- Improve earthquake resistant building techniques,
- Provide the utilization of the network as Early Warning System at the place which have startegical importance.

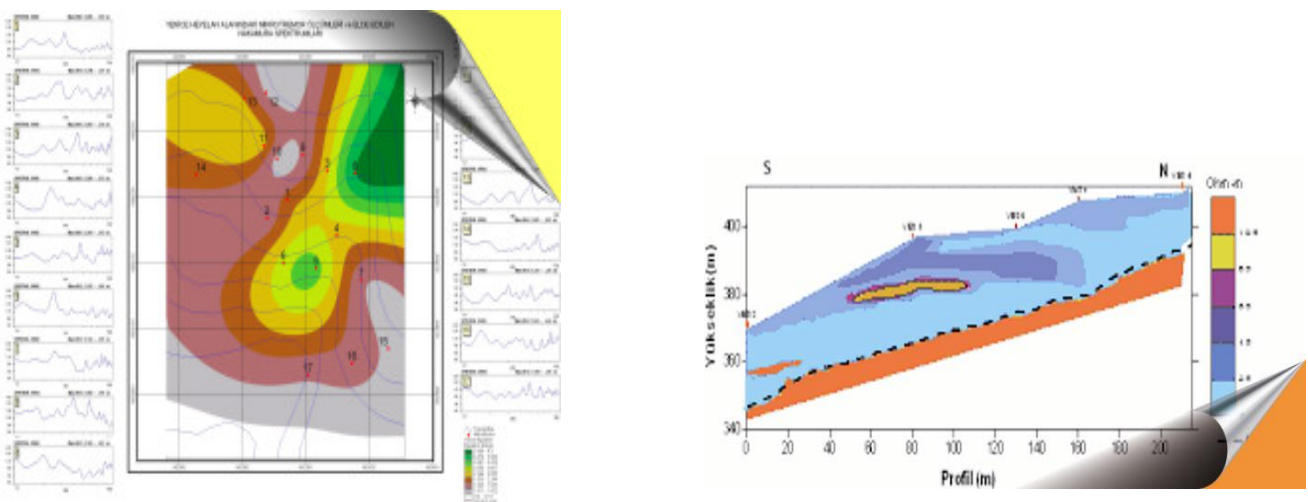
TURKISH JAPANESE PROJECT

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.



The Stations Map of Turkish – Japanese Project

MICROZONATION PROJECT



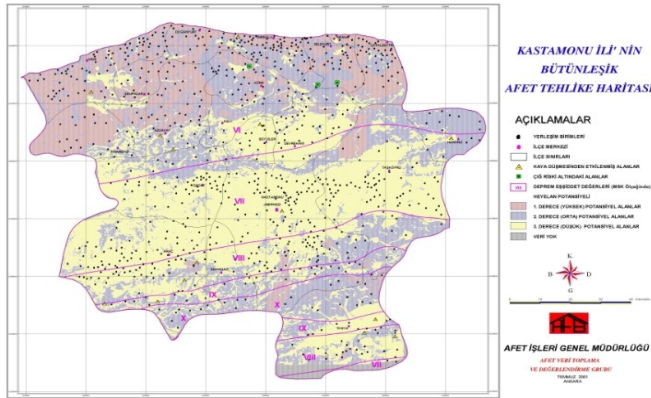
Detailed soil investigations must be performed before construction especially on hazardous areas. Geophysical measurement are very critical when investigating soil parameters. For this purpose Microzonation Team of Laboratory Section performs detailed geophysical measurements like microtremor, georadar, resistivity etc. at some residential areas when required and also supports natural hazard and risk determination projects by making geophysical microzonation studies.

With its own equipments this group performed succesfull studies in Adana, Ankara, Kastamonu, İstanbul, Bursa, Karabük, Bartın etc. This group also supports universities and other research institutes.

DETERMINATION OF NATURAL DISASTER AND RISK

The Project aims to prepare multi-hazard maps considering the major disaster types of the region. Pilot Project are is located at Northwest Black Sea Region. This study includes preparation of hazard maps of disaster types like landslide, rockfall, snow-avalanche and earthquake. Also detailed micro-zonation studies like geophysical measurements performed for cities in this Project. Geographic Information Systems and Remote Sensing applications are used during all stages of the Project. Results of this study is very practical for emergency aid plans.

MAIN SCOPES OF THIS STUDY



1. Preparation of Regional Multi Hazard Map of NW Black Sea Region by integrating provincial ones.

2. Developing co-operation with other governmental units which has responsibility on different types of disasters.

3. Preparation of basic rules of multi-hazard mapping.

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İTU PROJECT

Completed national and international projects in last 5 years

Investigation of site response of Yeşilköy and Avcılar area by means of array measurements of micro-teromors

Sponsors: ITU Research Foundation and TÜBİTAK

Investigation of environmental pollution of waste disposal in Isparta, Turkey by means of geophysical methods

Sponsors: ITU Research Foundation, Suleyman Demirel University

Seismic Properties of the Aegean Continental Shelf between İzmir and Saros Bays

Sponsors: TÜBİTAK

Tectonic activity and its interactions with ground water circulation, geothermics and seismicity (study area NW-Turkey).

Sponsors: İTÜ, ETH Zurich, TÜBİTAK

Partner Countries: Switzerland, Turkey

Seismotectonics of Marmara Sea

Sponsors: TUBITAK, ITU, CNRS, IPG Strasbourg, Bogazici University

Partner countries: Turkey, France

SEISMARMARA: Joint Research Project on the seismotectonic and active fault characteristics of Marmara Sea

Sponsors: TUBITAK, CNRS, ITU, IPGP, JICA, MTA

Partner countries: Turkey, France, Japan

Ongoing international projects

★ Investigations of Microearthquake Activity within the Sea of Marmara and Surrounding Regions by using Ocean Bottom Seismometers (OBS) and Broad-Band Land Seismographs

Sponsors: TÜBİTAK, CNRS, JICA, ITU

Partner countries: Turkey, France, Japan

★ Marmara Scarps Cruise Project

Sponsors: INSU, CNRS, TUBITAK, ITU, IFREMER, MTA

Partner countries: Turkey, France

• **Bogazici University, Kandilli Observatory and Earthquake Research Center, İstanbul**

(<http://www.koeri.boun.edu.tr>)

Ongoing projects

- Isparta Büklümü Sismik Ağ Projesi (2006 – ...)

- Mikro Tremor Projesi (2006 - ...)

- Türkiye ve Çevresinde Sismik İstasyonların Kalibrasyonu ve Kabuk Yapısının Belirlenmesi Projesi

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- **PROJECT**

FORESIGHT Frequent Observation-driven Realistic Evaluation and Simulation of Interacting Geophysical Hazard Triggers Duration: 11.09.2004 - 20.11..2006

Earthquake Prediction Studies at the Marmara Region with Radon Gas and other Methods (Year 2005)

Duration: 03.06.2005 - 30.12.2005

Micro-deformation Characteristics of the Region between GEBZE-TUZLA

Duration: 01.08.2003 - 01.12.2005

Seismic Micro-zoning and GIS Studies for the Yalova Settlement Center

Duration: 25.11.2003 - 30.09.2005

Monitoring 1999 İZMİT-DÜZCE Earthquakes Deformation Cycle

Duration: 15.07.2003 - 14.07.2005

Evaluation of GEBZE-KARTAL Seismic Zone Earthquake Risk and Seismic Hazard

Duration: 01.08.2003 - 31.05.2005

Dynamic Characteristics of West and Middle parts of North Anatolian Fault

Duration: 02.01.2001 - 31.12.2004

High - Resolution Long Term Earthquake Monitoring Project for the Sea of Marmara

Duration: 06.03.2000 - 31.12.2004

Underwater Ambient Noise Measurement and Evaluation and Sea Bottom Mapping

Duration: 11.12.2002 - 31.12.2004

Earthquake Prediction Studies at the Marmara Region

Duration: 25.03.2004 - 24.12.2004

Investigation of Crustal Velocity Structure of the Marmara Sea from the Analysis of SEISMARMARA-2001 Seismic Data

Duration: 01.06.2002 – 01.10.2004

Calibration of the Anatolian- Arabian Plate by Seismic Refraction Method

Duration: 26.03.2004 - 29.09.2004

Seismological Network Calibration between Turkey- Israel

Duration: 18.07.2001 - 14.07.2004

Upper Mantle Wave Propagation in the Southeastern Anatolian region of Turkey

Duration: 01.11.2002 – 31.12.2003

Earthquake Prediction Studies at the Marmara Region by Radon Gas and Other Methods

Duration: 20.06.2003 - 15.12.2003

Testing New Methods for Prediction of Earthquakes in the Marmara Region

Duration: 30.04.2001 - 30.06.2003

Seismicity of Kazan-Trona Mining Field in Central Anatolia, Turkey

Duration: 01.03.2003 – 26.06.2003

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(<http://www.deu.edu.tr>)