Presented at the
Eighth International Conference on Geochronology, Cosmochronology and Isotope Geology,
Berkeley, California, June 5-11, 1994.
(U.S. Geol. Surv. Circ. 1107, 27.)

THE H CHONDRITE PARENT BODY(IES): INTERNAL STRUCTURE AND TEMPORAL CONTRIBUTION TO THE METEORITE FLUX

BENOIT, P.H. and SEARS, D.W.G., Dept. Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR, 72701, USA.

The Antarctic meteorite collection has made many contributions to the study of parent body structure and evolution. Among these is the discovery of a group of unusual ordinary chondrites which is not found among the modern falls. These H chondrites, referred to here as "Group A", have high induced thermoluminescence (TL) peak temperatures, high metallographic cooling rates, significantly lower abundances of certain REE elements and have cosmic ray exposure (CRE) ages of about 8 Ma and were apparently fairly small during irradiation in space. Among the modern falls there are numerous H chondrites with CRE ages of about 8 Ma ("Group B"), but these meteorites have induced TL peak temperatures, metallographic cooling rates and REE element abundances indistinguishable from H chondrites with larger CRE ages ("Group C") from both the Antarctic and modern falls collections and were larger than Group A meteorites during irradiation (Benoit and Sears, 1992).

Our original study of the Group A Antarctic meteorites was based largely on H5 chondrites. We have since examined Antarctic H4 and H6 chondrites as well. We find that there are members of Group A among both the H4 and H6 chondrites. However, for the H4 chondrites the difference between Group A and the Group B and C meteorites is not as distinct as is the case for the H5 and H6 chondrites. The H6 members of Group A appear to be rare relative to Group B, compared to the proportions observed for the H5 chondrites in the Antarctic collection. Considering only the Group B and C meteorites, there is a tendency for H4 chondrites to have higher metallographic cooling rates and somewhat higher TL peak temperatures than H5 and H6 chondrites. No such tendency is observed among the Group A chondrites of types 4-6, but this must be viewed with caution due to the relative insensitivity of both metallographic determinations and induced TL response at the high cooling rates (about 100 K/My) observed.

The existence of the unusual Group A meteorites among the H chondrites, which have generally been considered fairly homogeneous, suggests that: (1) The meteorite flux has changed in composition over the relatively short time interval represented by the Antarctic meteorite collection (<800 ka), (2) the metallographic cooling rate data of the Group B and C chondrites can be explained by a simple stratified parent body model, with H6 having slower cooling rates than H4, but (3) the unusual group A meteorites do not fit this simple model. The group A meteorites may be derived from a totally different parent body or may have been created by extensive thermal processing during the 8 Ma event which generated large numbers of meteoroid bodies. If this latter situation is the case, the rarity of H6 members of Group A may be evidence of the survival of a stratified parent body up until the 8 Ma event.

Benoit, P.H., and Sears, D.W.G., 1993, Breakup and Structure of an H-chondrite Parent Body: The H-chondrite flux over the last million years: *Icarus*, v. 101, 188-200.