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THE PALEOGENE RECORD OF THE RHENODANUBIAN FLYSCH: TECTONIC AND CLIMATIC IMPLICATIONS

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The Paleocene to lowermost Eocene formations of the Rhenodanubian Flysch were deposited in an abyssal environment, at the continental rise to the south of the European Plate. The pattern of paleocurrents indicates a number of small distributary systems for the turbiditic material, which entered the basin from the north and was deflected to the east and to the west. Heavy mineral assemblages in the turbidites suggest the erosion of medium-grade metasediments in the Danian and the progressive erosion of underlying metamorphic magmatic rocks in the Thanetian and Ypresian.

The most obvious sedimentary event is the breakdown in turbidite sedimentation during the late Danian to the early Thanetian. Remarkably, this death of turbidites is associated with high values of chlorite in the clay mineral assemblages of interturbidite shales, indicating increased mechanical erosion of the adjoining land areas. Tectonic uplift of these areas and associated block faulting and tilting is assumed to be responsible for this increase in erosion as well as for the synchronous cutting off of the basin from the source area of the turbidites. This tectonic activity is related to the onset of the collision of the European and the Adriatic Plates. A second major event documented in the Paleogene record is the change from a predominantly siliciclastic system to a carbonaceous system in the upper Thanetian. Associated with the global negative carbon isotope excursion (CIE) in the upper part of calcareous nannoplankton zone NP9 is a strong three-fold increase in the rate of hemipelagic sedimentation. This indicates enhanced continental run-off, which probably was the result of the establishment of a monsoonal climate. This is supported by the composition of clay mineral assemblages, which display a slight increase in kaolinite. The top of the enhanced kaolinite input is poorly constrained because of a very high input of smectite due to volcanic activity in sub-zone NP10a. This igneous activity is assigned to the opening of the Northern Atlantic Ocean and has no geodynamic relevance for the Rhenodanubian Basin.