

⁵³MN PROFILES AND GARDENING PROCESSES IN LUNAR CORES 60010 AND 15011, K. Nishiizumi and J. R. Arnold, Dept. of Chem., B-017, Univ. of Calif., San Diego, La Jolla, CA 92093.

We have reported earlier on the content of ⁵³Mn in a series of lunar cores [1-6]. In the near-surface layers, the content of SCR-produced ⁵³Mn ($t_{1/2} = 3.7 \times 10^6$ yr) along with data from other groups on ²⁶Al (7.2×10^5 yr), nuclear tracks, and cosmogenic rare gases, have given information on the history of gardening of the lunar surface, especially in the time range 10^5 - 10^7 years [5,7]. Models have been built to describe the process ([8] and references therein). There is rough agreement between models and experimental data, but there are some puzzling features. New data continue to be needed.

(1) The level around 4 g/cm² depth (unit 7) was suggested previously [9] to be an old top surface, buried by ejecta in recent times. The series of rocklets above and down to that level, show a steeply falling gradient of activity. The bulk soil values are flat and high, indicating that the bulk material comes mainly from near the surface. However, the rocklets, especially the one at 4 g/cm² depth, must come from deeper levels. It probably originates from a depth greater than one meter in rock or soil, suggesting that a large impact is involved. These two different aspects must be reconciled to achieve a complete description.

(2) One of two rocklets at 13.5 g/cm² depth lies significantly above the curve of production and the bulk value at 10 g/cm² depth. Of course individual sample measurements will be a more sensitive probe for disturbance than bulk (average) measurements. We need a bulk measurement at the same level for fuller interpretation.

(3) A broad tendency is seen in the rocklet data (with the two exceptions discussed above), to conform more closely with the production profile than with that defined by the bulk fractions. The significance of this is not obvious to us; it may be an accident of sampling.

Core 15011, the upper portion of a double drive tube core, has not been reported previously. This core, according to the field description [10] should be a good one for studying gardening at the special region near Hadley rille. It appears to be among the least mature soils of the Apollo 15 site [11]. Some loss in handling is said by Allton [12] to have occurred from the top layers. We have received 15 ⁵³Mn samples from the reactor at the time of writing. We expect to report preliminary results at the conference.

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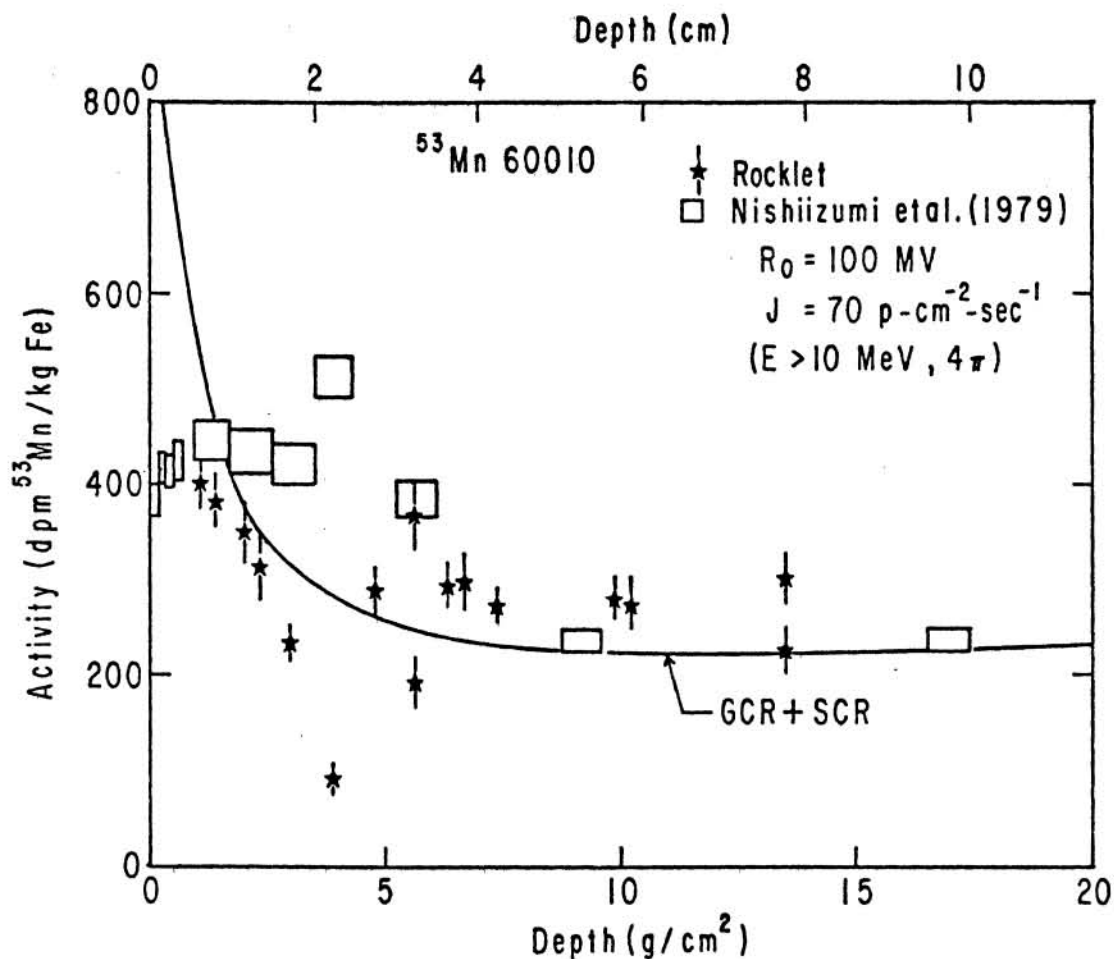


FIGURE 1