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Award

2008 Barringer Medal for Frank Kyte

Of all the Barringer medal awardees, Frank is probably the one who has seen the fewest craters . . . However, for what he might be lacking in terms of melt sheets, central peaks, and crater rims, Frank more than makes up in platinum group anomalies, Ni-rich spinels, meteorite fragments, and other extraterrestrial materials. Over the last 30 years, Frank has been highly productive in the identification and characterization of ejecta material of all kinds and shapes that lay hiding in the sedimentary record. Among his many research accomplishments, he discovered the only deep-ocean impact in the cratering record and he has the unique privilege of possessing a piece of the projectile that wiped out the dinosaurs.

Frank, a native of San Francisco, started his research career at San Jose State University and NASA Ames in the 1970s with groundbreaking work on interplanetary dust particles and cosmic spherules, working with Max Blanchard and Don Brownlee. He then moved to UCLA in 1978 to join John Wasson's research group. He was the first speaker ever to mention the words "KT boundary" at the Meteoritical Society's meeting in 1980. That very same year, he reported in *Nature* the elevated PGE concentrations he had measured in the KT clay of Stevns Klint (Denmark) and hole 465A of DSDP leg 62. After obtaining his Ph.D. in 1983, Frank remained at UCLA as a research geochemist. Over the years, he tackled with the same elegance and determination as that shown by his favorite football team, the great 49ers of the 1980s, many aspects of ejecta and extraterrestrial material research, while trespassing from time to time into the field of paleoenvironment reconstructions and oceanography. In 1981, he detected a positive Ir anomaly, of KT magnitude, in late Pliocene sediments from piston cores drilled in 1964 in the Bellingshausen Sea, somewhere close to the middle of nowhere between Chile and Antarctica. This Eltanin event, as it is now called, is so far the only example of a meteorite (most likely an ~1 km mesosiderite) impact in a deep ocean basin. This important discovery, described in several publications in the eighties was followed in the nineties and early 2001 by two Homeric, at least according to Frank's tales, expeditions to the Southern Ocean and Antarctica on the German research vessel Polarstern. A great deal of what is known today about oceanic impact derives from the data Frank and his colleagues collected on the Eltanin event. In the meantime, still working on the KT layer with his good friend

Frank and a tough Spitsbergen colleague discussing the possible Ir anomaly in the ejecta layer from the Mjølnir crater (ESF Svalbard workshop 2001).

Jan Smit, Frank characterized in detail another important, but at the time quasi-unknown, impact marker: the Ni-rich magnesioferrite spinels. Frank then came across core LL44-GPC3 drilled in the Central Pacific Ocean and extracted from it precious information on the KT boundary, and also on the Cenozoic sedimentation history of the Central Pacific Ocean. Frank pursued his KT work in the Pacific Ocean floor by studying several other deep-sea cores, in which, because of the lack of microfossils, the KT boundary had to be identified based on the presence of Ir, such as in holes 595 from DSDP leg 91 and 576 from DSDP leg 86. It is in the KT layer of core 576 that in 1997 Frank bumped into a piece of the KT meteorite, miraculously preserved. As Frank wrote in another

1998 *Nature* article, this 2 cm-size sample demonstrates that a carbonaceous chondrite about 10 km in size formed the Chicxulub crater 65 million years ago.

There is much more to say about Frank's work. For many years Frank patiently scrutinized the sedimentary record for PGE anomalies and ejecta products. In the nineties, he also produced quantitative estimates of the precise amount of shocked material present in the KT layer in the Pacific Region, explained the formation of the Ni-rich magnesioferrite spinels and was one of the crusaders of the impact origin of thick Archean age spherule beds found in the Barberton Group in South Africa.

Frank and I shared his tiny office at UCLA in 1993, an experience that taught me quite a lot not only about neutron activation and lab meticulousness but also about sushi, the stock market, computer games, the 49ers, and cocktails. Frank is indeed an out-of-the-ordinary and complex character. For years, every Christmas he tended bar at San Francisco's most famous Cliff House, an activity he seems to enjoy a great deal and was able to combine with a couple of football games and, since in he was in the Bay Area anyway, the presentation of research papers at the AGU Fall meetings.

Frank is a scrupulous researcher who is never afraid to undertake painstaking tasks, and who always fully and comprehensively documents the papers he writes. He is critical of his own work as well as that of others, and always ready for a good argument. I remember several passionate discussions at meetings about the origin of the "cosmic spinels," or the formation of the Archean spherule beds. At UCLA, Frank also teaches an oceanography class that attracts a wide student audience and is known for its day cruises offshore the Los Angeles harbor.

It was a pleasure to briefly review Frank's career and to write this citation for a respected researcher whom I also appreciate a great deal as a person. Frank certainly deserves his Barringer award, even if he does not work directly on craters. Frank has seen one crater, Gardnos in Norway. As Frank says "most impact researchers work on the hole, I am interested in what gets blown out of the hole."

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