



Clastic sedimentology and detrital geochronology: deciphering the growing phase of the Variscan belt.

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The late Palaeozoic Variscan Orogeny results from the convergence between two major plates: Laurussia and Gondwana. The relief created during the Variscan Orogeny has now been completely eroded away. However, the Devonian and Carboniferous sediments potentially record the birth of the relief and the exhumation of rocks during the early stages of this orogenesis. A multidisciplinary approach (structural, sedimentology and geochronology) is used in order to constrain the palaeogeography and the nature of the material being eroded during the growth of the Variscan belt. More specifically, two detrital dating methods, U/Pb on zircon and ^{39}Ar - ^{40}Ar on white mica, are used as complementary tools in order to decipher the age of the detrital material sources.

The weakly deformed Ordovician to Carboniferous sediments of the Mauges Unit (South-Armorican Domain, France) are located in the internal zones of the Variscan belt. Two Formations, respectively the Sainte-Anne Fm of Emsian (late Lower Devonian) age and the Ancenis Fm of Visean (Lower Carboniferous) age, are made up of gravity flow deposits that record the creation of a nearby relief.

The pre-orogenic Sainte-Anne Fm consists of immature sandstones with a large amount of lithic fragments of mainly sedimentary and volcanic origin. Among the detrital zircons analyzed, a population dated at ca. 400 Ma is therefore contemporaneous to the sedimentation and is interpreted as volcanic in origin. Considering the tectonic setting proposed for the area, these detrital zircons could record the creation of a magmatic arc.

The late-orogenic Ancenis Fm was deposited after the crustal stacking that occurred close to the Devonian/Carboniferous boundary (Champtoceaux Complex, Bosse et al., 2000; Pitra et al., 2009). Carboniferous sedimentation took place in a basin preserved due to a reactivation of the suture zone. The Ancenis Fm is a lacustrine to continental deposit, 3- to 6 km thick, and displays a coarsening-upwards mega-sequence; this implies that relief and subsequently the material removed were increasingly closer to the sedimentation area. This trend is associated with surface uplift and the progressive exhumation of Variscan magmatic and metamorphic rocks, as shown by the progressive appearance of younger zircons and/or white micas in the detrital record. In this study, the detrital record within the basin will be compared to the evolution of metamorphic and magmatic rocks in underlying units.