



## **Tectono-metamorphic evolution of the Paleoproterozoic ultra-high temperatures Khondalite Belt, North China Craton.**

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In the North China Craton, the Khondalite belt is a famous Paleoproterozoic domain where ultra-high temperatures (UHT) metamorphism was extensively documented over an area of 1000 square kilometers. Numerous petrological analyses argue for P-T conditions around 0.6-0.8GPa for temperature above 900°C for peak metamorphism. Unfortunately, the scarcity of available structural data prevents any discussion about thermo-mechanical behavior of the orogenic crust suffering high thermal regime.

In this contribution, we present a detail structural analysis of the Khondalite belt that allowed to distinguish two main deformation events, named D1 and D2. The deformation D1 led to the formation of the S1 foliation that dips weakly toward the South-East. S1 holds a N70°E trending mineral and stretching L1 lineation that is sub-horizontal or plunges weakly to the East. The D1 fabrics is reworked by the dextral transpressional D2 deformation responsible for the development of km-scale S2-C2-C'2 system. The N30°E trending S2 foliation is sub-vertical to highly dipping toward the East. Kilometer-scale C2 and C'2 shear zones are sub-vertical and trend N70°E and N90-100°E, respectively.

Petrological study and phase diagram modeling suggest that both D1 and D2 developed at UHT conditions. Garnet and spinel-bearing migmatites recording D1 fabric yield 0.7GPa for ca. 950-1015°C P-T conditions. Within D2 shear zones, numerous granitoids and mafic bodies are injected. Mafic intrusions are responsible for UHT contact metamorphism that can occur at low pressure as recorded in an olivine-bearing migmatite. This may suggest that the D2 S-C-C' system form an interconnected network of kilometer scale shear zones that act as pathways for percolation of mafic magmas from the mantle up to the base of the upper crust.

Our results allow to discuss the role of localized heat advection along crustal-scale shear zones as a possible mechanism responsible for UHT metamorphism at regional scale, with important implications for the thermo-mechanical behavior of the orogenic crust.