COSMOGENIC RADIONUCLIDES IN THE KOSICE H5 AND CHELYABINSK LL5 CHONDRITES AND COSMIC RAY MODULATION.

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Cosmogenic radionuclides: Cosmogenic radionuclides of different half-lives, including ^{26}Al, ^{60}Co, ^{22}Na, ^{54}Mn, ^{48}V, ^{46}Sc, etc.,are measured in the chondrites, the orbits of which have been registered, namely, in Kosice H5 (fall of 28 II 2010, aphelion q'= 4.5±0.5 AU) and Chelyabinsk LL5 (fall of 15 II 2013, q'= 2.78±0.20 AU). Both the chondrites fell at the ascending phase of the 24 solar cycle, which, in accordance with different $T_{1/2}$ of the radionuclides, provides information on the GCR intensity and variations at different heliocentric distances and for different time periods in the 23 and 24 solar cycles. High effective non-destructive low-level measurements of the radionuclide content have been fulfilled on the underground gamma-spectrometric complex of large volume Ge-detectors with the decrease of background being more than ten-fold.

Pre-atmospheric sizes: The track density of *VH*-nuclei of cosmic rays in olivine crystals of some samples was measured and analyzed. In the majority of crystals of the Kosice chondrite it amounts to ~10^5-10^6 track/cm^2. In the Chelyabinsk chondrite, about 40% crystals are characterized by a very high track density up to 10^7 track/cm^2, whereas in the remaining ones it is essentially lower (less than ~10^3 track/cm^2), which testifies to a complex multistage radiative and thermal history of this chondrite matter. Using the track data and ^{60}Co/^{26}Al ratios, pre-atmospheric sizes of the chondrites and shielding depths of the samples are determined: R~50 cm, d~3-33 cm for the Kosice chondrite (19 spec.), and R>>200 cm (2π-geometry of irradiation), d~10-20 cm (3 spec.), d~70 cm (1 spec.) and 120 cm (1 spec.) for the Chelyabinsk chondrite. These results are verified by the calculation of the short-lived ^{46}Sc and ^{48}V in the Kosice chondrite with using stratospheric data on the GCR intensity during ~$1.5T_{1/2}$ of the radionuclides before the chondrite fall onto the Earth.

Cosmic ray modulation: Measured contents of ^{54}Mn and ^{22}Na in the depth-identified samples are related to average heliocentric distances of the chondrites, at which these radionuclides were accumulated before the chondrite fall onto the Earth. Using the radionuclides as natural detectors of cosmic rays allows us to estimate average GCR integral gradients (E>0.5 GeV) for the corresponding time periods. The addition of these data continues the meteorite monitoring of intensity and variation of GCRs in the heliosphere, which has been carried out since 1957, i.e., on the time scale of already six 11-year solar cycles [Alexeev et al., 2012], up to 2013. The derived long-time regularities of that homogeneous data set testify to the stochastic nature of the solar cycle differences, conditioned by stochastic processes of the solar magnetic field inversion in the phases of maximum of the solar activity. Peculiarities of the transition minimum between the 23 and 24 solar cycles, as well as at the ascending phase of the 24 solar cycle, which are revealed due to cosmogenic radionuclides in the fresh-fallen Chelyabinsk and Kosice chondrites, confirm these features.

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