



Very young and fast exhumation, between 8 and 5 Ma, for the high pressure metasediments of Lengguru prism, W-Papua

Julia de Sigoyer (1), Camille François (2), Alain Cocherie (3), Manuel Pubellier (1), Vivien Bailly (4), and Jean-Claude Ringenbach (4)

(1) ENS, Paris, France, (sigoyer@geologie.ens.fr), (2) IPG, Paris, France, (3) BRGM, BP 36009, Orléans cedex 2, France, (4) TOTAL S.A., Pau, France

High pressure metasediments together with retrogressed eclogites and migmatites have been found in the internal part of the Lengguru prism (Wandamen peninsula, W-Papua).

The tectonic context is very active in this area with convergence rate between Australia and Caroline plates that reach 11 cm/yr.

Our tectonic study (Bailly et al., 2009) shows that the Lengguru prism was built between 11 and 2 Ma. It is now in an EW extensional context as attested by earthquake mechanism.

The metasediments outcropping in the northern part of Wandamen, present High Pressure paragenesis with garnet, phengite, kyanite that has crystallised at about 12 ± 3 kbar 600 ± 50 °C. The second metamorphic stage is related to a strong NS stretching and characterized by the imprint of sillimanite and biotite, consuming the first paragenesis during the decompression at 6-8 kbar 680-730 °C, leading to a local migmatisation of metasediment.

Thirty zircon grains from this metagreywackes rocks were dated by U-Pb method using LA-MC-ICPMS (Cocherie et al. 2009). The cathodoluminescence characterization of the zircons shows metamorphic rims around inherited cores. Some zircons included in metamorphic garnet were extracted with a micromill. These zircons and the metamorphic rims of the other zircons give age between 8.1 ± 1.1 Ma to 5.3 ± 0.2 Ma. In the less retrogressed sample characterized by the high pressure paragenesis most of the metamorphic ages are close to 8-7 Ma. While on more retrogressed sample age of 5 to 6 Ma are mainly obtained. The age of zircon cores ranges from 388 ± 27 Ma up to 1484 ± 49 including 636 ± 32 Ma and 736 ± 30 Ma.

These results suggest a high pressure event at about 8-7 Ma related to the subduction of these sediments, followed by their exhumation associated with the migmatisation only 1 or 2 Ma after their burial.

The age of high pressure metamorphism is the younger one ever documented (as young as the d'Entrecasteau one 8 Ma) (Baldwin et al., 2005). It the faster exhumation ever documented for high pressure rocks.

These results bring strong constrain on the process able to exhumed rocks so quickly in a convergent context. The temperature increase during this rapid exhumation suggested a context of break-off or it may due to a subduction retreat. These results bring also precious information on the tectonic processes involved in the prism formation suggesting the very rapid maturation of a prism able to "produce and exhumed" metamorphic rocks in less than 5 Ma.

- Bailly, V; Pubellier, M; Ringenbach, JC; de Sigoyer, J.; Sapin, F., 2009, Deformation zone Jumps, in a young convergent setting; the Lengguru fold-and-thrust belt, New Guinea Island, *Lithos*, vol:113 Issue: 1-2, 306-317

- Baldwin S. L., Monteleone B., Webb L., Fitzgerald P., Grove M., Hill E., 2005, Pliocene eclogite exhumation at plate tectonic rates in eastern Papua New Guinea, *Nature* 431, 263-267 (16 September 2004) doi:10.1038/nature02846

- Cocherie, A.; Fanning, C.M.; Jezequel, P.; Robert, M., 2009, LA-MC-ICPMS and multi-ion counting system, and SHRIMP U-Pb dating of complex zircons from quaternary tephras from the French Massif Central: magma residence time and geochemical implications. *Geochim. Cosmochim. Acta*. 73, 1095-1108.