# $^{14}C$ and $^{10}Be$ in cosmic dust magnetite

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We studied $^{14}C$ and $^{10}Be$ in magnetic separates from particulates recovered from the South Pole Water Well (SPWW) (Taylor et al., 2000) and from blue ice at Cap Prud'homme (CP), Antarctica by Maurette et al (1991). Previous studies on radionuclides ($^{10}Be$ and $^{26}Al$) in cosmic dust were performed on single spherules from marine sediments and ice (e.g. Raisbeck and Yiou, 1987; Nishiizumi et al., 1987).

We obtained $^{14}C$ samples by combustion in $O_2$ at a series of temperatures. Independently, samples were subjected to an acid-etching procedure where both $^{14}C$ and $^{10}Be$ samples were recovered. $CO_2$ was converted to graphite for AMS measurements. The combustion results show an interesting trend of high $^{14}C$ release in the 200-400$^{o}$C fraction. Levels of 11.4±0.8 and 43.5±0.4 dpm/kg $^{14}C$ were observed in high-temperature (>550$^{o}$C) fractions, for SPWW and CP respectively . Acid-etch samples indicated a total of 13±1 and 98±1 dpm $^{14}C$/kg for SPWW and CP. The acid-etch results sample a different component of carbon that the combustion experiments. We also measured low levels of $^{10}Be$ in the same acid-etched fractions. These results are consistent with spallogenic $^{14}C$ (due to SCR and GCR). The $^{10}Be$ results suggest that most of magnetic fraction is extra-terrestrial and that the cosmogenic nuclides are not likely surface-correlated; they also indicate low GCR exposure times.. The $^{14}C$ results on the other hand, suggest that the material was subject to substantial SCR and GCR irradiation during the last 20,000yr. Definitive conclusions about the nature of irradiation can be reached after we have information on $^{3}He$ concentrations in the samples; work is in progress. These results open up a new area for the study of extraterrestrial material in terrestrial reservoirs. The magnetic component is likely more resistant to weathering and can be easily separated from terrestrial components.

## References

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