

ISWI contribution from Romania



Astronomical Institute
of the Romanian Academy



ROMANIAN ACADEMY
INSTITUTE OF GEODYNAMICS
SABBA S. STEFANESCU

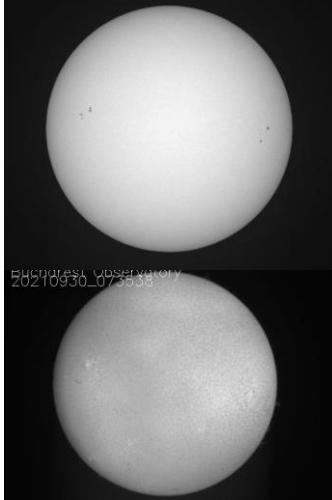


Space weather impact on magnetosphere and ionosphere

¹AIRA, ²IGSSAR, ³ISS, ⁴INFP, ⁵UGAL, ⁶ROSA



Bucharest Observatory
20210930_074808



Solar Observations @AIRA

Space Weather Bulletin in Romanian @AIRA
Solar filaments catalogue @AIRA
<http://92.87.254.21/~solar/products.html>

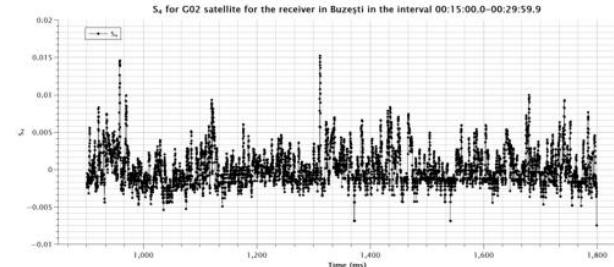
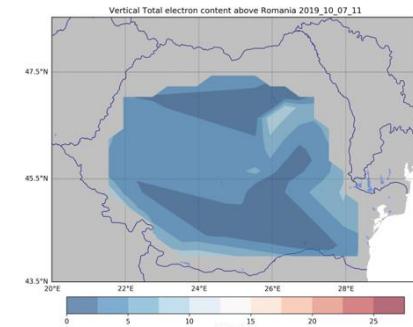
Romanian Infrastructure

AIRA – 2 optical telescopes, 1 Callisto spectrometer, 2 SID monitors
INFP/ISS – 31 permanent GNSS stations (monitoring and prediction of ionospheric activity)
ISS – Solar Observatory
IGSSSAR – network of repeat geomagnetic measurements (magnetometers)

The study of the connections between volcanism and geodynamically active processes

DEPARTMENTS

- DEPARTMENT OF VOLCANOLOGY AND DYNAMICS OF LITHOSPHERE
- DEPARTMENT OF NATURAL HAZARDS AND RISK
- NATURAL RESOURCES
- ELECTROMAGNETISM
- GEOPHYSICS
- SOLID EARTH DYNAMICS
- ATMOSPHERIC GEOPHYSICS
- GEODYNAMICS
- SYSTEMS OF COMPLEX MODELS



Ionospheric Monitoring Service @ISS/ROSA
<http://hephaestos.spacescience.ro/safespace/select.php>

Welcome to the ESA Space Weather Service Network
Please note that ESA SWSE services are under reconstruction

Federated products from the Institute of Space Science Romania (ISS Romania)

ISS Met Office deimos dDH CONSULTANCY

No forecast and Forecast Indices for Atmospheric Drag Calculation

This page provides nowcasts and forecasts of geomagnetic and solar indices needed for atmospheric modelling in support of atmospheric drag calculation.

Available products (please make a selection):

Solar Geomag

Nowcast

Forecast

Selection product interval:
Start: End: Last week

Format: JSON CSV OPNG

Submit Query

Selected Product Details ▾

Ap Index Nowcast 1-day (BGS) Latest values

F30 Index Forecast Absolute 30-day (CLS) Issued: 2022-02-04 04:01:19

F10.7 Index Forecast Absolute 30-day (CLS) Issued: 2022-02-04 04:01:19

ap Index Nowcast 3-hour (BGS) Latest values

F10.7 Index (LSI) Latest values

ESA Space Weather FORIND product @ISS
<https://swe.ssa.esa.int/forind-federated>

AIRA: <https://eeris.eu/ERIO-2000-000A-0046>
IGSSSAR: <https://eeris.eu/ERIO-2000-000Y-0445>
ISS: <https://eeris.eu/ERIO-2000-000S-0061>
INFP: <https://eeris.eu/ERIO-2000-000Q-0068>
UGAL: <https://eeris.eu/ERIO-2000-000C-0062>
ROSA: <https://eeris.eu/ERIO-2000-000S-0027>

TABLE 1 | The resulting logistic regression coefficients following the non-linear logistic regression model for normalized values (first row) and for standardized values (second row).

Independent variable/coefficient	V_{DSR}	AW_{CME}	MPA_{CME}	ACC_{CME}	POS_{CME}	b_0
Regression coefficient	-1.8916	34.4414	-0.3007	21.4110	9.1932	-44.7622
Regression coefficient *ST	-0.1706	8.3054	-0.0962	0.8432	9.2338	-31.9900

Geoeffectiveness Prediction of CMEs – Non linear regression model (Besliu-Ionescu and Mierla, 2020)

Summary of regression coefficients

	Regression Coefficient	Corresponding Value
1	Initial Speed (V_0)	-0.9988
2	Maximum Speed (V_M)	0.0051
3	Delta V Max (DVM)	-0.0061
4	Duration (d_t)	0.0053
5	Minimum Value of B_z ($B_{z\min}$)	0.1425
6	Interplanetary magnetic conditions (IMF)	0.0843
7	Free term (b_0)	7.6450

Geoeffectiveness Prediction of HSSs – Non linear regression model (Besliu-Ionescu and Maris Muntean, 2020)

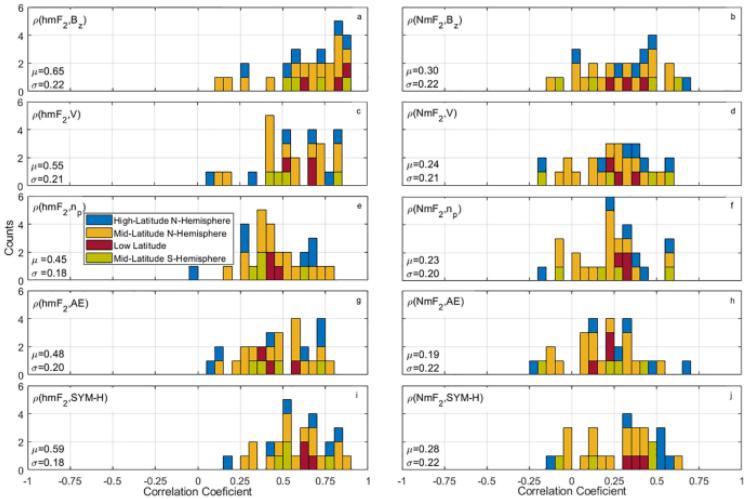


Figure 7. Histograms of the correlation coefficients between the ionospheric parameter spectra and the spectra of the solar wind and geomagnetic indices: (a) hmF_2 and B_z ; (b) NmF_2 and B_z ; (c) hmF_2 and V ; (d) hmF_2 and n_p ; (e) hmF_2 and AE ; (f) NmF_2 and n_p ; (g) hmF_2 and AE ; (h) NmF_2 and AE ; (i) hmF_2 and $SYM-H$; (j) NmF_2 and $SYM-H$. Each histogram covers the entire group of 28 ionosonde stations, while the color blocks depict the contributions from the subgroups containing the locations within specific latitude ranges. For each pair of variables, the median and standard deviation are listed.

Correlation coefficients between the ionospheric parameter spectra and the spectra of the solar wind and geomagnetic indices
(Negrea et al. 2021)

Complex interdisciplinary research of Solar activity impact on the Earth's environment

Temporal evolution of the R-M effect using probability density functions
(Munteanu et al. 2019)

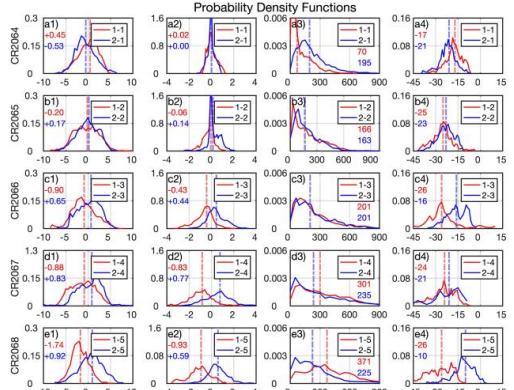
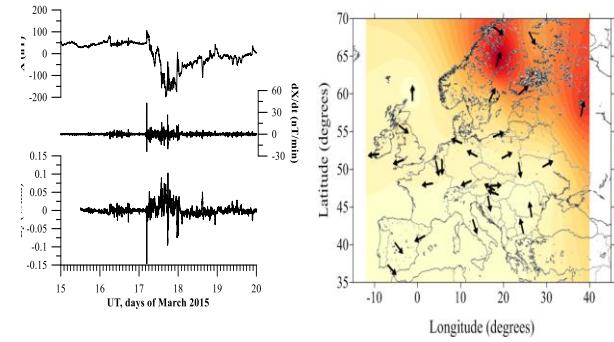


Figure 8. Temporal evolution of the R-M effect using probability density functions. Columns from left to right: IMF B_z (GSM) component, B_d , AE index and SYM-H index. Rows from top to bottom: CR2064, CR2065, CR2066, CR2067, CR2068, CR2069. Colors have the same meaning as in previous figures: red (blue) for sequence 1 (sequence 2). Each panel depicts the PDFs for the two HSS/CIR events within the same Carrington rotation. Colored numbers give their median values, also depicted as vertical lines.



St Patrick geomagnetic storm, March 2015, Surface geoelectric field – Emax (Geoelectric hazard maps)
(Demetrescu et al., 2018; Dobrica et al., 2016)

ENVIRON. RES. LETT. 8 (2013) 045032

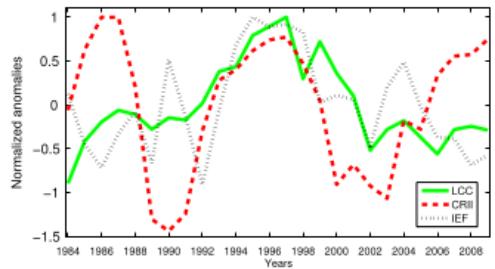


Figure 5. Variation of average mid-high latitude (30° – 75° N and S) low cloud cover (green continuous line), interplanetary electric field (black dots) and cosmic ray induced ionization (CRII) at 700 hPa (red dash). CRII is calculated using the atmospheric ionization model of Usoskin et al. (2010).

Variation of average mid-high latitude low cloud cover, interplanetary electric field and cosmic ray induced ionization (CRII) (Voiculescu et al. 2013)