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Experimental Study of the Blueschis and Marble-bearing High Pressure Metamorphic Belt of Rongma Area in the Central Qiangtang, Tibet

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A 500-km-belt of metamorphic exposures in the central Qiangtang block provides an opportunity for us to study subduction process of Paleo-Tethys Ocean [1,2]. The occurrence of Ca-rich blueschists and glaucophane-bearing marbles on this metamorphic belt are noteworthy because reports of marbles with glaucophane are rare among descriptions of high-pressure marbles. However, the maximum of metamorphism of this belt is highly debated because the traditional geothermobarometer cannot be confidentially extrapolated to more complex composition of metamorphic belt (especially with lithologic mixed). In order to constrain this behaviour, a series of piston–cylinder experiments were performed at pressures from 1.2 to 1.8 GPa and temperatures from 600 to 800 °C. The starting composition representative of Rongma high pressure metamorphic belt (synthesised with 93%basalt, 7%limestone and excess H2O at 1.8 GPa and 600 °C producing a glaucophane + barroisite + plagioclase + diopside assemblage) was run for 168 hours. This experiment demonstrates that this condition may be at or near the maximum of metamorphism. Another experiment was run for 48 hours at 1.2 GPa and 800 °C, producing a barroisite + winchite + plagioclase assemblage which are very similar to the assemblage of retrograde phase and suggest that this stage is a exhumation process followed by a decrease of pressure and increase of temperature. Our conclusion is an important supplement for subduction process research.

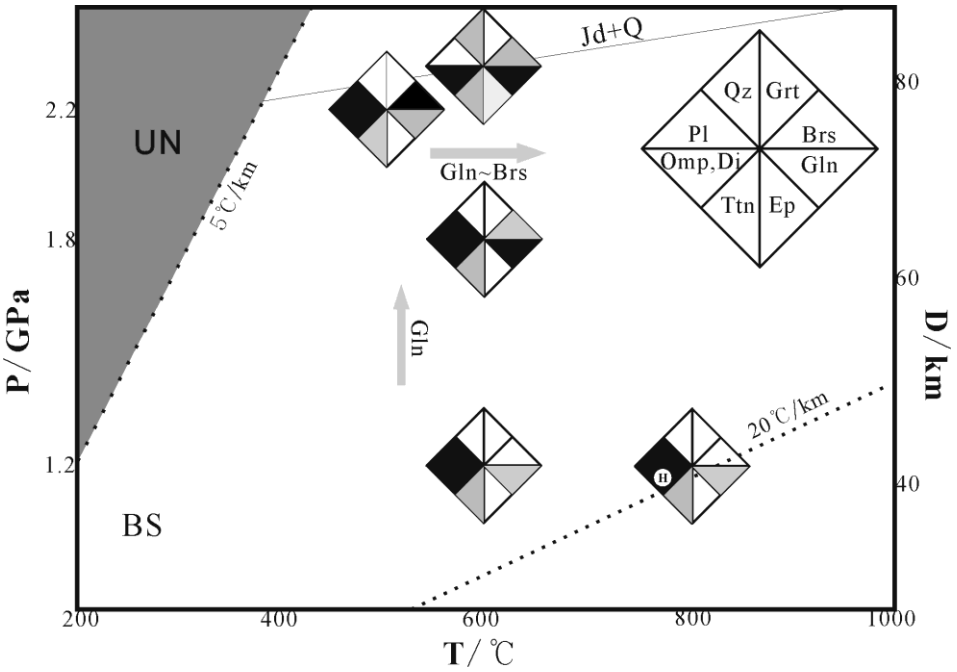

Figure 1: *Phase diagram constructed from the results of 5 runs*

References:

[1] Li J.C. et al. (2015) Acta Petrologica Sinica 31(7): 2078-2088.
[2]Zheng Y.L. (2015) Acta Petrologica Sinica 31(4):1137-1152.