Die variskische Entwicklung des Südwestlichen Aiguilles-Rouges-Massives (Westalpen, Frankreich)

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Petrological, geochemical and structural investigations were stressed to unravel the Variscan evolution of the southwestern Aiguilles Rouges Massif, a relic of the pre-Mesozoic basement of the Helvetic realm. The investigated area is built up by nine lithotectonic units: - Two gneiss units and a greenstone unit which likely evolved at an active margin (whole rock geochemistry, XRF and ICP-MS), which probably existed already before the Variscan hypercollision. - A Visean basincomprises detritical sediments and volcanic rocks. The geochemical composition of the latter points to an extensional environment during the basin formation, which was probably forced by orogenic activity. - The granites of Montées-Pélissier and of the Pormenaz intruded syncinematically in dextral transpressive shear zones. - The formation of the intramontaneous Pormenaz-Coupeau basin, presumably linked to active faults, began in Westfal D and continued until the boundary between Carboniferous and Permian. - Autochthonous and parautochthonous mesozoic cover, Morcles nappe and autochthonous Upper Carboniferous sedimentary rocks were deformed only during Alpine orogeny. At the base of the Morcles nappe exists an allochthonous slice of Upper Carboniferous rocks ("Vervex-unit"). Deformed Late Visean rocks and undeformed Westphalian D sediments limit the age of all observed Variscan structures to Namurian to Westphalian C. A first foliation s1 with a subvertical stretching lineation str1 is macroscopically rarely preserved. The mainly subhorizontal str2 strikes N-S parallel to the subvertical pervasive foliation s2. Shear sense criteria show relative dextral movements under simple shear. Strain analysis in the Montées-Pélissiers granite proved an oblate strain for the deformation after the syn-D2 granite emplacement. The continuation of the transpression during retrogressive metamorphism is supported by the structures evolved post-D2.The formation of the Upper Carboniferous basin (Westphalian D) was triggered by an extensional stress field. Geothermobarometric investigations yielded anti-clockwise rotated P-T-t-d-paths with a T-maximum above 700°C and a subsequent P-climax at about 11 Kb and already lower T for the gneiss units. Contrarely, the zonation of amphiboles in the greenstone unit result in a clockwise rotated P-T-t-d-path with 620°C and 6.7 Kb maximum conditions. All paths show quasi isothermal compression and decompression segments as indicators for active burial and uplift. The different path forms are due to the overthrust of the less hot greenstones above the gneisses. The Visean schists suffered a middle greenschist facies metamorphism. Hiatusses of metamorphism and forms of P-T-paths let suppose that juxtaposition of the units occurred during the Mid Carboniferous collision.