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## Paleomagnetism of Metamorphosed Sudbury Dykes, Canada: Relevance to a Theory of Crustal Shortening across the Grenville Collisional Orogen

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The 1.235 Ga ESE-trending Sudbury dyke swarm cuts Paleoproterozoic to Archean rocks, but at its SE end becomes deformed and metamorphosed by the ~ 1 Ga Grenville orogen, a result of collision between Laurentia and another continent, thought to be Amazonia.

The Grenville orogen is characterized by a parautochthon that runs the length of the Grenville Province and which is separated from allochthonous terranes to the SE by the Allochthon Boundary Thrust (ABT). Both terranes are the result of the 1.09 - 1.02 Ga Ottawa orogen, the main collisional event.

Paleomagnetic results from metamorphosed Sudbury dykes and from a meta-gabbro anorthosite about 2.47 Ga old, define a direction of magnetization (shallow down to the ESE) that characterizes the parautochthon, and which differs profoundly in direction from the neighbouring allochthonous terrane which carries a steep up

magnetization to the WNW. These magnetizations are thought to represent the result of metamorphism and uplift following respectively late and early stages of the Ottawa orogen.

A model is presented, suggesting that the uplifted allochthonous terrane was carried NW on the ABT and a succession of progressively deeper thrust faults for several thousand kilometers<sup>1</sup>. Since the allochthonous terrane is considered to be part of Laurentia, a possible implication is that Laurentia was shortened by several thousand kilometers in a NW direction, as a result of the Ottawa orogen. If true, the shape of Laurentia prior to the orogen may have been sufficiently different from what it is today, to impact pre -1.1 Ga continental configurations.

### References

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