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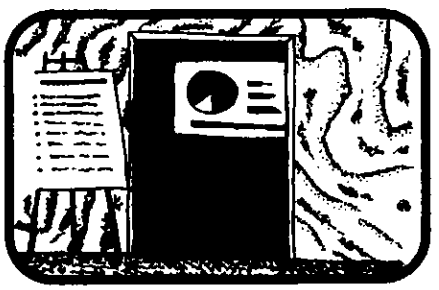
Conference Report



Large Meteorite Impacts and Planetary Evolution

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The second international conference on Large Meteorite Impacts and Planetary Evolution was again held in Sudbury, Ontario, from 30 August 30 to 5 September 1997. Sudbury is the perfect venue for such a conference as it is the site of what is now widely believed to be one of the world's largest meteorite impacts. Approximately 140 registrants from South Africa, Ethiopia, Ghana, China, Russia, Germany, Austria, Norway, Britain, Australia, Czech Republic, Finland, Netherlands, Sweden, United States and Canada enjoyed Sudbury's hospitality and fine weather.

The three formal days of the conference were fully occupied with 79 oral presentations and 30 posters (Lunar and Planetary Institute, 1997). In order to entertain such a full program, talks were limited to 15 minutes and the morning coffee breaks were eliminated. This structure was not fully appreciated by all the participants but the program stayed on schedule. A shortened lunch break was accommodated by the organizing committee providing lunch on site.

A very popular and entertaining public lecture entitled "Strange Worlds: Radar Encounters with Earth-approaching Asteroids" by Dr. Steven Ostro of the Jet Propulsion Laboratory, California, was sponsored by both the conference and Science North, a non profit science centre.

The Sudbury Structure was examined by more than 60 participants on pre- and post-conference field trips (Dressler *et al.*, 1992) led by B.O. Dressler. A specialized post-conference trip emphasizing the geochemistry of the mineralized Sublayer of the Sudbury Igneous Complex (Lightfoot *et al.*, 1997) was led by Gord Morrison and Peter Lightfoot of Inco Exploration and was fully subscribed. The trip discussed the data bearing on the origin of the Sublayer and Offsets and the associated mineral deposits and showed examples of two Sublayer structures; an embayment and radial Offset Dike.

The first day of the scientific program, on the Sudbury Structure and diamonds and carbonaceous matter in the Sudbury and other terrestrial impact structures, provided new insight on the origin of the Sudbury Igneous Complex, the Sudbury Breccia pseudotachylites, and the heterolithic breccias of the Onaping Formation. It was shown that laboratory geochemistry and basic field observations must both be used to solve geological problems as isotopic evidence supports an one-magma impact melt origin for the Igneous Complex (M. Ostermann, A. Dickin) while structural field evidence (U. Riller, J. Cowan) is in disagreement with this interpretation. Field observation can also result in widely divergent interpretations as the commonly accepted impact origin of the Sudbury Breccias was challenged in one talk proposing a magmatic-breccia origin possibly not related to the Sudbury impact. Following the 1994 discovery of fullerenes in the impact breccias of the Onaping Formation (Becker *et al.*, 1994), the origin of the carbonaceous matter in the breccias and mudstones of the Sudbury Basin has come centre stage in Sudbury geology (L. Becker, D. Heymann) and provided for several "lively" discussions during the meeting. Other studies of the Onaping Formation presented carbon isotopic evidence for a biogenic origin of the carbonaceous matter in the heterolithic breccias of this formation. The Sudbury Structure is an additional site from which impact diamonds have been reported (V. Masaitis).

Day two of the conference was filled with talks on several terrestrial impact structures, on shock metamorphic effects on target rocks, and on the possible impact origin of the Bushveld Complex, South Africa (W.E. Elston). Of special interest were several presentations on the K/T-boundary, Chicxulub Structure (Yucatan) and the Jurassic-Cretaceous boundary Morokweng impact structure in South Africa (M. Andreoli, C. Koeberl). This recently discovered structure possibly is 340 km in diameter and is 144.7+1.9 Ma old. This age is indistinguishable from the age of the Jurassic-Cretaceous boundary, indicating that large meteorite impacts may have influenced the evolution of life on Earth to a considerably larger degree than previously assumed.

The "Effects of Planetary Impact" and "Geophysical Constraints on the Character of Large Impact Structures" sessions on the third and last presentation day of the conference dealt with the impact of cratering on early Earth (R.A.F. Grieve), meteorite impact and lunar differentiation (P.H. Warren), numeric modelling of large

impact basin formation, a review of geophysical data on the Vredefort Structure in South Africa (H. Henkel), and a wealth of new data and interpretations on the Chicxulub Structure. BIRPS (British Institutions Reflection Profiling Syndicate) seismic profiles across the northern part of the Chicxulub Structure are presently being investigated by an "International Chicxulub Working Group." The seismic profiles were on display for the entire conference and were the source of much discussion. The seismic work and several drill holes to a depth of about 700 m provide the background for a deep drilling project planned by the International Continental Drilling Project (ICDP).

It is expected that a proceedings volume will be published as a GSA special paper late in 1998 or early in 1999.

Field trip guide books for trips offered during the conference are available from: Publication Sales, Ontario Ministry of Northern Development and Mines, 933 Ramsey Lake Road, Sudbury, Ontario, Canada P3E 6B5.
E-mail:Pub_sales@torv05.ndm.gov.on.ca

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Positions Available