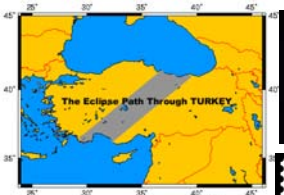
International Heliophysical Year 2007 (IHY)
Turkish National Activities

Official IHY Opening Ceremony – *IHY Kick-off Event*

B.U. KANDILLI OBSERVATORY GROUP: *A. ÖZGÜÇ; T. ATAÇ; R. PEKTAŞ*

METU/ODTÜ GROUP: *Y.TULUNAY; E.TULUNAY; Z.KOCABAŞ; E.ALTUNTAŞ; T.YAPICI; E.T.ŞENALP*

MARCH 29, 2006 TOTAL SOLAR ECLIPSE

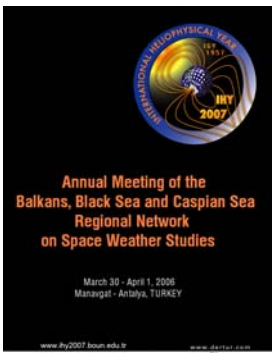


More than one million Sun glasses were distributed along the totality path.

Twenty five scientists from six foreign countries (*Azerbaijan, India, Bulgaria, Slovakia, Japan, Ukrain and Turkey*) made experiences during the eclipse. And many scientists from six Turkish universites joined to the experiments.

- For commemorative coins please visit http://www.darphane.gov.tr/dizayn-ehatirapara.htm
- For commemoration stamps please visit http://www.ptt.gov.tr/tr/pul/show/html/06-3.html

IHY ACTIVITIES



81 scientists including leading experts in various research areas of Space Weather from many countries attended this meeting and presented 59 contirbutions.

"**Importance of Astronomy in Science**"

A symposium for science teachers.

Organized by Ministry of Education and TUBITAK National Observatory

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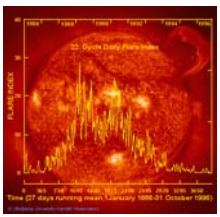

Since 1976 Flare Index is calculating and publishing for public use.

http://www.koeri.boun.edu.tr/astronomy/fin dex.html (*Kandilli Observatory*)

ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SO LAR_FLARES/INDEX

- Since 1947 Solar Photospheric observations and,
- Since 1965 Solar Chromospheric observations are carrying on.

SOME RELEVANT NEAR-EARTH SPACE COURSES

DEPT. OF AEROSPACE ENG.
http://www.ae.metu.edu.tr/

- AE453 Introduction to Atmospheric Physics I
- AE454 Introduction to Atmospheric Physics II
- AE551 Introduction to Space Sciences
- AE554 Applied Orbital Mechanics

DEPT. OF ELECTRICAL AND ELECTRONICS ENG.
http://www.eee.metu.edu.tr/

- EE 503 Signal Analysis and Processing
- EE 543 Neurocomputers
- EE 553 Optimization
- EE 557 Estimation Theory

COST 724 and IHY RELATED CAPABILITIES and CASE STUDIES

COST 724 action:
Developing the Scientific Basis for Monitoring, Modelling and Predicting Space Weather

Modeling

METUNN and Cascade Model
METU-Neuro-Fuzzy Network Model
TY Genetic Programming

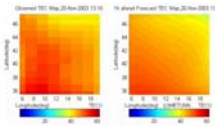

Figure 1. METUNN TEC Mapping

Signal Processing Applications

Data organization and filtering; Fast Fourier Transform, Welch's Periodogram Analysis, signal modeling using Autoregressive and autocorrelation methods

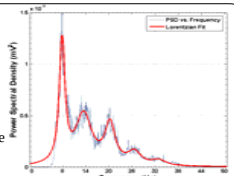

Figure 2. Power spectral density of Schumann Resonances versus frequency. Superimposed is the Lorentzian approximation (bold curve)

Solar X-Ray and Radio Data Forecast

GOES Data is used in METU-NN

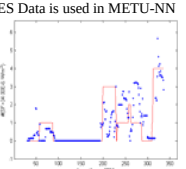

Figure 3. The number of events: observed (red), and forecast (blue) one month in advance between 31 Jan. - 1 Dec. 2004

Ionospheric and Geomagnetic Response to the IMF

"Three Events", IMF B_z polarity change and B_y polarities

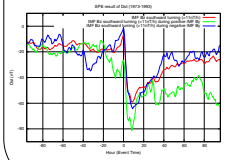

Figure 4. SPE Results of Dst index (1973-1993)

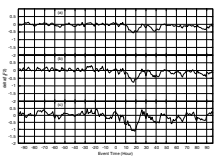

Figure 5. SPE Results of foF2 values Arkhangelsk (1973-1993)

Schumann Resonances (SR) Forecast

8, 14, 20, 26, 32 Hz SR Characteristics
Diurnal Variations

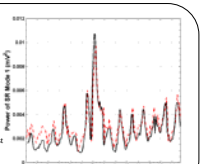

Figure 6. Observed (dashed) and forecast (solid) SR values in November, December 2004

Total Electron Content Forecast

Forecast of TEC values up to 24 hours in advance with METU-NN, METU-C, and METU-NFN models

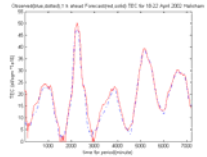

Figure 7. Observed GPS TEC values (blue, dotted) and 1-hour ahead Forecast TEC values (red, solid) for 29-31 October 2003 for Hailsham

SOME DISSEMINATION AND OUTREACH ACTIVITIES

1. Tulunay Y., E. Tulunay, E. T. Senalp, The Neural Network Technique-1: A General Exposition, Advances in Space Research, **33/6** , pp.983-987, 2004.
2. Tulunay Y., E. Tulunay, E. T. Senalp, The Neural Network Technique-2: An Ionospheric Example to Illustrate the Application of an Neural Network Based Model, Advances in Space Research, **33/6**, pp.988-992, 2004.
3. Tulunay Y., D.G. Sibeck, E.T. Senalp, E. Tulunay: Forecasting magnetopause crossing locations by using Neural Networks, Advances in Space Research, **36 (12)**, 2378-2383, 2005.
4. Crosby N. B., M. J. Rycroft, Y. Tulunay: Overview of a Graduate Course Delivered in Turkey, Emphasizing Solar Terrestrial Physics and Space Weather, Surveys in Geophysics, **27**, 319-364, 2006.
5. Tulunay E., E.T.Senalp, S.M.Radicella, Y.Tulunay: Forecasting Total Electron Content Maps by Neural Network Technique, *Radio Science*, **41 (4)**, RS4016, 2006.
6. Senalp E.T., E. Tulunay, Y. Tulunay: Neural Networks and Cascade Modeling Technique in System Identification, Series: Lecture Notes in Computer Science, Subseries: Lecture Notes in Artificial Intelligence, **3949** / 2006, Ed.: Savaci, F. Acar, 84-91, 2006

COST 724 – IHY Case Study
"I LOVE MY SUN"
An outreach Activity in Turkey: The Space Weather and the Sun as conceived by the School Children