

# **Estimation of peak metamorphic temperatures of the Yukon-Tanana Terrane, Yukon, through the Raman carbonaceous-material geothermometer**

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The Yukon-Tanana terrane (YTT) is one of the pericratonic terranes that constitute the North American Cordillera accretionary orogen in Yukon, Canada. Widespread regional metamorphism occurred in YTT, associated with its accretion to the western margin of Laurentia. Metamorphism in the YTT developed in a diachronous manner across different regions of the terrane from the Late Permian to the mid-Cretaceous, reaching a general amphibolite-facies metamorphic grade. Peak metamorphic temperatures between ~600-670°C have been constrained for YTT rocks in the Stewart River region, in west-central Yukon, by petrology and phase equilibria modelling. However, petrographic observation has suggested lower metamorphic grades for other areas in the YTT, such as in the Thirtymile-Wolf Lake and eastern part of the Finlayson Lake regions, suggesting that peak metamorphic temperatures could have been different in other areas of the terrane.

In this study we applied the Raman spectroscopy of carbonaceous materials (RSCM) geothermometer on carbonaceous metasedimentary rocks of the YTT, in order to provide new constraints about the peak metamorphic temperatures in different areas of the terrane. The RSCM technique is based on the irreversible process of graphitization that carbonaceous materials undergo at increasing temperatures, which increases their crystallinity, recording the peak temperature reached by each sample. We considered samples of the Finlayson and Snowcap assemblages, from the Thirtymile and Dunite Peak regions, in southeast Yukon, and from the Stewart River and McQuesten regions in west-central Yukon.

Our preliminary results show lower peak metamorphic temperatures in metasedimentary rocks from the Thirtymile and Dunite Peak regions compared to the previously reported ones for the Stewart River region. In Thirtymile, metasedimentary rocks of the Finlayson assemblage show RSCM temperatures between  $462 \pm 30^\circ\text{C}$  and  $476 \pm 32^\circ\text{C}$  ( $\pm 2\sigma$ ), while in the Dunite Peak area, the RSCM temperature range is between  $496 \pm 36^\circ\text{C}$  and  $517 \pm 50^\circ\text{C}$ . The confirmation of these results with more RSCM analyses, as well as their interpretation, will be considered in subsequent studies.