

*High mountain Alma-Ata cosmic ray station: current state
of cosmic ray research by means of Neutron Monitors.*

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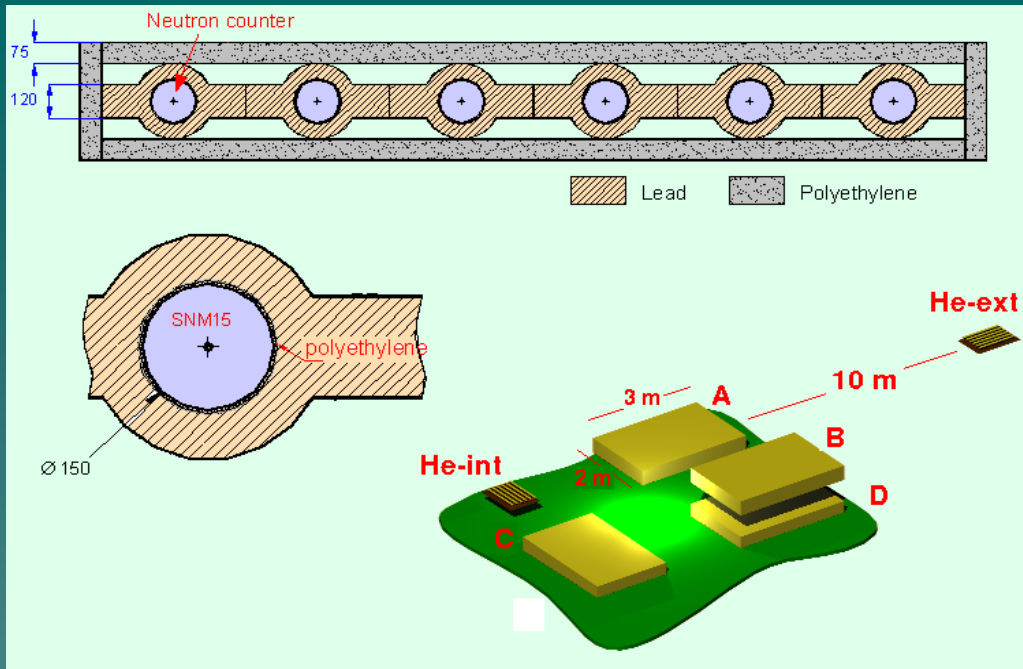
Tien-Shan High Mountain Cosmic Ray Station and Neutron monitor (cosmic ray station Alma-Ata B) is situated near Almaty city on distance of 28 kilometers at the mountain. It has been operated since 1973 at the Institute of Ionosphere, Ministry of Education and Science.

Location of Cosmic Ray Station Alma-Ata B:

Latitude 43.25 N

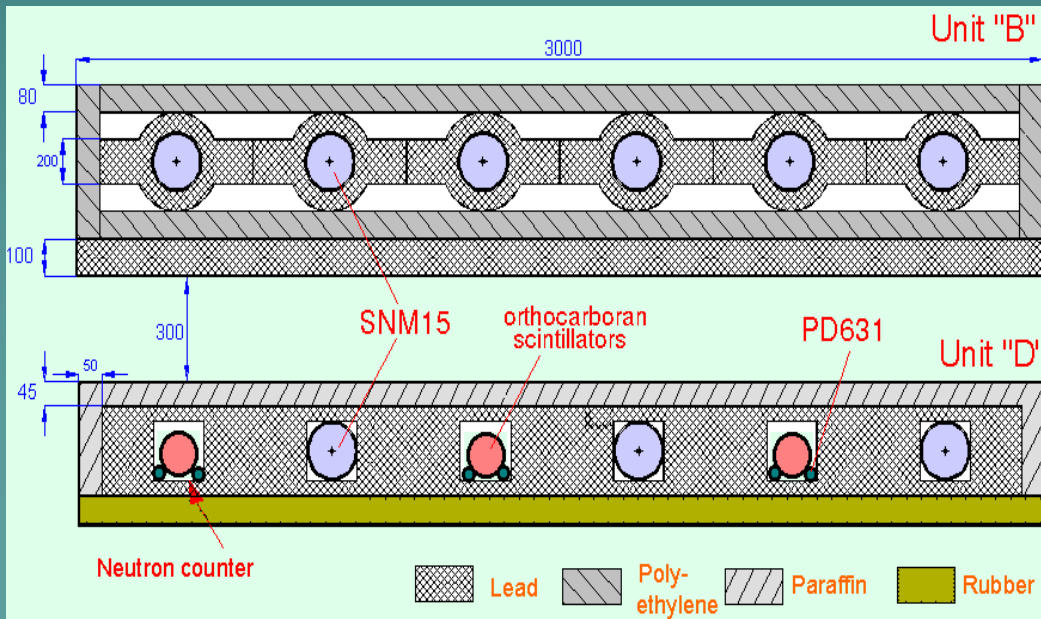
Longitude 76.92 E

Altitude 3340 m above sea level



Type 18NM-64
 Standard pressure 675.0 mb
 Geomagnetic cut-off rigidity 6.7 GV
 Neutron monitor consist of 4 sections: A, B, C, D.
 A, B, C – are standard sections with 6 boric counters SNM15 and section D – is under section B.
 The Alma-Ata high mountain (3340 m) cosmic ray neutron monitor has average counting rate of 1200 c/s.

Neutron monitor is used not only for the investigation of cosmic ray variations, but also nuclear processes
 (Investigation of EAS in collaboration with Lebedev Physical Institute, Russian Academy of Sciences - FIAN)



The combination of its geomagnetic cut-off rigidity and high statistic allows the observation of GLE and possible such rare events as solar neutron fluxes.

Tien Shan Mountain Cosmic Ray Station - Neutron monitor - Microsoft Internet Explorer

Файл Правка Вид Избранное Сервис Справка

Назад Поиск Избранное

Адрес: <http://tien-shan.org/ionos/index.htm>

DM Bar

Tien Shan Mountain Cosmic Ray Station

Russian Academy of Sciences P.N. Lebedev Physical Institute

Home Hour data Minutely data Pressure Indices Digital data

The Alma-Ata high mountain cosmic ray neutron monitor

Neutron monitor (cosmic ray station Alma-Ata B) is situated 28 km from Almaty at the mountain. It is operating in Laboratory of Geocosmical Relationships at the Institute of Ionosphere, Ministry of Education and Science.

Location of Cosmic Ray Station Alma-Ata B:

- Latitude 43.2 N
- Longitude 76.6 E
- Altitude 3340 m above sea level
- Standard pressure 675.0 mb
- Geomagnetic cut-off rigidity 6.61 GV
- Type 18NM-64

The Alma-Ata high mountain (3340 m) cosmic ray neutron monitor has a counting rate of 1200 c/s. The combination of its geomagnetic cut-off rigidity and high statistic is such that permits to detect and investigate solar flare particles and modulation effects of galactic cosmic rays.

Now we present hourly, minutely graphs of cosmic ray intensity and hourly data of atmospheric pressure at the station.

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 Russian Academy of Sciences
 P.N. Lebedev Physical Institute (FIAN)
 Tien Shan Mountain Cosmic Ray Station

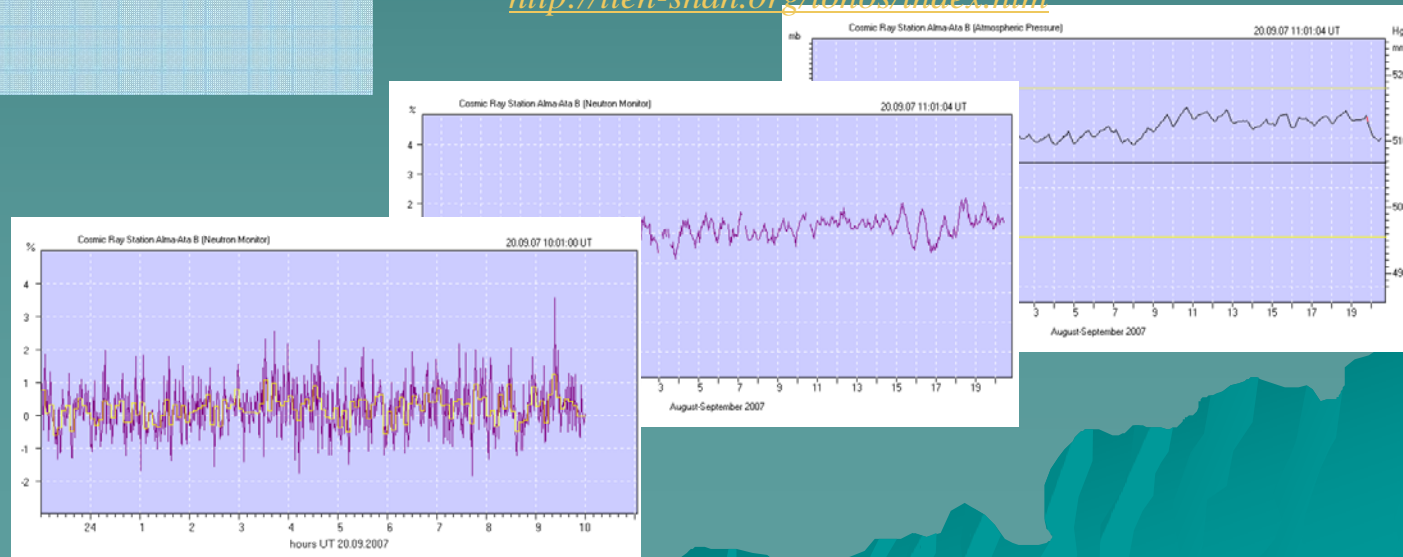
The continuous monitoring of the cosmic ray intensity by means of neutron monitor «Alma-Ata B» has been operating since August, 1973.

In collaboration with IZMIRAN group in 2000 registration system for NM was developed. The time resolution of channel data of NM is 1 min, time, but update of intensity - every hour in real time.

The registration system allows to estimate quality of the channel data and if necessary to enter correction coefficient.

In 2003 web-site with hour updating of the data was developed, where we present hourly, minutely graphs of cosmic ray intensity and hourly data of atmospheric pressure and CR-activity indices.

<http://213.211.74.115/ionos/index.htm>
<http://tien-shan.org/ionos/index.htm>





Now new registration system was developed using 8-channel counter board PCI-1780 (Advantech) and new pressure sensor BRS-1M (made in St. Petersburg Main geophysical observatory) with allowable error ± 30 Pa in the range 600 – 1100 GPa.

The new registration system is created for the solution of the following problem:

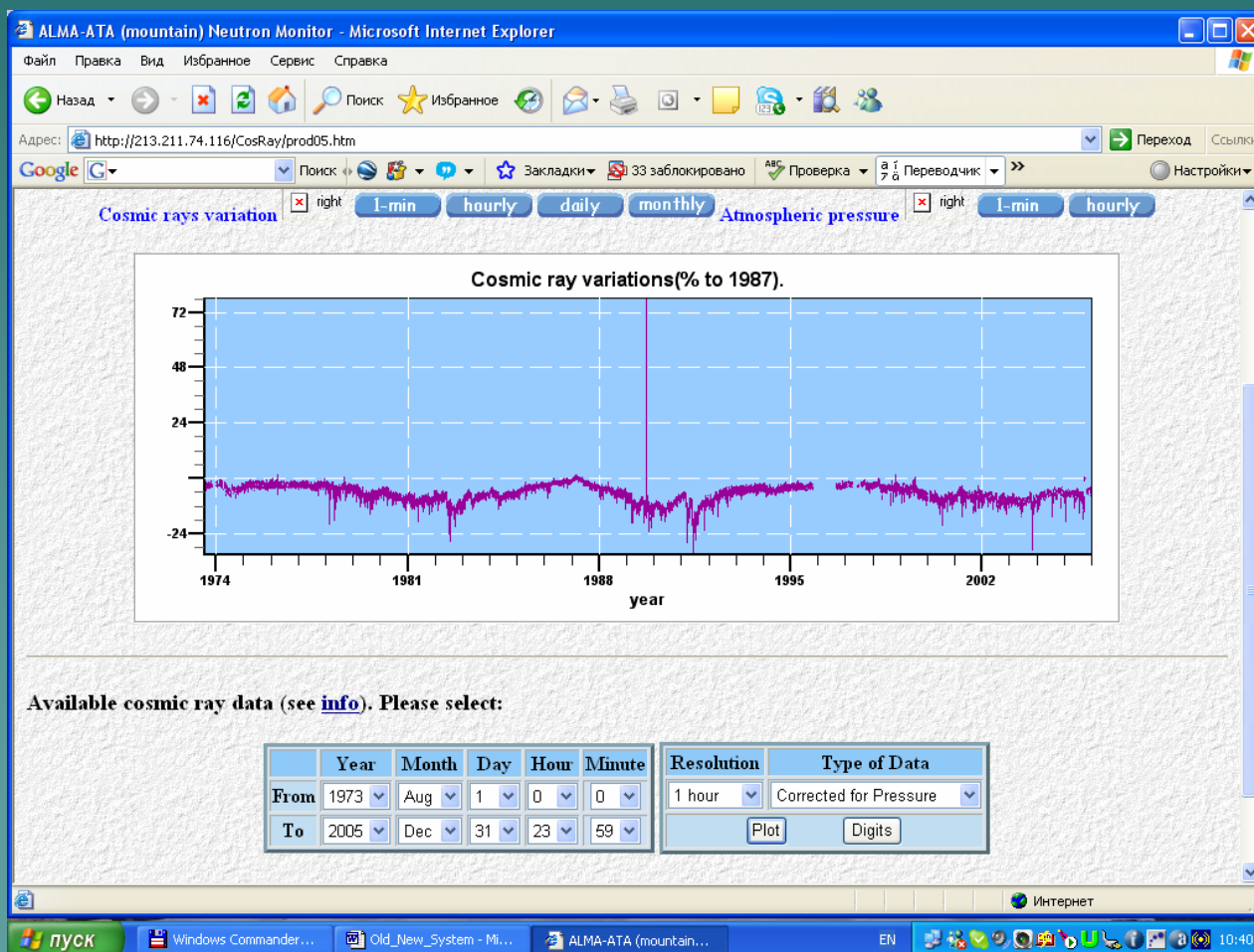
Counting rate from 18 channels of NM, creation of files for 1-min intensity and atmospheric data, correction data, if necessary, calculation of 1-min and 1-hor intensity and CR-activity indexes, recording of results into database for archiving, presentation data on web-site.

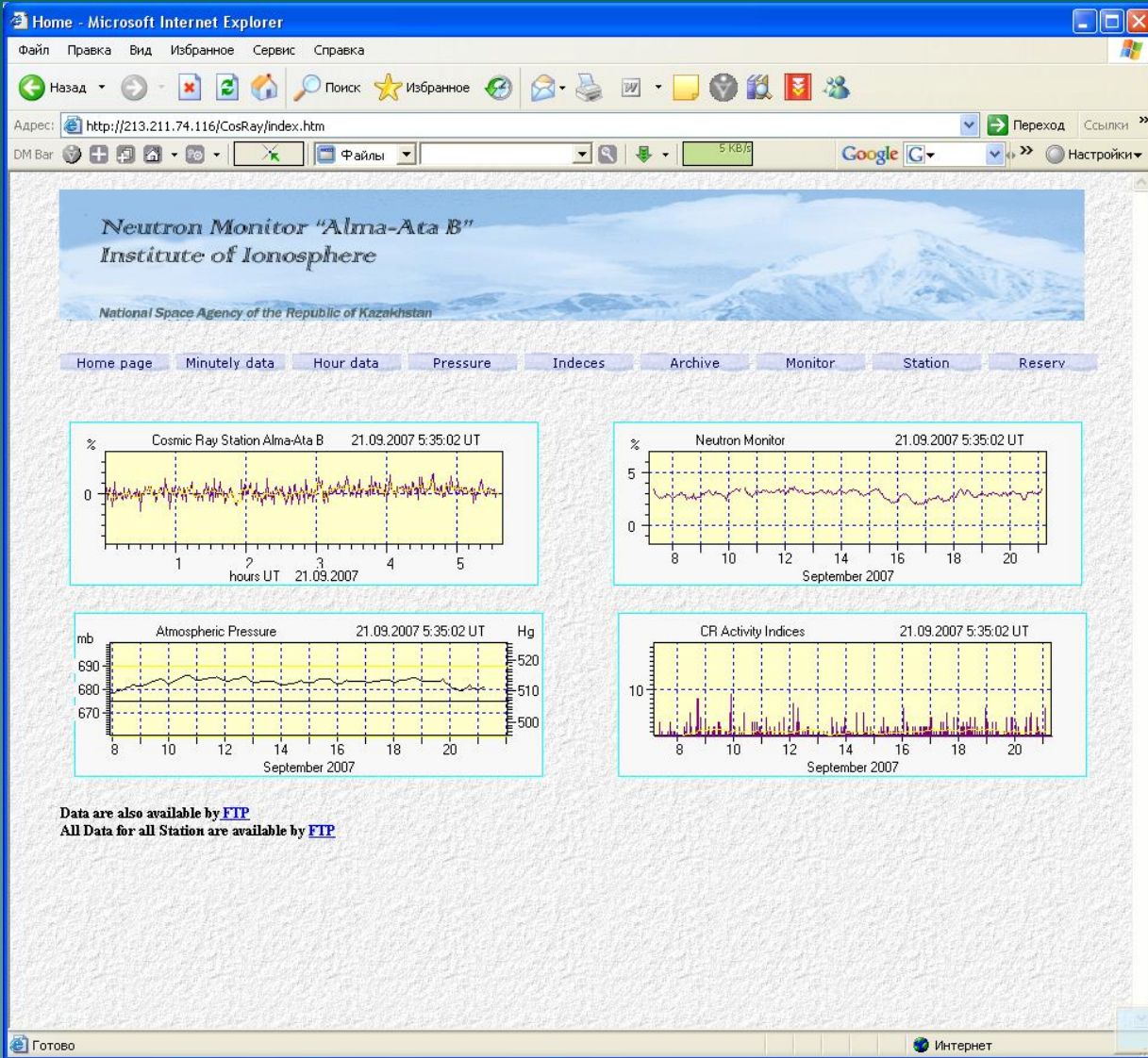


The interface with cosmic ray intensity data in real time obtained by means of high-altitude neutron monitor has been realized on Institute of Ionosphere web-site.

Software of database was created by IZMIRAN group.

Control panel allows to select a time interval, type of the data and the form of data presentation.





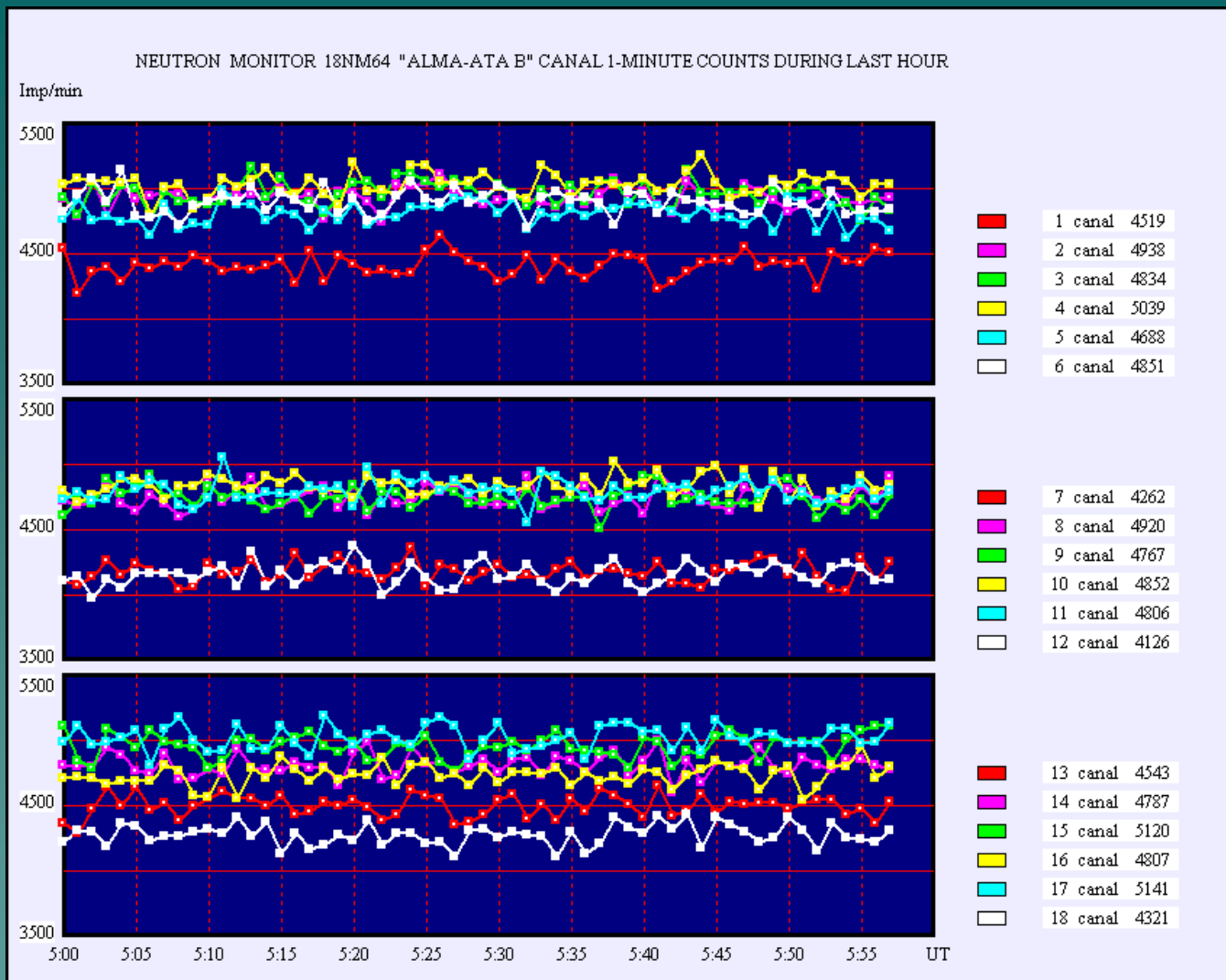
All information in graphic and text forms is represented on web-site <http://213.211.74.116/CosRay/index.htm> and updated every minute.

There are 1-min data for last 5 hour, 1-hour data for last 14 days.

Data are also available by <ftp://213.211.72.133>

At present time we finished the creation of archive of old 5-min data for 1973-2000, when there is no PC registration system. Now we correct these data.

Since September, 1, 2007 the new system of 1-min registration operate in parallel with old system.



In connection with remoteness of cosmic ray station, specific conditions at high mountains it is very important to solve the problem of control and distant access to registration system. The minute channel data for last 60 and 600 minutes are submitted. PC with registration system is registered on site of distant management LogMeIn.com that enables full access to PC.



The new point of INTERNET line was created near Cosmic ray station in direct visibility to Almaty city for operation of “Revolution” Internet system. There is fiber-optic cable from this point to cosmic ray station (700 m) for thunderstorm protection.



A new experimental complex ATHLET (Almaty THree Level Experimental Technique) includes three experimental setups of similar type at altitude of 3340, 1750 and 850 m above sea level.

P.N.Lebedev Physical Institute, Moscow,

Institute of Ionosphere, Kazakhstan,

Physical-Technical Institute, Kazakhstan,

Al-Faraby Kazakh National University, Kazakhstan

<http://www.tien-shan.org/she/vardbaccess/index.html>

ATHLET collaboration



In the frame of collaboration with FIAN (P.N.Lebedev Physical Institute, Moscow) this new detector for registration of term neutrons (^3He counter – PD631) at the atmosphere was developed ...

... and was installed at 4000 m above sea level.



August, 2007

Welcome to Kazakhstan!



Almaty Lake is nearby Cosmic Ray Station



NMDB FP7 Project

Participant 11 – Almaty

Olga Kryakunova

Institute of Ionosphere, Almaty, Kazakhstan



WP3

Automatized system providing collection of the primary data, processing of 1-minute and hourly values of cosmic ray intensity and atmospheric pressure, representation of the operative graphic and text information in real time (1-minute data), automatic filling of a database and representation of the archival information for all period of the operation on a web-site.

Automatic restoration of system operation is provided after de-energization of power supply system, the distant control and management of registration system via the INTERNET at absence of direct access of the persons on duty (distant management of a computer).

The program of the control of Neutron Monitor operation, based on representation of 1-minute channel counts of the monitor is developed.

There is an experience of service of the distant high-mountain station (protection against thunder-storms, operation of the INTERNET line in absence of direct visibility and complex weather conditions (temperature drops, presence of a snow, etc.).

WP6

Summer intern program in cosmic rays physics, solar physics and space weather research at Tien-Shan cosmic ray station (for Kazakh State University students).

Development of Kazakhstan web-site with neutron monitor data and space weather parameters at the Institute of Ionosphere. Presentation of everyday space weather forecast (Ap-index, F10.7 and level of disturbances of magnetic field at Kazakhstan region, presentation K-indexes from Magnetic Station at Almaty).

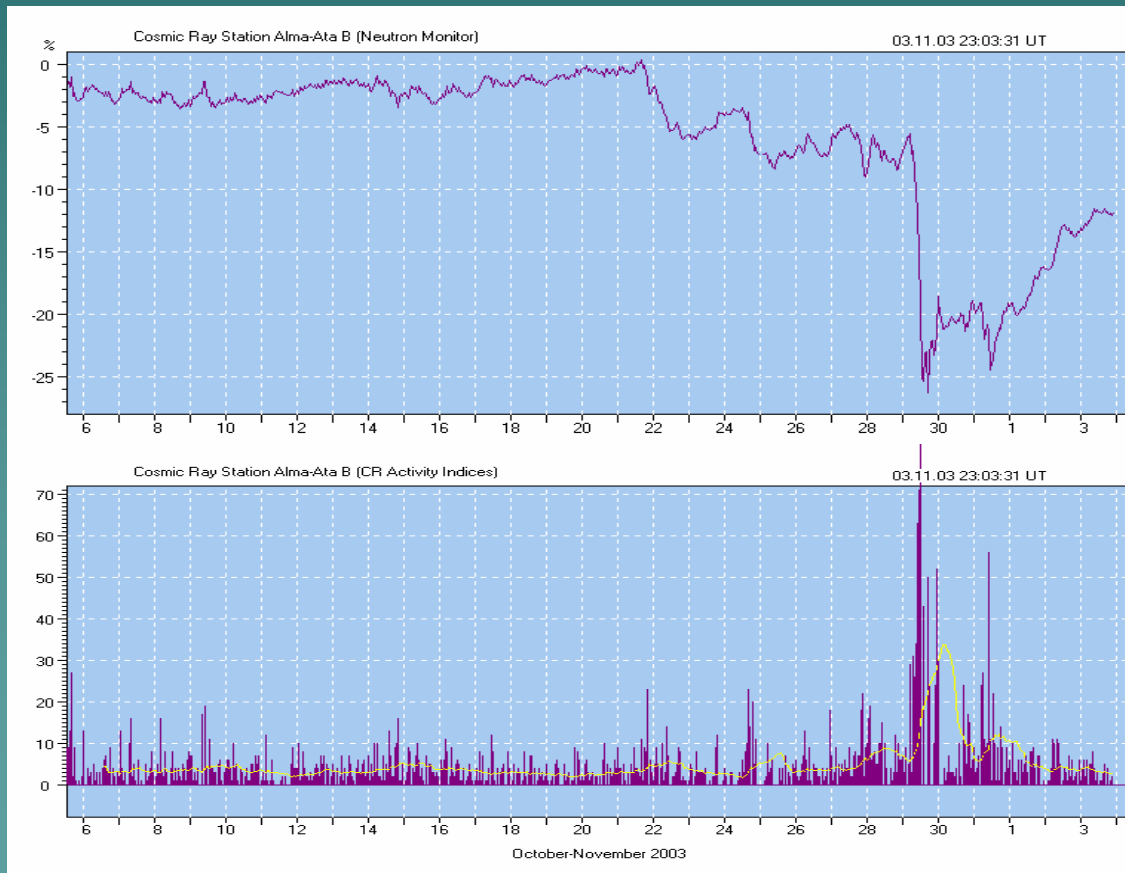
Space weather forecast information in newspapers, TV in Kazakhstan (by means of IZMIRAN-Institute of Ionosphere methods).

WP5

Investigation of GLE at the middle

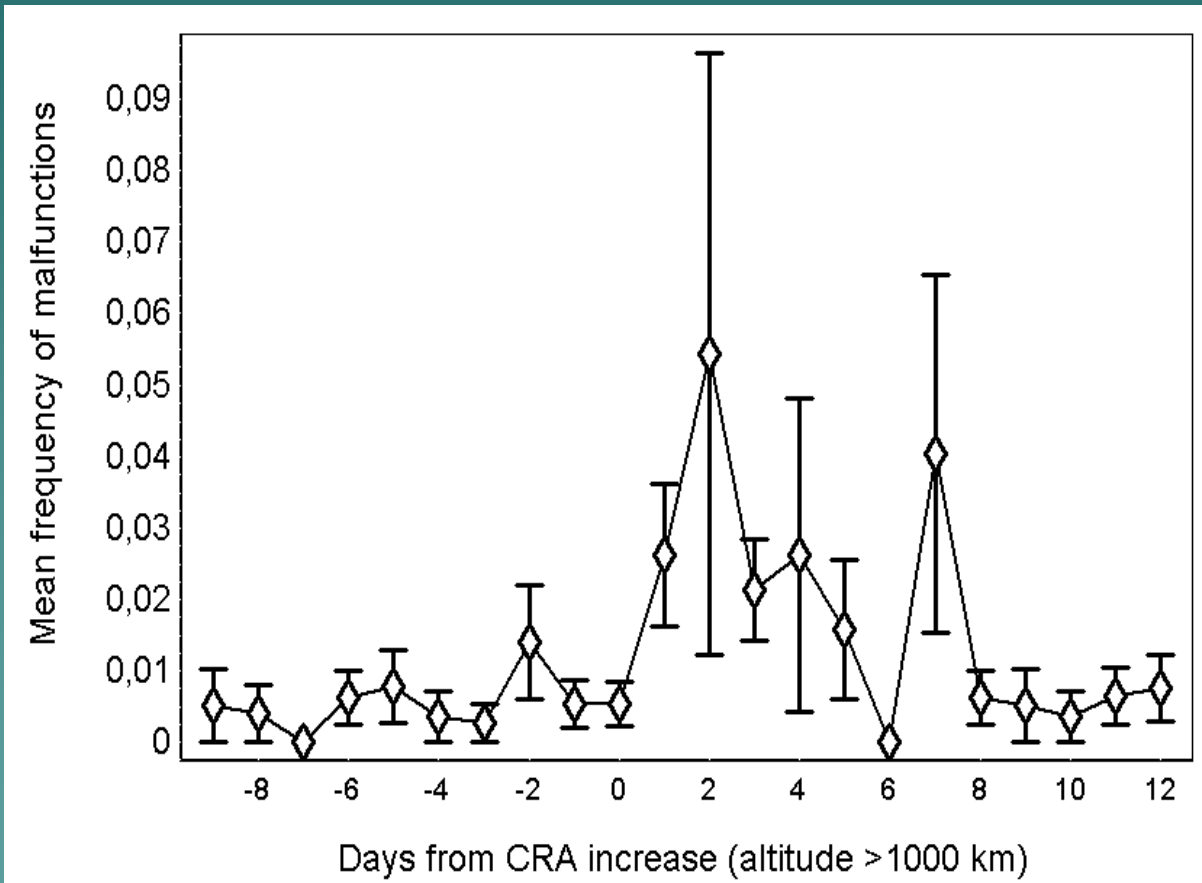


Data of high-altitude neutron monitor Alma-Ata B (3340 m above sea level).



Variations of cosmic ray intensity.

Cosmic ray activity indices.



The relation of satellite malfunctions to the behavior of cosmic ray activity indices for Alma-Ata station. We applied the epoch method to our data, choosing day with each of satellite anomalies as zero-day. This figure demonstrates that at the high altitude, just after CRA-index increase, a significant rise of the satellite malfunctions frequency is observed.

Now the Center of Diagnostics and the Forecast of Geophysical Environment carries out the daily forecast.



June 18, 2006

Launch of the first Kazakhstan satellite KazSat.

ИНФОРМАЦИЯ

Центра диагностики и прогноза геофизической обстановки
ДГП «Институт ионосферы» на 11 часов 16 июня 2006 г.

В прошедшие несколько суток магнитное поле Земли менялось от спокойного до слабозмущенного. По данным Геомагнитной обсерватории «Алма-Ата» сегодня К-индекс = 3 - 4, что соответствует слабозмущенной обстановке.

Возмущенность околоземного космического пространства, оцененная по данным высокогорной станции космических лучей, остается слабой. В ближайшие сутки ожидается слабозмущенная геомагнитная обстановка.

18 июня предполагается запуск с космодрома Байконур первого казахстанского спутника связи KazSat. На день запуска вероятен спокойный или слабозмущенный уровень геомагнитной активности и возмущенности околоземного космического пространства. Поток релятивистских электронов в магнитосфере Земли на геостационарных орбитах в пределах нормы. Прогноз радиационной обстановки у Земли – благоприятный.

ПРОГНОЗ

радиосвязи в КВ-диапазоне

Прогноз максимально применимой радиочастоты (МПЧ) и наименьшей применимой частоты (НПЧ) на 18 июня 2006 года для трассы Астана-Байконур (а) и трассы Алматы- Байконур. Частота выражена в МГц, время местное, декретное Астаны.

Прогноз максимально применимой радиочастоты (МПЧ), оптимальной рабочей частоты (ОРЧ) и наименьшей применимой частоты (НПЧ) на 18 июня 2006 года для трассы Астана-Байконур (а) и трассы Алматы- Байконур. Частота выражена в МГц, время местное, декретное Астаны.

Трасса	время	МПЧ	ОРЧ	НПЧ
Almaty-Baykonur	0.00	11.7	9.9	1.2
Almaty-Baykonur	2.00	10.2	8.7	1.4
Almaty-Baykonur	4.00	8.4	7.1	1.2
Almaty-Baykonur	6.00	7.9	6.7	1.7
Almaty-Baykonur	8.00	10.0	8.5	2.8
Almaty-Baykonur	10.00	11.5	9.8	3.6
Almaty-Baykonur	12.00	12.0	10.2	4.2