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Talk title	Meso-Neoproterozoic Paleomagnetism of Southern Namibia: Supercontinental Configurations, Structural Rotations, and Stratigraphic Correlations
By	David A.D. Evans, Dep't. of Earth & Planetary Sciences, Yale University
Date	Thursday, 7th of July 2023
Time	17h45
VENUE	To be Confirmed

Abstract:

"Meso-Neoproterozoic Paleomagnetism of Southern Namibia: Supercontinental Configurations, Structural Rotations, and Stratigraphic Correlations"

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Paleomagnetism can be a powerful tool in reconstructing ancient supercontinents, testing regional structural models, and informing stratigraphic correlations. When a key reference paleomagnetic pole exists for a given craton, such as the Umkondo large igneous province (LIP) across Kalahari at ca. 1110-1100 Ma, then that pole can constrain the reconstruction of that craton in an ancient megacontinent or supercontinent. It can also serve as a benchmark for evaluating whether Kalahari-marginal terranes were autochthonous or allochthonous, or whether they experienced local rotations. The resolution of such methods is usually on the order of ~10 degrees, expressed either as a local rotation of that amount or a translation of ~1000 km (1 degree of arc distance on the Earth's surface is equivalent to 111 km).

Examples from southern Namibia are presented. In the Sinclair region, volcanic and sedimentary strata of the Guperas and Aubures Formations show paleomagnetic remanence directions that are indistinguishable from the Umkondo direction from autochthonous Kalahari. A bimodal dyke swarm intruding the Guperas Formation, but not the Aubures redbeds, is dated at 1105 Ma, confirming that its magmatism belongs to the Umkondo LIP. These data show that the Sinclair region has not significantly rotated or translated relative to Kalahari craton since the late Mesoproterozoic. In addition, Aubures redbeds show a similar paleomagnetic pole to that of the Umkondo, suggesting that the Aubures Formation is not substantially younger than ca. 1100 Ma. In the Rehoboth region, the Opdam (Bitterwater Member) and Doornpoort Formations yield directions that are similar to each other, suggesting that the Doornpoort is also ca. 1100 Ma in age, correlative to the Aubures, and part of a widespread system of late-Namaqua molasse deposits that includes the Kalkpunt Formation in the Koras basin of South Africa. Paleomagnetic fold tests show that both the Sinclair and Rehoboth regions experienced mild deformation during sedimentation within those basins.

The Rehoboth inlier data however, are systematically offset from correlative Sinclair results by about 30 degrees (clockwise). Earlier paleomagnetic results (Piper, 1975), documenting likely mid-Cambrian magnetic overprinting of the southern Rehoboth inlier, are also offset from the Gondwanaland apparent polar wander path by a similar amount. Given these datasets both old and new, it is proposed that the entire Rehoboth basement inlier rotated clockwise during later stages of the Damara orogeny. The rotation could have involved an internally rigid block around a pivot point near the Naukluft syntaxis, or it could have been distributed through numerous small-scale shear zones across the Rehoboth region. Further paleomagnetic study of the southern Rehoboth homoclinal cover succession (Doornpoort/Klein Aub/Kamtsas Formations) will test the timing and magnitude of the proposed rotations. They may also help test a recently proposed Rodinia supercontinent reconstruction model that places Kalahari craton adjacent to the northwestern rather than southern margin of Laurentia.

