

Space Weather activities in Kazakhstan

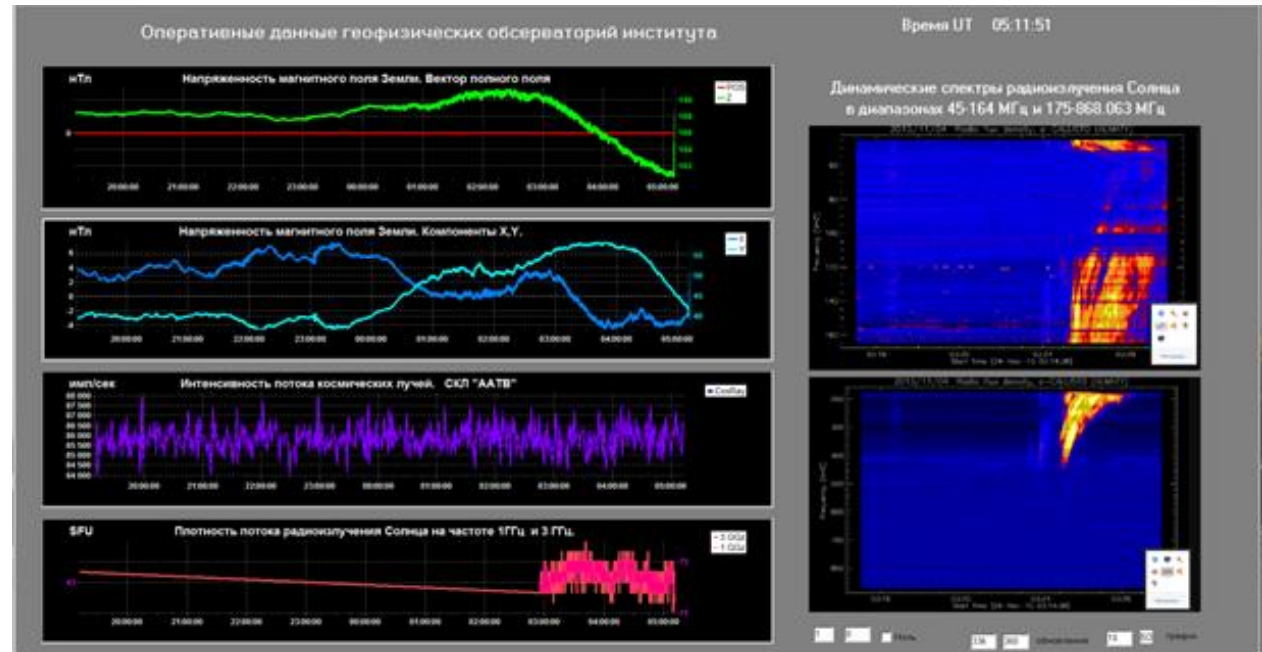
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ISWI Steering Committee Meeting, 11 February, 2022

Kazakhstan multi-level complex for key space weather parameters measurements

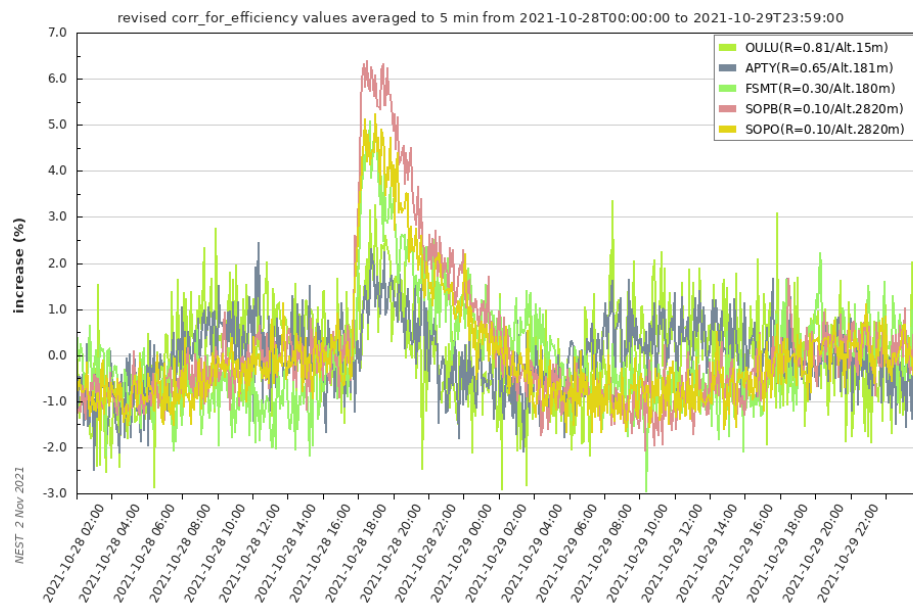
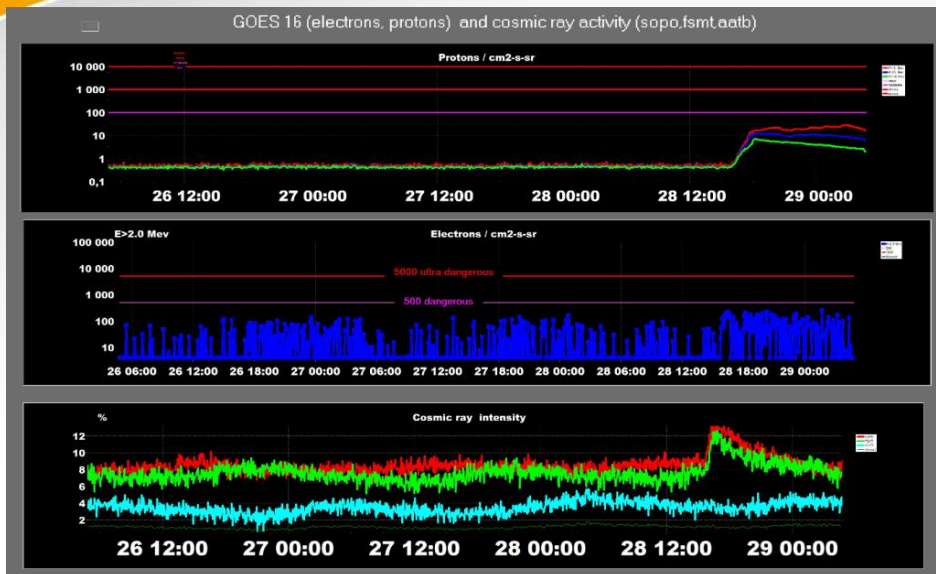


Neutron Monitor 18 NM-64 at high mountain cosmic ray station (**3340 m a.s.l.**) (www.nmdb.eu)

Geomagnetic observatory “Alma-Ata” (**1300 m a.s.l.**)

Measurements of the solar radio spectra of the Sun in the range of 40 - 800 MHz from the CALLISTO spectrometer at Almaty and the solar radio emission flux density at frequencies of 1.08 GHz and 2.8 GHz (**2700 m a.s.l.**)

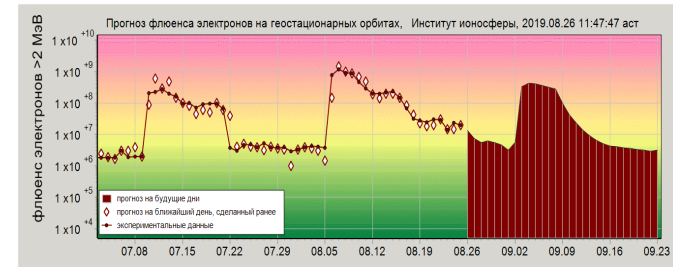
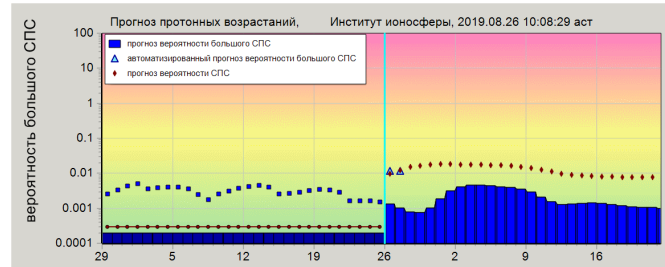
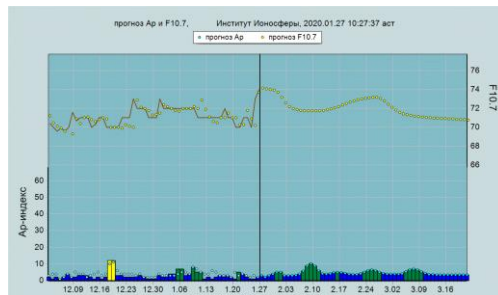
All measurements are included in a common information system that displays real-time measurements with high resolution



Monitoring of the state of near-Earth space is carried out daily in the space weather diagnostics and forecast system. Figure shows a view of the screen on which real-time data are displayed for fluxes of high-energy protons with energies > 10 MeV, > 50 MeV and > 100 MeV (top panel), fluxes of high-energy magnetospheric electrons with energies > 2 MeV, measured in geostationary orbits by a satellite GOES-16. The lower panel shows the values of the cosmic ray intensity as measured by the South Pole (SOPO), Fort Smith (FSMT), and Alma-Ata B (AATB, Institute of the Ionosphere) neutron monitors. The data on the monitor screen is presented in real time. It can be seen that the enhancement in the flux of particles on neutron monitors is ahead of the enhancement in the flux of protons in geostationary orbits. It is on this principle that the alert system is based, which is created within the framework of the present task of the Program.

Ground Level Enhancement of solar cosmic rays (GLE73) on stations OULU, APTY, FSMT, SOPB and SOPO

KAZAKHSTAN SPACE WEATHER PREDICTION CENTER



Kazakhstan Space Weather Prediction Center works daily. We issue the short-term and long-term forecasts of the magnetic activities (Ap-indexes) and solar activity (F10.7) for 55 days, the forecast of probability of a large proton enhancement for 28 days and the forecast of fluence of magnetospheric electrons with energy > 2 MeV at geostationary orbit for 28 days. We provide this information to all interested organizations in Kazakhstan.

NEW scientific and technical program

NEW scientific and technical program “Development of the National System for Space Situational Awareness: Monitoring of Near-Earth and Deep Space and Space Weather” (2021-2023)

The participants of the program are: Fesenkov Astrophysical Institute and the Institute of Ionosphere.

The goal of the Program

Development of the means for near-Earth and deep space observations. Development of the Space Situational Awareness (SSA) system to monitor the situation in the NES and beyond, identify and predict situations that pose a threat to the operation of spacecraft.

Key indicator of the Program:

- a) Space Situational Awareness System (SSA);
- b) Wide-angle optical system;
- c) Methods and technologies for monitoring near-space objects;
- d) Low and medium resolution spectrograph for spectral and spectrophotometric observations of extremely dim objects with fast spectral variability;
- e) Methods of space weather diagnostics and forecasting;
- f) Online resource for providing access to SSA data for clients.