

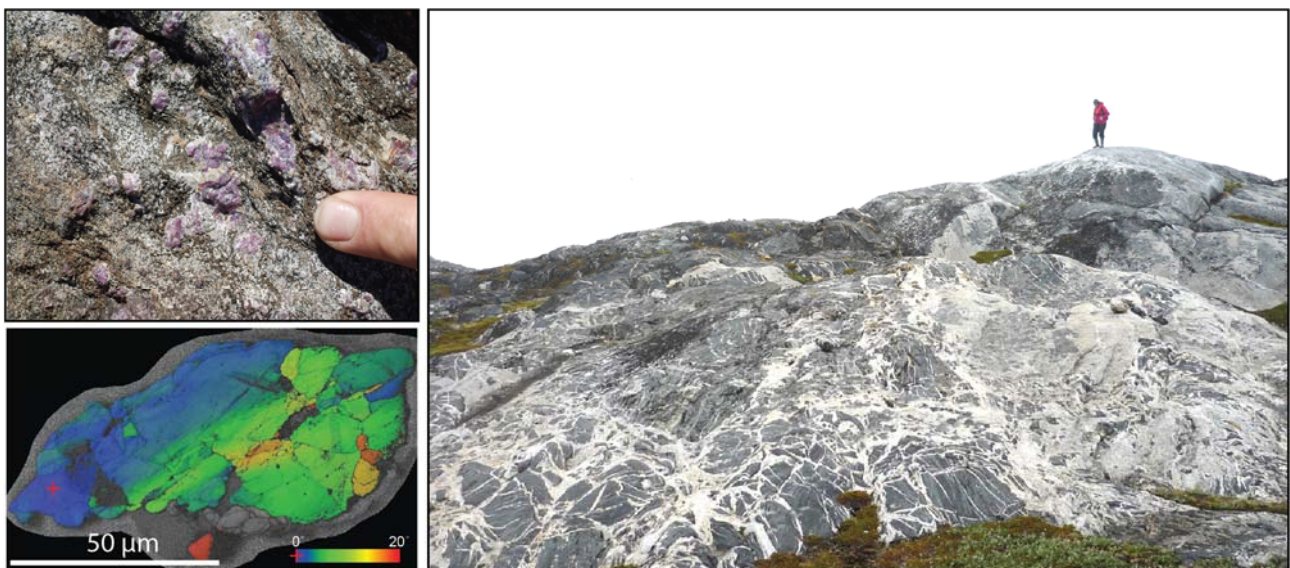
Seminario

Ancient impacts, early life, and gemstones: Insights into the Archean Eon from southern West Greenland

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The Akia Terrane of southern West Greenland hosts several peculiar geological features that record a transitional period in global geodynamics during the Archean Eon. The terrane is dominated by grey gneisses, metasedimentary rocks, and ultramafic complexes metamorphosed to granulite-facies conditions. In the northern Akia Terrane, microstructures and structural map patterns have been used to argue that the ~100 km wide Maniitsoq structure formed from a giant meteorite impact at 3.0 Ga; however, diagnostic evidence of impact metamorphism is absent. Some of the impact-like features may be the result of long-term polyphase deformation and high-temperature metamorphism associated with modern-style horizontal plate movements. The southern Akia Terrane hosts gem-quality corundum (ruby–sapphire) that is locally mined and may have grown during the tectonic juxtaposition of exhumed ultramafic blocks with aluminous (meta)sedimentary rocks at 2.5 Ga. This corundum contains graphite with biogenic carbon isotope signatures. Metamorphic phase equilibrium modelling indicates burial of this surficial material to depths >15 km. Taken together, the field, petrological, temporal, and metamorphic constraints from the Akia Terrane indicate that a modern-style geodynamic regime operated in the Neoproterozoic in southern West Greenland.

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