COSMOGENIC RADIONUCLIDES Al-26 and Mn-53 IN CHONDRITES, V.A.Alexeev, V.V.Malyshev, and A.K.Lavrukhina, Vernadsky Institute of Geochemistry and Analytical Chemistry, USSR Academy of Sciences, Moscow, USSR

This paper presents an analysis of data reported in the literature and authors's data on the Al-26 ($t_{1/2}$=0.72 Myr) and Mn-53 ($t_{1/2}$=3.7Myr) content in ordinary chondrites. Figure 1 shows the distributions of Al-26 in antarctic and nonantarctic chondrites. To eliminate the difference in Al-26 formation rates in H- and L- or LL-chondrites a normalizing coefficient of 1.08 (1) was used. To estimate the average earth age of antarctic chondrites a correlation analysis of these two distributions was undertaken. The correlation coefficient was found is a maximum (r_{max} = 0.84) when the histogram for antarctic chondrites is displaced by 5.4±0.7 $dpm \cdot kg^{-1}$ towards higher Al-26 content values. This displacement corresponds to an average earth age of antarctic chondrites of about 0.1Myr.

Figure 2 presents the histograms of Mn-53 distributions in chondrites. A correlation analysis of these distributions showed that the correlation coefficient is a maximum (r_{max} = 0.75) when the histogram for antarctic chondrites is displaced by 40±8 $dpm \cdot kg^{-1}$ Fe towards lower Mn-53 contents.

The distribution of Mn-53 and Al-26 saturated contents in nonantarctic ordinary chondrites was investigated as a function of their radiation age. The radiation age of chondrites was determined according to Nishiizumi et al. (2). It is found that the Mn-53 average content is higher by (21±9)% in meteorites with radiation age $T \leq 12$ Myr than in those with $T > 12$Myr (Fig.3). A similar excess, though less pronounced, we observed for L- and LL-chondrites too. A similar, but less pronounced effect is noticed also for Al-26. The higher Mn-53 and Al-26 saturated contents in chondrites of low radiation age, especially in H-chondrites, can be attributed to the fact that a considerable proportion of meteorites with $T \leq 12$ Myr years originates from a comet or from the objects of Chiron like, with the orbits more inclined to the ecliptic plane and/or extended (3;4), which caused their irradiation by cosmic rays of higher intensity (5). The greater proportion of such chondrites in the antarctic meteorites might cause the abovementioned higher Mn-53 content in the meteorites from Antarctica.

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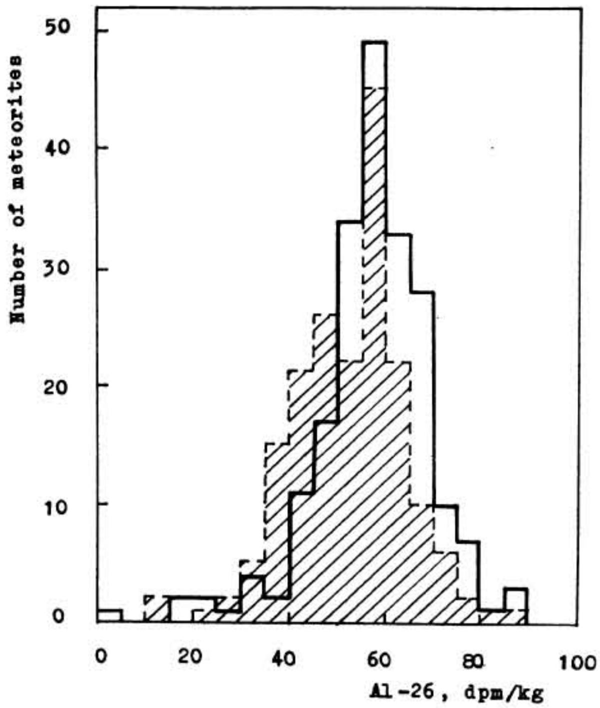

Fig.1. Distributions of Al-26 contents in 180 antarctic (dashed line, the histogram is hatched) and 205 nonantarctic ordinary chondrites. Antarctic chondrite data are taken from (1).

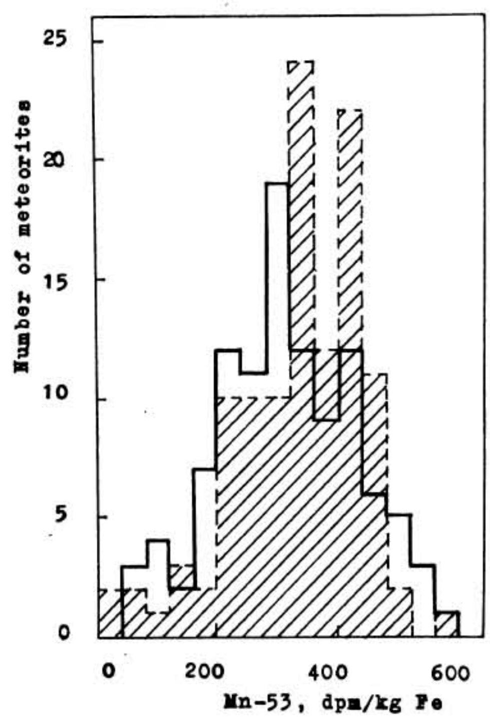

Fig.2. Distributions of Mn-53 content in 112 antarctic (dashed line, the histrogran is hatched) and 106 nonantarctic (solid line) ordinary chondrites

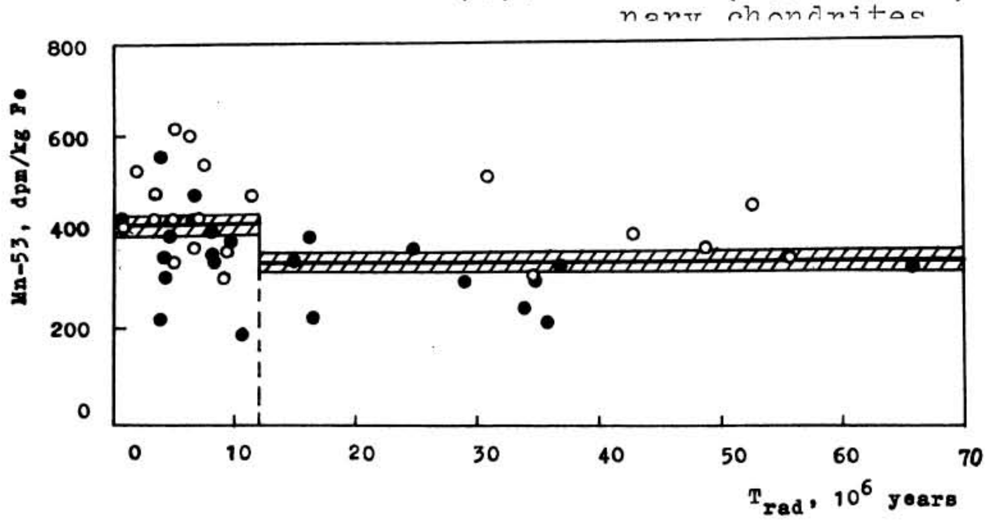

Fig.3. Distributions of Mn-53 saturated contents as a function of radiation age in 56 nonantarctic H-chondrites. Hatched areas correspond to the average Mn-53 contents ($\bar{N} \pm \sigma_{\bar{N}}$) for T ≤ 12Myr and T > 12Myr. The open circles stand for the finds, and the full for the falls.