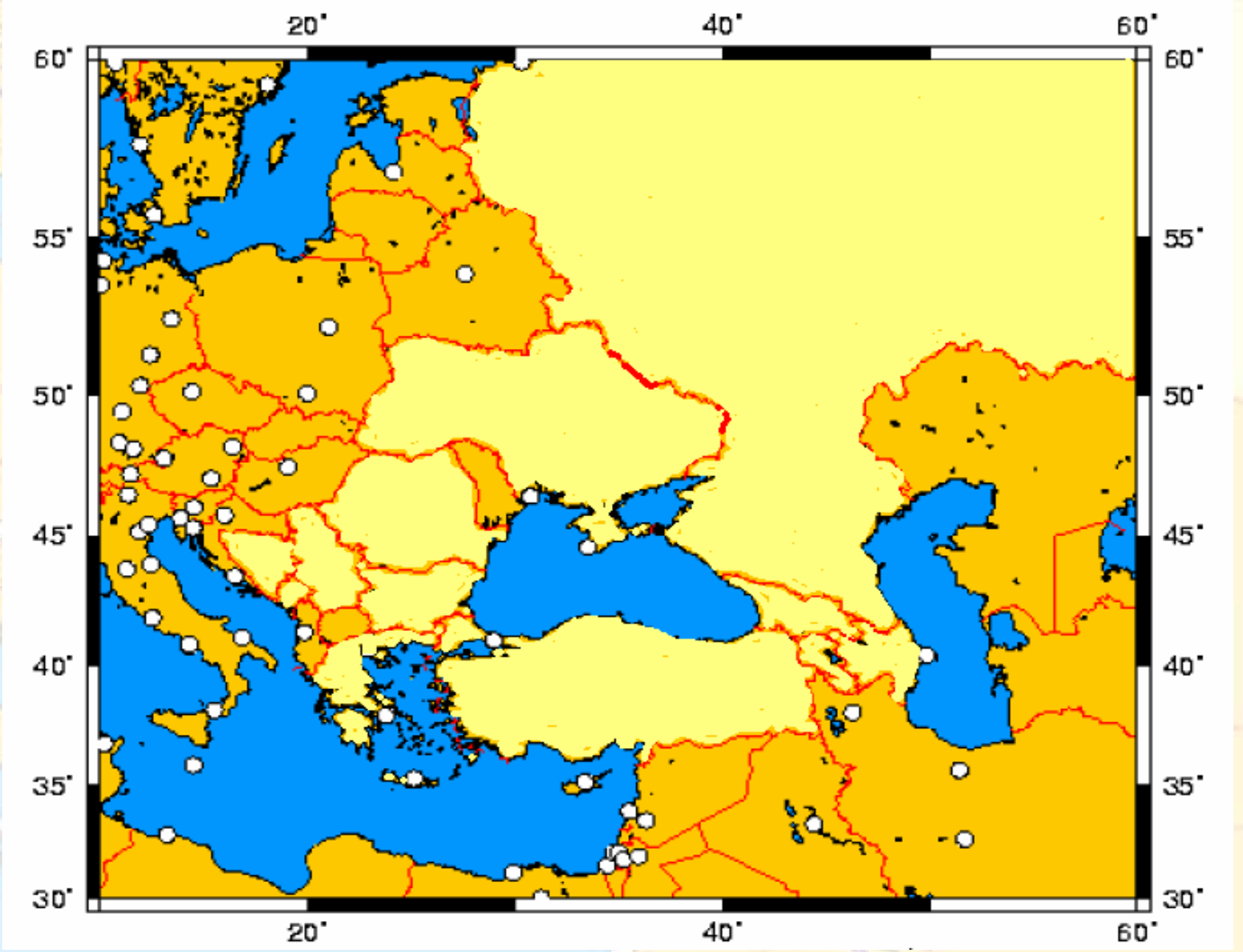
Balkans/Black Sea/Caspian Sea Region Activities

National Coordinators

Ashot Chilingarian – Armenia
Elchin Babayev – Azerbaijan
Katya Georgieva – Bulgaria
Vladimir Ruzdjak and Bojan Vrsnak – Croatia
Marina Gigolashvili – Georgia
Xenophon Moussas and Alexander Nindos – Greece
Georgeta Maris and Christiana Dumitrache - Romania
Alexander V. Stepanov – Russia
Istvan Vince – Serbia
Atila Özgüç – Turkey
Oleg Lytvynenko - Ukraine


20°
40°
60°
60°
55°
50°
45°
40°
35°
30°

Outline

- Resources and experience in the member countries
- Network activities
  - organizational
  - scientific
  - educational
- Problems

Experiences in the member countries

- Solar physics – Azerbaijan, Croatia, Georgia, Greece, Romania, Russia, Serbia, Turkey, Ukraine
- Cosmic rays – Armenia, Russia
- Solar wind-magnetosphere-ionosphere – Bulgaria, Georgia, Greece, Romania, Russia, Serbia, Turkey, Ukraine
- Sun-climate – Bulgaria, Georgia, Romania, Russia, Turkey
- Solar-seismicity – Bulgaria, Russia, Turkey, Ukraine
- Solar influences on the biosphere and human health – Azerbaijan, Bulgaria, Georgia, Russia

Coordinated observations

- Solar observations: Azerbaijan, Croatia, Georgia, Greece, Romania, Serbia, Turkey, Ukraine
- Cosmic rays: Armenia, Bulgaria, Croatia
- Magnetospheric and ionospheric measurements: Bulgaria, Greece, Romania, Russia, Serbia, Turkey, Ukraine
- Atmospheric measurements: Bulgaria, Georgia, Ukraine
- Geomagnetic activity: Azerbaijan, Bulgaria, Georgia, Greece, Romania, Russia, Serbia, Turkey, Ukrainia
- Human physiological state: Azerbaijan, Bulgaria, Georgia, Russia

Joint research project

Solar influences on climate and life on the Earth

- Long-term and sunspot cycle variations in solar activity
- Mechanisms of solar variability, onset and evolution of solar recurrent and sporadic events, and the associated interplanetary phenomena
- Solar forcing on the Earth's atmosphere, geomagnetic field, seismicity, and life

Other participating countries

- Belgium
- France
- Germany
- Italy
- Poland
- Spain
- A total of 17 countries

Armenia

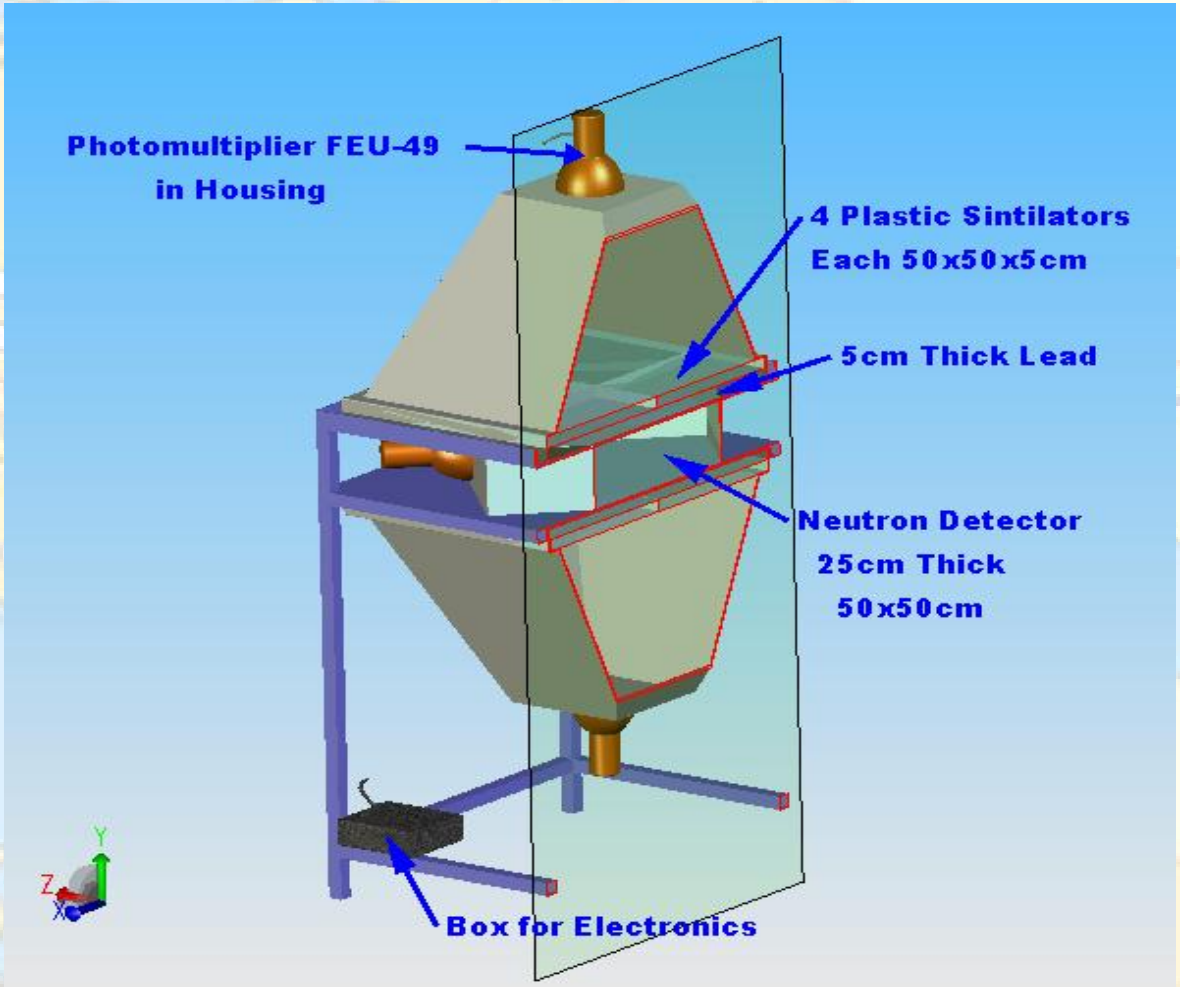
Aragats Space Environmental Center of the Cosmic Ray Division of Alikhanian Physics Institute

two high-altitude stations on Mt. Aragats (40°30′N, 44°10′E), alt. 3200m and 2000 m, cutoff rigidity 7.6 GV

several monitors continuously measure the intensity of the secondary Cosmic Ray (CR) fluxes and send data to the Internet in real time (http://crdlx5.yerphi.am).

Sevan Detector

Space Environmental Viewing and Analysis Network



Software Trigger (Microcontroller based)

111 – Charged particle-high; 300 MeV muon

010 – Neutral particle

100 – Low energy charged particle

011 – High energy neutral particle

001 – horizontal muon

101 – 2 horizontal muons

MMM – Extensive Air Shower

Space Environment Viewing and Analysis Network (SEVAN)

Azerbaijan

- Shamakhy Astrophysical Observatory - Shamakhy
- Batabat Astrophysical Observatory - Nakhchivan
- Azerbaijan National Aero-Space Agency – Baku
- Azerbaijan National Academy of Sciences
  - Research Institute of Physics
  - Research Institute of Radiation Researches
  - Research Institute of Photoelectronics
  - Research Institute of Cybernetics
  - Research Institute of Mathematics,
  - Research Institute for Information Technologies
- Departments (Astrophysics, etc.) of the Baku State University, Azerbaijan Technical University

Four main scientific trends in astronomical studies:

- Physics of stars and nebulae
- Solar physics
- Solar-terrestrial relations
- Investigation of the solar system bodies

solar-terrestrial relations

"Working Group on Study of Solar-Terrestrial Relations" in the Azerbaijan National Academy of Sciences.

- Influence on technical, engineering and ecological systems (scintillation of microwave radio signals, oil production activity and functioning of oil-gas transportation pipelines, electric power grids, Caspian Sea level, climate, traffic, plants, beekeeping, etc.);
- Affects on human life and health (virus-epidemic diseases, human brain functional state, cardiovascular diseases, sudden cardiac deaths, ophthalmologic diseases, thalassemia, etc.).
- Space weather education and outreach: special academic courses, mass-media, daily and weekly columns in newspapers, summer schools, young scientists conference

FUTURE ACTIVITIES

- Establishing Azerbaijani Astronomical Journal devoted to the IHY-2007
- Seminars for public and journalists on Space Weather in 2007 as a part of Baku city AstroSeminar
- BALKAN, BLACK SEA and CASPIAN SEA REGIONAL NETWORK on SPACE WEATHER STUDIES ANNUAL MEETING and IHY CONFERENCE on SOLAR and SOLAR-TERRESTRIAL PHYSICS September 2007, Baku, The Republic of Azerbaijan
- Special IHY Events in Baku State University and Zangi Lyceum - 2007
- 4-th Tusi Summer Regional Astronomical School "Sun and Geosphere" and Young Scientist's Conference - 2007
- Mass media activities: articles and interviews in state and private TVs and Radios, newspapers, journals, agencies – on weekly/monthly bases accompanied by video, etc.
- Space and Astronomy Museum in ShAO and

YURI's NIGHT '07

"Circling the Earth in the orbital spaceship I marvelled at the beauty of our planet. People of the world! Let us safeguard and enhance this beauty - not destroy it!"

- Yuri Gagarin

"Yuri's Night" World Space Party
April 12, 2007,

Bulgaria

- Main area: solar-terrestrial influences

- Solar physics
- Solar observations
- Solar wind-magnetosphere-ionosphere interactions
- Solar influences on climate, seismicity, human health
- In situ ionospheric/magnetospheric measurements (During IHY aboard the International Space Station)
- Ground-based measurements of atmospheric emissions and constituents
- Remote sensing of the Earth and planets

Participants in the program:

- *Bulgarian Academy of Sciences*
  - Solar-Terrestrial Influences Laboratory
  - Institute of Space Research
  - Institute of Geophysics
- *Sofia University*
  - Center for Space Research
- *10 people's observatories with planetaria*

Activities

- First regional planning meeting – June 2005, Sozopol, Bulgaria
- Educational and outreach activities (in schools and planetaria)
- Open doors day – 10 June 2005
- Special IHY issue of "Comptes Rendus de l'Academie Bulgare des Sciences"

An IHY initiative:

Bulgaria will host a cosmic ray detector as a part of SEVAN network

Peak Mussala
25°35'E, 42°11'N
altitude 2925 m

Mussala station

- Cerenkov light telescope;
- Gamma background control;
- Measurements of the Earth's magnetic field;
- UV and ozone measurements;
- Automatic weather station acidity of clouds;

An IHY initiative:

Bulgaria offers a low-cost instrument

Liulin

Internet based portable instrument measuring in real time the variations of the spectra and the flux of secondary particles from galactic and solar cosmic rays inside of the Earth atmosphere including GLE and the Forbush decreases

Croatia

Participants in the program

- Zagreb University
  - **Zagreb observatory**
  - **Hvar observatory**
  - **Visnjan observatory**
- Planetarium at the Technical Museum

An IHY initiative:

Croatia will host a cosmic ray detector as a part of SEVAN network

Zagreb observatory 45°49‘ N, 15°58‘ E, 226.7m

Cutoff rigidity 5.54 GV

Georgia

Participants in the program

Abastumani Astrophysical Observatory
- Solar and Heliospheric Physics Observatory
- Center of Plasma Astrophysics

Institute of Geophysics
- Observatory of Cosmophysics
- Dushet Geophysical Observatory
- Department of Ozone and Aerosol Physics

Tbilisi State University
- Ionospheric Observatory
- Laboratory of Extraordinary Phenomena

Romania

National initiatives

- Project EFYRA - coordinator Cristiana Dumitrache
- Project PROTEL - coordinator Petre Popescu
- Project HELGA - coordinator Nedelia Antonia Popescu
- Astronomy and World Heritage - Magda Stavinschi
- VIS-SHP - coordinator Vasile Mioc
- Solar Research Theme - Dynamic processes in solar atmosphere and heliosphere - coordinator Cristiana Dumitrache

International initiatives

- **Workshop on "Flows, Boundaries, Interactions", Bucharest, 3-5 May 2007**
- **Young Scientists International School on "Heliosphere and Galaxy", Bucharest, 3-5 May 2007**

Serbia

Participants in the program

- Belgrade observatory
- Belgrade University, Faculty of Mathematics
- Institute of Physics
  - Ionospheric station
- Institute of geomagnetism
  - Magnetic observatory

Turkey

Participants in the program

- Boğaziçi University, Kandilli Observatory
- METU, Dept. of Aerosspace Eng.
- METU, Dept. of Electrical and Electronics Eng.

MARCH 29, 2006 TOTAL SOLAR ECLIPSE

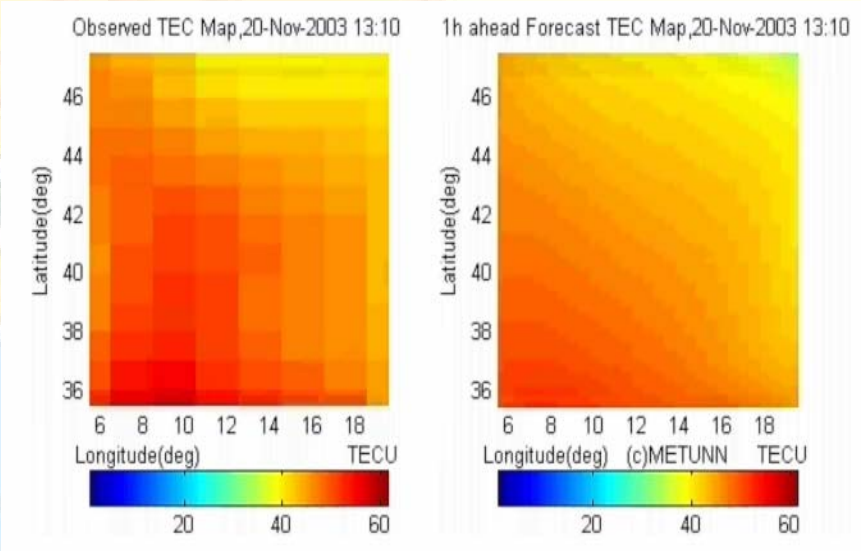
Commemorative stamps and coins for the TSE.

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

Scientific

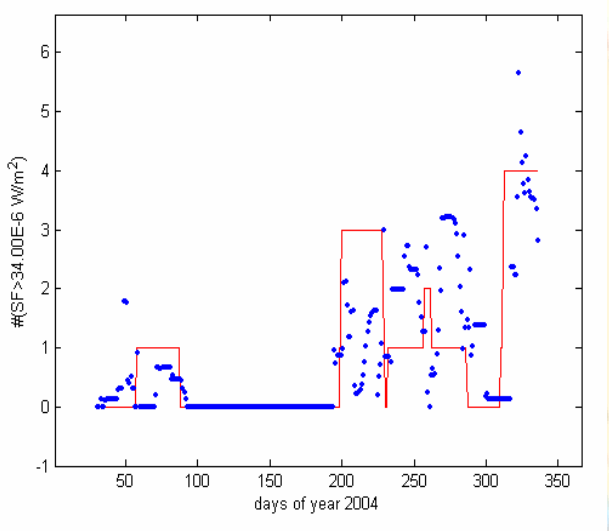
Modeling

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



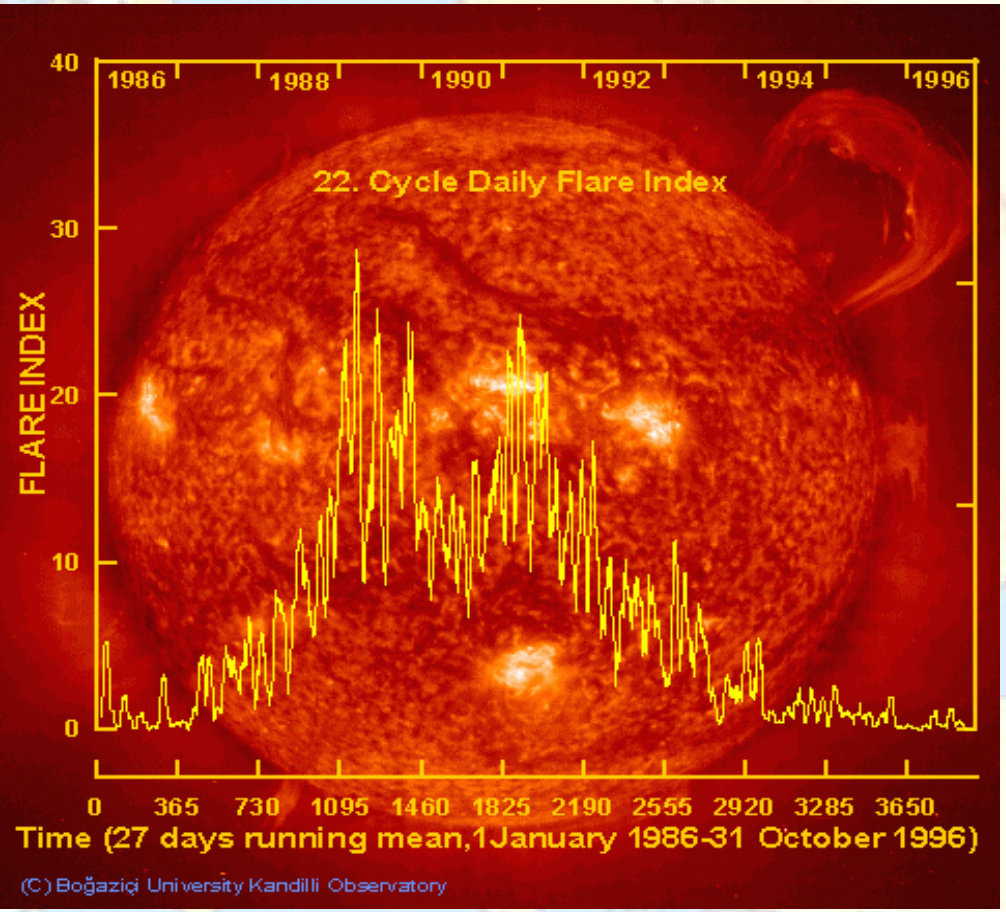
. METUNN TEC Mapping

Solar X-Ray and Radio Data Forecast



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

Scientific



Since 1976 Flare Index is calculating and publishing for public use.
http://www.koeri.boun.edu.tr/astronomy/findex.html (*Kandilli Observatory*)
ftp://ftp.ngdc.noaa.gov/STP/SOLAR_DATA/SOLAR_FLARES/INDEX
- Since 1947 Solar Photospheric observations and,
-Since 1965 Solar
- Chromospheric observations are carrying on.

OUTREACH ACTIVITIES

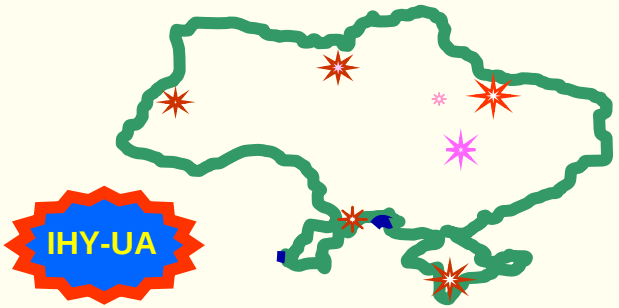
COST 724 – IHY Case Study

I LOVE MY SUN

An outreach Activity in Turkey:

The Space Weather and the Sun as conceived by the School Children

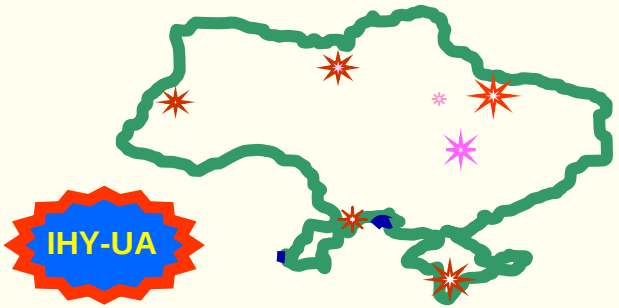
Ukraine



Ukrainian scientists have wide experience in all spectrum of IHY subjects. About fifteen scientific establishments will be carry out theoretical and experimental investigations, ground-based and onboard observation within the framework of the national and international projects which are relevant to IHY problems

IHY-Ukraine instrumentation employed includes:
Optical telescopes, laser device for the location of satellites, unique radio telescope UTR-2 and VLBI "URAN“(decameter wavelengths), radio telescopes RT22, RT3 (mm-dm wavelengths), ground-based gamma-telescope GT-48, incoherent scatter radar, MF radars, Doppler radars, ionosondes, magnetometers, ULF and HF coherent radio receivers.

National Academy of Sciences of Ukraine



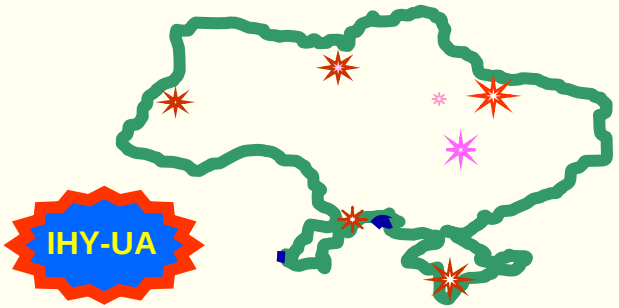
- Main Astronomical Observatory (Kiev)
- Institute of Radio Astronomy (Kharkiv)
- Space Research Institute NSAU (Kiev)
- Lviv Centre of Institute of Space Research Institute (Lviv)
- Observatory "URAN-4" of Institute of Radio Astronomy (Odessa)
- Poltava Gravimertric Observatory of Institute of Geophysics (Poltava)
- H.V.Karpenko Physico-mechanical Institute (Lviv)

Ministry of education and science of Ukraine

- Crimean astrophysical observatory
- Kharkiv V. Karazin National University (Department of Space Radio Physics)
- Institute of Ionosphere (Kharkiv)
- Kyiv National Taras Shevchenko University (Astronomical Observatory)
- Odessa National I.I. Mechnikov University (Astronomical Observatory)

Development of a space weather forecast methods

Development of the theory, methods and information technologies of complex study of solar-terrestrial relationship as a basis of prediction of a space weather and its impact on biological and technical objects. Theoretical, experimental and observational investigation of Sun, interplanetary and geo- space.



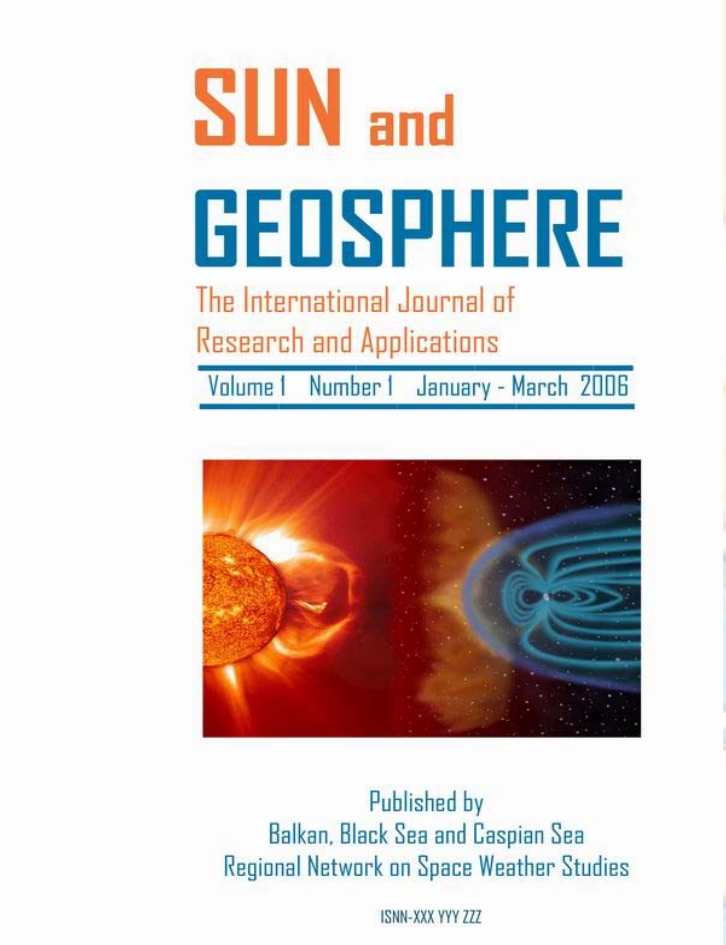
Decameter investigation of the solar activity, solar wind, and ionosphere response.

Observation of sporadic solar decameter wavelengths radio emissions on radio telescopes UTR-2 and URAN-2. Investigation of solar wind parameters and ionosphere disturbances by cosmic sources scintillation method on radio telescopes UTR-2 and URAN-4.

Ionospheric disturbance above Vranch seismic region

Monitoring of ionosphere above Vranch seismic region by using of radio telescope URAH-4, Doppler radio receivers network and data of GPS permanent stations.

Network activity



Scientific

International scientiic journal

- Volume 1, No. 1 – proceedings of the first regional meeting (Sozopol, 2005)
- Volume 1, Nos 2 & 3 – proceedings of the second regional meeting (Antalya, 2006) (refereed)
- Electronic version http://www.shao.az/SG/
- Then.. refereed publications

Network activity

Scientific

Research proposals

- The physics of solar erruptive events and which ones are potentially hazardous;
- Atmospheric changes caused by solar UV irradiation variability at different time-scales;
- Comparative study of geomagnetic, ionospheric and seismic effects of Coronal Mass Ejections and High Speed Solar Wind;
- Participation in the scientific program of RAS
- Use of the radioastronomical data for space weather forecast
- Ionospheric disturbances above Vranch epicenter

Network activity

Scientific

Annual regional meeting/conference

- Third regional meeting – September 2007, Baku, Azerbaijan

- IV Summer Astronomical School on Solar and Solar-Terrestrial Physics - September 2007 – Shamaki, Azebaijan (right after the IHY regional meeting)

Network activity

Scientific

- Deployment of instruments (cosmic ray monitors, Doppler radio receivers…)
- Bilateral and multilateral collaborations
- Databases (cosmic rays, high speed solar wind, solar flares, CME's)

Network activity

Scientific

Unsuccesful attempts of research project proposals:

- **Proposal for COST Action: S**un-**E**arth **C**oupling and its **R**eflection on the **E**nvironment and **T**errestrial **S**ystems (**SECRETS**)
- **INTAS Proposal for South Caucasian Republics 2006** - Solar Influences on Climate and Life on the Earth (**SICLE**)

Network activity

Organizational

-Balkans/Black sea/Caspian Sea network for space weather studies

Web-sites:

www.stil.bas.bg/IHY
www.ihy2007.boun.edu.tr/
www.shao.az/IHY/
www.astro.ro/~ihy/

Network activity

Educational – summer schools

- Young Scientists International School on "Heliosphere and Galaxy", Bucharest, 3-5 May 2007
- Yearly Gamov summer schools – Crimea, Ukraine – 2006 and 2007 devoted to IHY
- IV Summer Astronomical School on Solar and Solar-Terrestrial Physics - September 2007 – Shamaki, Azebaijan (right after the IHY regional meeting)

Network activity

Educational

- Looking for possibilities for training of young scientists from member countries in different participating institutions
- Tutoring and co-tutoring of PhD students by members of the network
- Popular papers

Problems
(and what help we could use)

- Educational materials (papers, movies, etc.)
- Travel grants
- New instruments and upgrade of existing instruments
- European and international programs (FP7, INTAS, …)

Thank you!