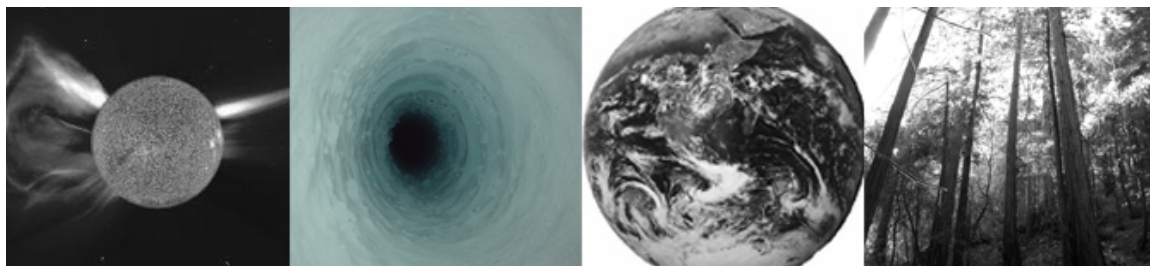


# Environmental Sciences And **CREATE** Seminar Series

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## The analysis of chemical zoning of a garnet population: Determination of the P-T-t path of Grenvillian metamorphism in the Mazinaw Domain, southeastern Ontario

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Earth Sciences instructor and St. FX alumna

Growth zoning of a population of garnet porphyroblasts has been successfully used to infer the metamorphic P-T-t history of a sample. The studied sample is a garnet-biotite-staurolite bearing metapelite of the Flinton Group, a package of metasediments in southeastern Ontario metamorphosed during the Grenville Orogeny (ca. 1089-980 Ma). Characterization of the garnet population with high-resolution X-ray micro-computed tomography revealed a unimodal, slightly positively skewed crystal size distribution (CSD). Garnet porphyroblasts ranging from 4000 to 200  $\mu\text{m}$  in diameter from the different size classes of the CSD were centrally sectioned. EPMA analysis of the centrally sectioned porphyroblasts revealed decreasing  $X_{\text{spss}}$  and  $X_{\text{grs}}$  and increasing  $X_{\text{alm}}$  and  $X_{\text{pyp}}$  from core to rim consistent with a prograde zoning. Garnet growth simulations with the THERIA\_G software were used to reproduce the observed growth zoning along a specific P-T-t path. Large porphyroblasts of the population were used to determine a clockwise P-T path over the interval 3.7 to 5.9 kbar and 513 to 615°C while modification of growth zoning via intracrystalline diffusion in relatively small porphyroblasts was used to infer an average heating rate of 2°C Ma<sup>-1</sup>.

All are welcome.

Thursday, **October 17<sup>th</sup>**, 2013

1:15 – 2:05PM

Physical Sciences Centre 2045

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