SOLAR AND HELIOSPERIC INFLUENCES ON THE GEOSPACE

Bucharest, ROMANIA,

1 – 5 October 2012

The fourth conference organized in the frame of The Balkans, Black Sea and Caspian Sea Regional Network on Space Weather Studies.

http://www.geodin.ro/CONFERENCE2012/index.htm

Lectures

Special volume dedicated to the lectures.

Elena Moise: ***Interstellar Neutral Atoms and Their Journey*** *through the Heliosphere:*
- review of the heliosphere, He-Cone modulation with the solar cycle

Ilia Roussev: *Heliophysics: Anatomy of Solar Anger:*
- review of Space research and CMEs studies;
- Heliophysics close tides with Space Weather

Lectures

Marilena Mierla: *Slow solar wind:*
- short history of the solar wind
- observations and models of the slow solar wind

Diana Beşliu-Ionescu: *Seismic Emission from Solar Flares*
- introduction to global and local osscilations of the Sun
- review of the solar flares and their association with the sunquakes

Lectures

Mirela Voiculescu: *Ionospheric perturbations induced by interplanetary and solar forcing:*

- introduction to ionosphere and magnetosphere systems
- at polar cup boundary Es layers are influenced by IMF
- both By and Bz can influence the formation of the trough (depletion in density of F-region)
- sometimes clear connection between the trough and plasmapause is observed
- sub-auroral ion drifts and IMF are related sometimes

Lectures

Ingolf Dammasch: ***Space weather data and services at ROB/SIDC:***
Data: Sunspot numbers; Solar Images; PROBA2 Science Center; SDO Data Center; Radio Observations
Analysis Software: Solar Weather Browse, CACTUS, NEMO etc.
Space Weather Forecast: daily duty

Remus Hanea: *Data Assimilation and its applications:*
- combine model with the measurements (both affected by uncertainties) plus the prior knowledge in order to optimally estimate the "truth"
- the truth is somewhere at the middle between model and measurements

Petra Vanlommel: *Where communication and space weather meet:*
- different ways to communicate the science to the public (both scientists and non-scientists communities): conferences, TV programs, internet etc.

Research and Outreach in different countries

Olga Malandraki: *Heliophysical research in Greece: the space weather perspective:*
- research area and projects in the heliophysic group in Greece
- Space Weather Forecasting Center at the University of Athens
- SEP server

Olga Malandraki: *COMESEP Project: Space Weather Impact Forecasting*
- CMEs and SEP: Forecasting the Space Weather Impact
- coutries involved: Greece, Denmark, Belgium, Austria, Croatia, India, USA, UK

Research and Outreach in different countries

Elena Moise: *Hawai'i Center for Advancing $istemic Heliophysics Education (HI CA$HEd)*
- education and outreach in Hawaii

Mihai Pomeran: *Cyberdyn: a State-of-the-Art Supercomputing Facility at the Institute of Geodynamics of the Romanian Academy*
- high performance computing cluster

Solar Dynamo and SC prediction

Katya Georgieva: *Solar dynamo theory – recent progress, questions and answers:*

- 2 maxima in all cycles resulting from different physical processes: 1) earlier one at all latitudes; 2) later one at low latitude
- we do not enter a new grand minimum

Mircea Rusu: *The asymmetry of the solar cycle: Analysis of the cycle #24 forecast:*

- explanation of this asymmetry by a nonlinear van der Pol model
- 2 gaussian fit for each cycle (2 coupled-oscillators?)
- prediction for SC 24

Flares, Sunquakes and Waves

Ingolf Dammasch: *Observation of flares with LYRA on PROBA2:*

- LYRA and GOES shapes look similar
- LYRA and GOES together may be able to tell you something about the thermal evolution of flares

Diana Besliu-Ionescu: *Sunquakes and Moreton waves*

- Are Moreton waves slower than EIT waves?
- Are Moreton waves faster than Sun Quakes?

Coronal Mass Ejections

Alessandro Bemporad: *Observations of solar storms in the outer corona:*

- review of observations
- many significant results were obtained only when data from completely different spectral windows were combined (radio & WL or WL & UV data).
- Many results on interplanetary propagation of CMEs were obtained only when data from remote sensing and in situ instruments were combined.

Ilia Roussev: *Global MHD Modeling of CMEs and Related Shock Waves Originating from Complex Active Regions:*

- CMEs models: start with the magnetic observations at the Sun
- coupling between convective region, outer atmosphere and IP medium

CMEs – Geomagnetic storms

Atila Özgüç: *Effects of Hysteresis between Maximum CME Speed Index and Geomagnetic Indexes:*
- coronal indexes (sunspot area, solar radio flux, CME speeds etc.) versus geomagnetic indexes
- CME index is different from the others in the declining phase of solar activity
- in the ascending phase the curves are similar

Daniela Adriana Lăcătuş: *Studies of CMEs causing geomagnetic storms in the period 2007-2011*
- fit a flux-rope like model to the 24 CMEs which have produced geomagnetic storms
- the model predicts correctly 17 events out of 24

CMEs – Geomagnetic storms

Marilena Mierla: *Empirical model for predicting the occurrence of major geomagnetic storms during SC23*
- logistic regression model to predict the occurrence of major geomagnetic storms
- above 90% correct prediction

Oana Stere: *The study of coronal mass ejections travel time to the Earth*
- spherical model for propagating CMEs – good results for symmetric halo CMEs

Constantin Oprea: *Study of solar parameters causing major geomagnetic storms during SC 23*
- good correlation between Bz, Akasofu coupling function and Dst; poor correlation of Dst with temperature and density

IM - Magnetic Clouds

Alin Razvan Paraschiv: *Internal characteristics of magnetic clouds at 1 AU:*

- all magnetic clouds observed during SC 23
- for some events it was observed an increase in the density after the passage of the MC
- this was not explained by the prominence eruptions
- other causes to look for (HSS?)

IM - High Speed Streams

Georgeta Maris Muntean: *Specific features of the high-speed streams in the solar wind and geomagnetic storms during the last prolonged solar minimum:*

- The last minimum phase exceeded two times the interval of previous minima (57 months)
- 283 numbers of HSS at this minimum (more than in the previous ones).
- 5 HSS/month (more than in the previous ones)
- minima are not quiet periods

Space climate

Crisan Demetrescu: *On the climate of the solar-terrestrial space:*

- review of geomagnetic variability and space climate features
- signatures of the magnetic (Hale) cycle and of the Gleissberg cycle of the solar activity have been evidenced in the HMF, in the SW speed, in the dynamical pressure of the SW at magnetopause, in the TSI, in the open solar magnetic flux, in the GCR flux and in the geomagnetic activity;

Solar – terrestrial climate relationships

Venera Dobrica: *Long term solar and geomagnetic activity. Consequences on the terrestrial climate at regional scale:*
- introduction to solar and geomagnetic activity
- a good correlation between aa and TSI, sunspot number in case of 11-years running averages
- recent global warming is very unlikely to be due to solar and geomagnetic variability

Simona Bota-Condurache: *Assessing the relationship between clouds and the interplanetary magnetic field*
- good correlation between the IMF and the cold and worm currents
- the cause of this correlation remains to be investigated

Solar – terrestrial climate relationships

Katya Georgieva: *Solar influences on climate:*

- history and importance of short and long-term solar-climate connections
- controversy about solar and human induced climate change
- influence of different solar indices (sunspots, TSI, solar poloidal and toroidal fields etc.) on the climate

Geomagnetic activity

Boian Kirov: *Solar magnetic field and geomagnetic activity:*

- The relative importance of sunspot-related and non-sunspot-related solar activity varies on centennial time-scales
- In 1985 the long-term increase of the global solar magnetic moment changed to decrease. In the same time, the continuous increase in the geomagnetic activity floor changed to decrease.

Geomagnetic activity

Razvan Greculeasa: *Sources of the geomagnetic activity at local scale. Case study - European geomagnetic observatories*
- study of Dst (equatorial ring current) and AE (ionospheric auroral electrojet) for the geomagnetic storm on 3-4 August 2010
- same beginning and evolution of the storm

Cristiana Ştefan: *The evolution of the Earth's magnetic moment in the last 400 years. Consequences on the magnetopause standoff distance*
- use the aa-sunspot number and aa-wind dynamic pressure plus the Earth magnetic moment to estimate the magnetopause distance (around 10 Re in the actual time)

Papers to be published in

Sun and Geosphere