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**An equatorial Laurentia at 550 Ma confirmed by Grenvillian inherited zircons dated by LAM ICP-MS in the Skinner Cove volcanics of western Newfoundland**

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Volcanic rocks of the Skinner Cove Formation of western Newfoundland carry a primary remanence acquired at 550 Ma at a paleolatitude of 19°S. There has been doubt that this represents the latitude of the Laurentian margin at 550 Ma, because the Skinner Cove Formation is allochthonous. We present new evidence from inherited zircons in the volcanic rocks that should remove this doubt. Zircon crystals extracted from an ankaramite flow and a trachyte flow were dated individually by measuring U-Th-Pb isotopes for ~30 × 30 μm areas using a laser ablation microprobe (LAM) linked to an inductively-coupled-plasma mass spectrometer (ICP-MS). Most of the zircons from the ankaramite are concordant and yield a 550±5 Ma date indistinguishable from the 550+3/-2 Ma date previously reported using multi-grain thermal ionization mass spectrometry. About half of the zircons from the trachyte are

also concordant yielding an overlapping date of  $556 \pm 5$  Ma. The other half cluster at  $\sim 1000$  Ma and at  $1500\text{--}1600$  Ma, which are characteristic ages of the Grenvillian basement exposed nearby in the Long Range Inlier. These zircon xenocrysts were very likely picked up as the Skinner Cove magma ascended through Grenvillian basement of the Laurentian margin. There can now be little doubt that the  $\sim 19^\circ\text{S}$  Skinner Cove paleolatitude represents Laurentia's southern margin at 550 Ma. This makes it unlikely that Laurentia changed from south polar at  $\sim 523$  Ma to equatorial at  $\sim 508$  Ma due to a rapid  $\sim 90^\circ$  change in the Earth's rotation axis. (This  $\sim 90^\circ$  polar change, causing methane release, has recently been proposed as a trigger for the Cambrian faunal explosion.)