N89-21323
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MINERALOGY AND PHASE-CHEMISTRY OF THE CRETACEOUS/TERTIARY SECTION IN THE LATTENGEBIRGE, BAVARIAN ALPS.

G. Graup, Max-Planck-Institut für Chemie, Saarstraße 23, D-6500 Mainz,
Present address:
Field Laboratory of the German Continental Drilling Program, D-8486 Windischeschenbach, Federal Republic of Germany.

The Lattengebirge K/T section reveals three distinct Ir spikes. Two of them are contained in the K/T transition zone sensu strictu termed "clayey interval", with 4.4 ppb Ir at the actual K/T boundary, and 2.8 ppb Ir 10 cm above the boundary. The highest Ir enrichment of 9 ppb, however, was detected in semi-cleaned organic material from a thin sandstone layer of Upper Maastrichtian age at 16 cm below the boundary. In this layer various discernible phases are preserved, contrasting with the worldwide observed K/T transition zones which are generally entirely composed of diagenetically altered materials. Given that, important clues to understanding the Cretaceous terminal events may be provided.

The phases of the Cretaceous Ir bearing layer at Lattengebirge consist of: (1) sandstone fragmental minerals in a carbonate matrix, (2) coal which is partly burnt, (3) melt glasses presumably of combustion-metamorphic origin, and (4) sulfides, mainly chalcopyrite, contained in the coal.

Like many (but not all) known K/T sections and the Lattengebirge boundary sensu strictu, the Cretaceous horizon is enriched in Ir and chalcophile elements as well. However, here the Ir bearing phase can be identified as the sulfides in the coal which yield a concentration of 110 ppb Ir versus 3.6 ppb for the bulk layer. Sulfides in the coal are clearly not the impact-derived carrier phase for iridium. Also, the glasses, contrary to expectations, are neither of impact or volcanic origin. Both processes are ruled out by the extreme chemical heterogeneity of the glasses, with SiO_2 contents ranging from 29% to 79%. This heterogeneity comes from the varied source materials comprising marine, near-shore sediments like high-alumina shale, ironstone, graywacke, and marly sandstone. The Lattengebirge glasses were formed by combustion metamorphism. Sedimentary source rocks are likewise demonstrated by the sedimentary REE pattern of the silicate melt glasses. The sedimentary environment of the source rocks is in accordance with that of coal. Although the Lattengebirge section offers the freshest materials, including melt glasses, of all K/T localities investigated, no unequivocal evidence of formation by impact has been found there.