



New U-Pb zircon-dating constraints on the age and origin of allochthonous bauxite deposits of Languedoc (Southern France): geodynamic consequences.

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In southern France, the dominantly carbonate Jurassic to Neocomian formations underwent a major erosional/weathering hiatus ranging from Dogger to Maastrichtian, which is outlined by bauxite deposits trapped on top of karstified Jurassic limestone. This hiatus is restricted to Aptian-Albian in some areas. This particular period corresponds to the inversion of the Tethyan margin (referred to as the “Durancian Isthmus”) and, is contemporaneous with 1) rifting and mantle exhumation in the Pyrenees, 2) Variscan basement denudation in the southern French Massif Central revealed by Apatite Fission Track analyses and 3) subsidence along EW-oriented basins in the Northern Pyrenees and southern Provence. The erosional and weathering products, as detrital bauxites of Languedoc, offer the opportunity to address the question of the geodynamic link between all these events.

In order to investigate the origin of the reworked bauxites, we performed LA-ICP-MS U-Pb dating of detrital zircons from 3 karst bauxite basins, stretching from Bédarieux (close to present-day Variscan French Massif Central) to Cambelliès (close to the Mediterranean Sea).

The discovery in the bauxites of volcanic zircons dated from 113 to 117 Ma constrains the age of the bauxite event, which is bracketed between early Albian (volcanic zircons) and latest Albian (biostratigraphic ages determined by marine foraminifera inside sandstone capping the bauxites).

In addition, analysed detrital zircons display ages ranging from 300 Ma to 3.5 Ga. The most important populations yield Neoproterozoic (550-700Ma), Mesoproterozoic (1100Ma) and Paleoproterozoic (1700-2700Ma). This suggests that allochthonous bauxites deposits of Languedoc represent reworked weathering horizons derived from i) Variscan basement, progressively exposed to erosion and ii) from the reworked marly limestones of early Neocomian age which extended across the whole area.

These new results bring constraints on the geodynamic evolution of southern Europe during the Cretaceous.