



Space science + information technologies

- Department of Space Monitoring
- FP-7 related activity in space science

V. Kalegaev

Department of Space Monitoring

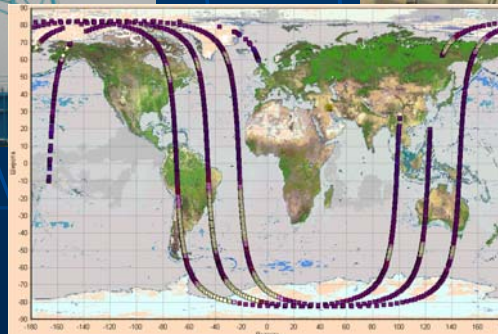
Analysis of conditions in space on the basis of space experiments data and intensive computations

- Established in 2006
- Consists from 4 labs
 - Space Missions Control Center
 - Space Data Analysis
 - Space Detectors Modelling
 - Space Science Practical Training



Space Missions Control Center

- Manages remote space objects (Tatyana Satellite - launched on 21 January 2005)
- Receives scientific data in special format (telemetry)
- Remote Sensing of the Earth's surface



Space Data Analysis Lab

■ Data Center

- Collection the scientific data from space missions
- Software development for data processing, storage and visualization

Data analysis and modeling

COSMOS.MSU.RU
МГУ-250 космический научно-образовательный проект
Московского государственного университета им. М. В. Ломоносова

MSU-250 data service:
Tatyana KDM data (Energetic particles count rates)

Data available from 08.02.2005 till 08.04.2005

Date interval (no more than a couple of days, please)

Start date: 08 February 2005 00
End date: 09 February 2005 23

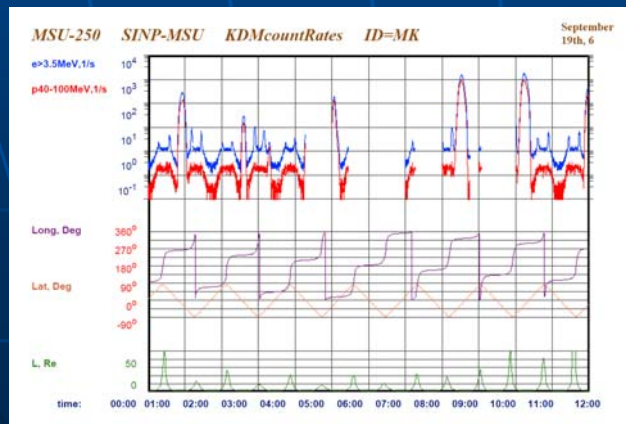
Select the channels

- PPD (3), $E_{\alpha} \geq 70 \text{ keV}$ and $E_{\beta} \geq 0.8 \text{ MeV}$ ($G=9.7E-02$)
- PPD (4), $E_{\alpha} \geq 2.14 \text{ MeV}$ ($G=9.7E-02$)
- PPD-1 (6), $E_{\alpha} = 0.3-0.6 \text{ MeV}$ ($G=9.7E-02$)
- PPD-1 (7), $E_{\alpha} = 7.16 \text{ MeV}$ ($G=9.7E-02$)
- PPD-2 (8), $E_{\alpha} = 0.7-0.9 \text{ MeV}$ and $E_{\beta} = 7 \text{ MeV}$ ($G=2.E-02$)
- PPD-2 (9), $E_{\alpha} = 15-40 \text{ MeV}$ ($G=25$)
- Sc-1 (12), $E_{\alpha} = 40-100 \text{ MeV}$ ($G=25$)



Space Monitoring Data Center

- Oracle RDB
- Internet services
- Space experiments
 - Coronas-F
 - International Space Station
 - Tatyana
 - Meteor 3M
 - Coronas-I, Cosmos-1686, Mir...



Space Monitoring Data Center - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://elana.sinp.msu.ru/magnetosphere/index.py?nav=coronasf.h

Getting Started Latest Headlines NEWS SEARCH USEFULL MISC НИИЯФ МГУ MSU-250 Space Physics Home P...

Space Monitoring Data Center MSU

Space Monitoring Data Center

Skobeltsyn Institute of Nuclear Physics MSU

Main Satellite data Services Projects References Sign in About

Coronas-F data (energetic particle fluxes)

Data available from 18.08.2001 to 31.08.2002

Time interval

1 January 2001 0

1 January 2001 0

Data channels

Protons 1-5 MeV

Protons 2-14 MeV

Protons 26-50 MeV

Protons 50-90 MeV

Electrons 0.6-1.5 MeV

Electrons 1.5-3 MeV

Electrons 3-6 MeV

Electrons 6-12 MeV

Electrons >1.6 MeV; Protons >23 MeV

Electrons >1.6 MeV; Protons >90 MeV

LAT (spacecraft latitude), degrees

LONG (spacecraft longitude), degrees

ALT (spacecraft altitude), kilometers

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http://elana.sinp.msu.ru/magnetosphere/index.py?nav=auth.html

The main aim is to provide the data services and modern computing tools for space science and education

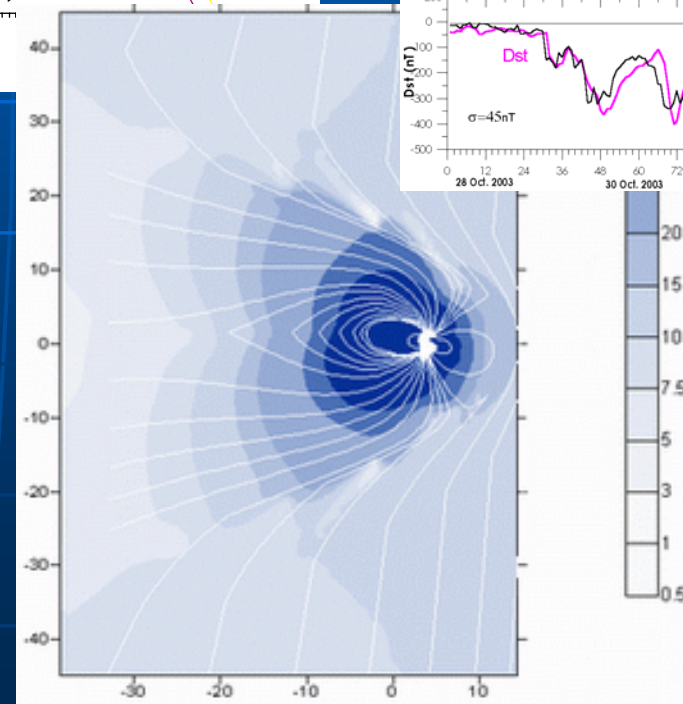
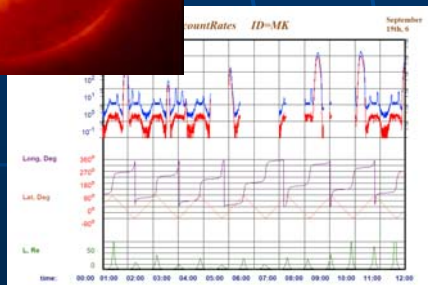
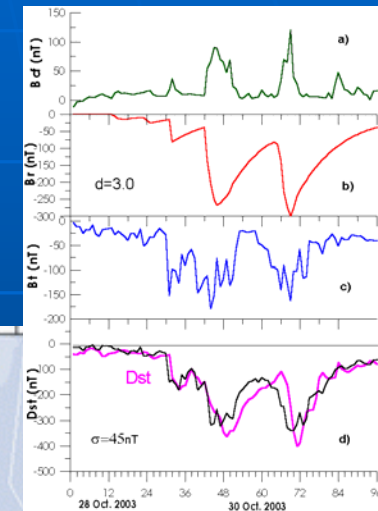
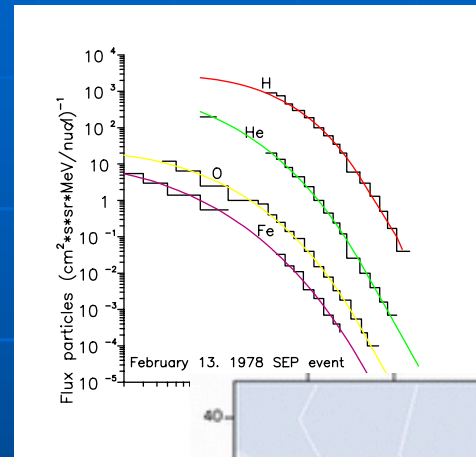


Data analysis: Models at SINP

- The semi-empirical model of GCR fluxes
- Semi-empirical probabilistic model of SEP particle fluxes
- Radiation environment models
- Model of the magnetospheric magnetic field

Space Weather monitoring

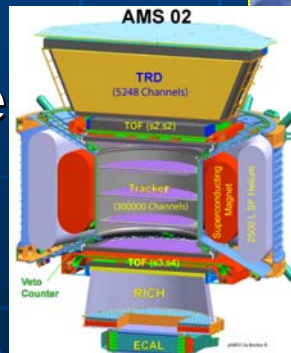
- Data from Space
- Modeling
- Scientific applications
- Space weather prediction



Space Detectors Modeling Lab

- The Alpha Magnetic Spectrometer Experiment: An experiment to search in space for dark matter, missing matter & antimatter on the International Space Station (2008)

- The main approach: distributed storage and distributed processing of data



Education and Outreach

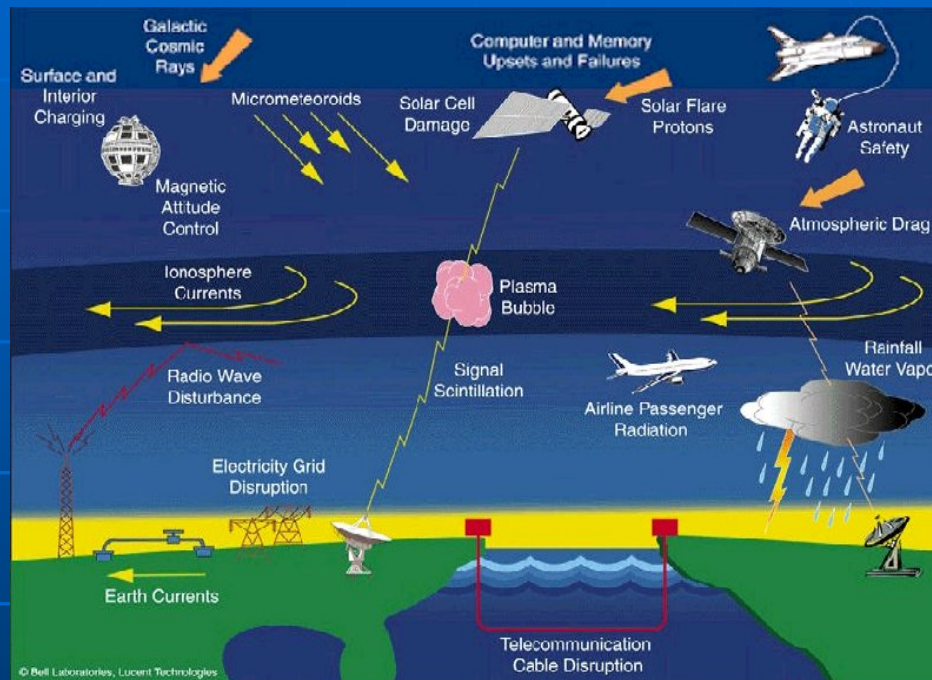


- Practical training courses with MSU students (from September 2005)

- New lecture courses
- Scientific work of students



FP7 related activity in the field of planetary space weather



Why is this important?

Space weather gives us displays of the beautiful aurora or northern lights.

But, at its worst space weather, is a ***natural hazard*** that can catastrophically disrupt the operations of many technological systems, thus causing disruption to people's lives and jobs.

Significant European capability to develop mitigation services, spin-out to industry

- Planetary radiation environments and effects
- Planetary space weather
- Sun-Earth Virtual observatory

Planetary radiation environments and effects

JRA inside the Europlanet I3

PI: Patricia Gonçalves (LIP Lisbon)

- University of Barcelona (E)
- University of Bern (CH)
- Bordeaux University, CENBG (F)
- Finnish Meteorological Institute (FIN)
- University of Kiel, IEAP (D)
- KU Leuven (B)
- Lisbon Institute of Physics (P)
- SINP MSU (RUS)
- SpaceIT (CH)
- European Space Agency (ESA)

Planetary radiation environments and effects

Objectives:

Development of advanced planetary and lunar radiation environment models

Data analyses from onboard radiation instruments in planetary and interplanetary missions and database development based on these

Planetary space weather

(networking activity inside the Europlanet I3)

*M. Hapgood, J. Liliensten, N. Crosby, A. Viljanen,
R. Vainio, S. Vennerstrom, T. Dachev, V.
Kalegaev, A.D. Aylward*

Outputs

Generate/consolidate knowledge on planetary SpW

- Publication in appropriate scientific and engineering journals (develop new journals?)
- Focused summaries on the web
- Targeted advice for potential users within the European planetary community.
- Updates to databases & models of planetary environments.
- Review interfaces to make best use of the available e-infrastructures

Sun-Earth Virtual observatory

Aim is to mobilise European e-resources for space weather and underlying science (Sun-Earth connections)

Pooling the data resources existing in different observatories and data centers scattered across the world, so that complementary information from different sources can be rapidly located, recovered and used to further scientific research.

Presented at FP7 information event on Research Infrastructures in Brussels on 6 February

Mike Hapgood, Chair, European Space Weather Working Team (M.Hapgood@rl.ac.uk)