

Overview of the Aircraft Radiation Monitoring Results Obtained with Liulin type Spectrometers-Dosimeters

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In this overview we present the results of aircraft measurements by means of a Si-diode energy deposition spectrometer Liulin type developed first in STIL-BAS for the purposes of the space radiation monitoring at MIR and International Space Station (ISS) [1]. These spectrometers-dosimeters are further developed, calibrated and used by scientific groups in different countries for the monitoring of the aircraft radiation fields. Calibration procedures of them are performed at different accelerators where protons and heavy ions were used. Few calibrations runs in the CERN high-energy reference field behind the concrete shield were performed also. The long term aircraft data base were accumulated in 2001-2004 years onboard of an A310-300 aircraft of Czech Air Lines, during 6 long-term (each one for about 2 months) monitoring and about 30 return single flights. Some of results obtained are presented, discussed and analyzed. During these flights we succeeded to perform measurements during a rare event of intense solar flare on 15th April 2001 and the subsequent Ground Level Event (GLE) 60 and in number of Forbush decreases.

Dosimetric measurements of the ionizing radiation environment at ~20 km altitude aboard NASA's ER-2 high altitude research aircraft and balloon experiment up to ~30 km were performed and the obtained results are discussed also.

Simultaneous experimental comparison of the GCR fluxes, doses and dose to flux ratios at aircraft altitudes and on ISS are presented and discussed.

The data obtained on aircrafts were always compared with exposure levels calculated by means of transport codes CARI 6 and EPCARD 3.2. The results are presented and discussed.

Keywords: aircraft radiation monitoring; galactic cosmic rays, accelerometers calibrations; silicon detector; spectrometer; dosimeter

References

- [1] Dachev, Ts., B. Tomov, Yu. Matviichuk, Pl. Dimitrov, J. Lemaire, Gh. Gregoire, M. Cyamukungu, H. Schmitz, K. Fujitaka, Y. Uchihori, H. Kitamura, G. Reitz, R. Beaujean, V. Petrov, V. Shurshakov, V. Benghin, F. Spurny, Calibration Results Obtained With Liulin-4 Type Dosimeters, J. Adv. Space Res., V 30, No 4, 917-925, (2002).