TERRESTRIAL AGES OF METEORITES USING ^{14}C AND ^{14}C/^{10}Be: SOME NEW RESULTS FROM ANTARCTICA.

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Introduction: It is important to determine the terrestrial age, or residence time, of a meteorite on the surface of the Earth, as this gives us useful information which can be applied to studies of infall rates, meteorite distributions, weathering of meteorites and meteorite concentration mechanisms. The study of the terrestrial ages of these meteorites gives us useful information concerning the storage and weathering of meteorites and the study of fall times and terrestrial age. We would expect that weathering of meteorites and their eventual destruction would be a function of the terrestrial age. In addition, weathering would affect trace-element composition. However, a direct connection of weathering rates to the terrestrial survival times of meteorites was initially shown by Wlotzka et al. [1] and later by Bland et al. [2,3].

Terrestrial ages of meteorites have been determined by the concentration of ^{36}Cl, ^{14}C or ^{41}C, measured independently or also in combination. With measurement of more than one radionuclide, we can correct for shielding effects [4-6]. At our laboratory, we make measurements of ^{14}C and ^{14}C/^{10}Be. We previously considered that the production rate of ^{14}C/^{10}Be should be reasonably constant at ~2.5 to 2.6 [7,8]. Recently, we have also undertaken some modeling calculations [9] to determine if we can assume a constant production rate of ^{14}C and ^{10}Be.

The smaller size of many Antarctic meteorites may result in lower ^{14}C/^{10}Be ratios. We have obtained more than 200 ^{14}C terrestrial ages on Antarctic meteorites, from many different sites.

Trends in terrestrial ages: The trends in terrestrial age are that some sites exhibit older terrestrial ages than others. The Allan Hills Main icefield, Elephant Moraine and Queen Alexandra Range tend to have many meteorites beyond the range of ^{14}C (>40kyr). Other Allan Hills sites and the Yamato region show a much younger age distribution. It is important to be able to understand differences in the production rates of ^{14}C. We will discuss our results in terms of recent modeling calculations for ^{14}C and ^{10}Be [9]. We have also studied the terrestrial-age distributions of various achondrites and compared the age distributions to ordinary chondrites.

References: [1] F. Wlotzka et al., 1995, *Lunar & Planetary Institute Technical Report* **95-02**, 72. [3] P. A. Bland et 1996. al., Monthly Notices, Royal Astronomical Society **238**, 551. [4] A. J. T. Jull, 2000. in AAccretion of extraterrestrial matter throughout Earth=s history@ (eds. B. Peuker-Ehrenbrink and B. Schmitz), Kluwer Academic/Plenum Publishers, New York., pp. 241-266 [5] A. J. T. Jull et al., 1998. *Geological Society of London Special Publication* **140**: 75. [6] K. C. Welten et al., 2003. *Meteoritics & Planetary Science* **38**:499 [7] D. A. Kring, et al., 2001. Meteoritics & Planetary Science, 36: 1057. [8] K. C. Welten et al. 2001. Meteoritics & Planetary Science, 36: 301. [9] K. J. Kim et al. 2003, abstract #1191, 35th Lunar & Planetary Science Conference.