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Emplacement Temperatures of Voluminous Siberian Traps Volcaniclastic Deposits

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The Siberian Traps are one of the largest known continental flood basalt provinces, with a total volume of approximately 4,000,000 km3. The eruption has been invoked as a possible trigger for the end-Permian mass extinction. Explosive deposits generally constitute a minor component of continental flood basalts. But up to 25% of the extrusive volume of the Siberian Traps consists of mafic tuffs, which dominate the base of the stratigraphy in many areas. These explosive episodes may have increased the environmental impact of the Siberian Traps. The extent and origin of the tuffs is not well known; they may represent some combination of phreatomagmatic, phreatic, and degassing-driven explosive eruptive deposits, along with reworked volcaniclastic units. Previously, paleomagnetic conglomerate tests have been used to determine emplacement temperatures for volcaniclastic deposits. We present preliminary results from paleomagnetic analysis of lithic fragments contained within samples from the >200 meter thick tuffaceous deposits along the Angara River in central Siberia. We hope to employ these measurements to determine temperature of emplacement of these tremendous volcaniclastic deposits. Emplacement temperatures can help to positively identify pyroclastic deposits, and as such they are an important clue to the style of early Siberian Traps eruption. For volcanic eruption to generate global consequences, delivery of material to the stratosphere is crucial. Episodes of explosive eruption may have elevated the efficiency with which degassing Siberian Traps volatiles were entrained into an ascending thermal plume. Estimates of emplacement temperature can help to differentiate poorly sorted pyroclastic deposits from lahar or alluvial deposits. By extension, assessment of emplacement temperatures may shed light on the extent of pyroclastic volcanism and therefore on the potential climatic impact of this late Permian or early Triassic eruption.