FISSION TRACK GEOCHRONOLOGY IN FRENCH-ITALIAN WESTERN ALPS : MAIN RESULTS AND TECTONIC CONSEQUENCES.

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The Western Alps offer an exceptional opportunity to study in details the mechanisms of continental collision. Numerous data have been obtained from metamorphic petrology (i.e. P-T paths characteristic of high to ultra-high pressure and low temperature metamorphism), from geochronology of High Pressure rocks (Sm/Nd, U-Pb, Lu-Hf, Ar-Ar...) and from structural and geophysical investigations. However, up to now very little is known about cooling history of HP rocks below 300°C. We therefore investigate zircon and apatite fission track dating from meta-ophiolites of the Western Alps.

This area was metamorphosed under blueschist and eclogite facies conditions and results from the tectonic coupling of contrasted tectonometamorphic units. The easternmost Monviso unit area suffered eclogite facies conditions P>15 kb and T>500°C. The Queyras Schistes Lustrés underwent a progressive eastward blueschist metamorphism increasing from 6-8 kb and T ≤300°C in the West Queyras to P >9-10 kb and T≈350-400°C in the East Queyras. On the other hand, the Chenaillet massif escaped Alpine metamorphism.

The salient fission track results are:

-In the eclogitic ophiolites (Monviso) the ages are 19.6±0.8 Ma on zircon and 8.6±1.7 Ma on apatite

-In the East Queyras zircon ages range from 26.9±1.5 Ma to 21.9±1.2 Ma and apatite range from 14.2±1.9 to 9.4±1.1 Ma

-In the West Queyras zircon ages range from 91.4±1.9 Ma to 64.2±1.8 Ma and apatite range from 22.3±1.6 to 21.9±0.8 Ma.

-The ophiolites without Alpine metamorphism (i.e. Chenaillet massif) yield ages of 118.1±3.7 Ma on zircon and of 65.1±5.9 Ma on apatite

These results support a diachronic cooling histories for the different tectonometamorphic units, well recorded in the eclogitic and East Queyras area. In the West Queyras, the older zircon fission track ages might be related to the low temperature conditions during metamorphism. In these case zircon fission track ages cannot be interpreted as a cooling ages but correspond to mixed ages between a magmatic (crystallisation) and metamorphic ages. In the East Queyras, the coupled dating on zircon and apatite give us cooling ages below 240 and 100°C, which allows a cooling rate about 8-11°C/Ma to be obtained for the studied area. We combine these new data with avalaible geochronological constraints from the same area in order to discuss burial and exhumation processes in Western Alps.