Calcareous nannofossil record of ODP Site 1090 (South Atlantic) before and after the Eltanin impact at ~2.5Ma: Preliminary results

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The Eltanin asteroid impact was first discovered as an Ir anomaly in 1981 (Kyte *et al*., 1981). The impact ripped up Eocene, and probably Paleocene, sediments that afterwards were redeposited in a chaotic assemblage (Gersonde *et al*., 1997). Chronostratigraphic data, obtained from a series of 4 piston cores recovered on the R/V *Polarstern* ANTXVII/5a Cruise, place the Eltanin impact at 2.5 Ma (Gersonde *et al*., 2003). It is the only known asteroid in a deep-ocean basin. Recent results estimate that the asteroid was larger than 1 km (Gersonde *et al*., 2003). Up to now, no crater has been found. Glatz *et al*. (2002) claimed to have found a 132 km crater, but this has been rejected later on (Gersonde *et al*., 2003). The impact might have caused mega-tsunamis, probably visible in sediments throughout the Pacific and Southern Ocean shores, which may have had an effect on the climate by ejection of large amounts of saltwater into the atmosphere (Gersonde *et al*., 1997). Disturbance from the impact clearly extends for about 100 km north and east of the Freeden Seamounts. However, with increasing distance to the north and the east, the concentrations of ejecta decrease and thick deposits of disturbed sediments are not present (Gersonde *et al*., 2003).

In the last decade, scientists have tried to obtain a better understanding of the impact and its consequences. Impact deposits have been recovered from 20 sediment cores. Tsunami deposits of 7-10 m thick, found along the coast of N Chili, might be related to this impact (Felton & Crook, 2003). A study of the sediment cores of the Bellinghausen Sea, made by Flores *et al*. (2002), did not reveal significant changes in the calcareous plankton association for the interval immediately after the impact, but relatively slow sedimentation rates and extensive bioturbation may be indicative of paleoenvironmental changes immediately after the impact. During Leg 178, Site 1096 (at 1300 km from the impact site) was examined to find traces of the impact. In this site, no strong evidence was found that could be related to the impact (Kyte, 2001).

The present study is focused on the calcareous nannofossil record of this particular interval (between 3 and 2 Myr) to see whether or not significant changes in the calcareous nannofossil record can be observed and/or related to the Eltanin impact. For this purpose, material of OPD Hole 1090B, recovered during Leg 177, is studied. This core is situated in the Subantarctic zone of the South Atlantic, on the southern flank of the Agulhas Ridge. A well-preserved nannofossil assemblage is found, in which the most abundant species are *Calcidiscus leptoporus*, *Coccolithus pelagicus*, *Reticulofenestra minuta* and *Reticulofenestra minutula*. Strong fluctuations in the abundance of these taxa are observed and may indicate oceanographic changes during the Late Pliocene interval. It is difficult to determine whether those changes could be related to the Eltanin impact or to other important processes occurring during this time interval (*e.g*., closure of the Isthmus of Panama and the onset of Northern Hemisphere glaciation).

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