Geophysical Research Abstracts
Vol. 17, EGU2015-8132, 2015
EGU General Assembly 2015

Syn- to post-Taconian basin formation in the Southern Québec Appalachians, Canada: constraints from detrital zircon U-Pb geochronology

Morgann Perrot, Alain Tremblay, and Jean David
GEOTOP, University of Québec in Montréal, Canada (perrot.morgann@gmail.com)

In Southern Québec, In the Southern Quebec Appalachians, the Laurentian continental margin (Humber zone) and adjacent oceanic domain of the Dunnage zone were amalgamated during the Ordovician Taconian orogeny. The Dunnage zone includes ophiolites, overlying synorogenic Ordovician deposits of both the Saint-Daniel Mélange and Magog Group and the remnants of a peri-Laurentian volcanic arc, the Ascot complex. However, recently-acquired detrital zircons geochronological data challenge some aspects of the formation and evolution the Magog Group as documented so far.

The Magog Group consists of ∼3 km pile of sandstone, felsic volcaniclastic rocks, graphitic slate and sandstone at the base (Frontière, Etchemin and Beauceville formations) overlain by a ∼7 km-thick of a turbidites flysch sequence, constituting the St-Victor Formation at the top. The maximum age limit for the Magog Group is currently considered to be Caradocian based on graptolite fauna. This has been proven consistent with a 462 +5/-4 Ma (U-Pb ID-TIMS) from a felsic tuff of the Beauceville Formation, but in obvious contradiction with a detrital zircon U-Pb age of 424 [U+F0B1] 6 Ma recently measured in the St-Victor Formation. A detrital zircon U-Pbgeochronology study (LA-HR-ICPMS), focused on the St-Victor Formation, has been therefore initiated in order to better constrain the age and tectonic evolution of the Magog Group. Results were treated according to a Bayesian mixture modeling to highlight different age populations. A feldspar-rich sandstone, directly overlying the Ascot Complex (ca. 460 Ma) and belonging to the base of the St-Victor Formation, yielded ages as young as 431 ± 3 Ma (Wenlockian). Higher in the stratigraphy, a quartz-feldspars sandstone sample contains zircons as young as 419 ±2 Ma (Pridolian). Finally, another sandstone sample from the stratigraphic top of the analyzed sequence yielded a bimodal age distribution, showing prominent populations clustering around ca. 950 Ma and ca. 435 Ma.

These preliminary results suggest a time gap as high as 30 m.y. between the St-Victor Formation and underlying rocks of the lower Magog Group and the Ascot Complex. Combined with current mapping in southern Quebec, this implies the probable occurrence of a major unconformity at the base of the St-Victor, and suggests that a large part of the Magog Group sedimentary sequence has been the result of post-Taconian sedimentation rather than that of a typical forearc sequence as commonly reported in literature.