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Exhumation of the Saualpe eclogite unit, Eastern Alps: constraints from ^{40}Ar/^{39}Ar ages and structural investigations

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The Cretaceous-aged eclogite-bearing unit and its tectonic overburden of the Saualpe, Eastern Alps, have been investigated in order to constrain the mode of exhumation of the type locality of eclogites. ^{40}Ar/^{39}Ar ages of white mica from the eclogite-bearing unit suggest rapid, uniform cooling and exhumation between ca. 85.6 and 78.1 Ma considered to represent Santonian-Campanian cooling and exhumation. Overlaying units show upwards increasingly older ages with an age of 261.7 +/- 1.4 Ma in the uppermost low-grade unit (Lower Magdalensberg Group). We consider this Permian age as geologically significant and record a Permian tectonic event. Biotite and amphibole of all units show variable contents of extraneous argon. Consequently their ages are geologically meaningless. A major ductile normal fault has been detected between the eclogite-bearing and the overlying units. This observation argues for rapid exhumation of a subducted high-pressure wedge within a subduction channel. Rapid erosion of the exhuming wedge facilitated exhumation. Eroded Sedimentary rocks are preserved within adjacent Gosau basins, although only low-grade rocks of the uppermost tectonic unit can be found.