Tracking a Jurassic reversal of the Earth's magnetic field

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Roughly 180 million years ago, during the height of the Jurassic period, the Earth's magnetic field flipped, bringing the magnetic north pole once again into the Northern Hemisphere.

This so-called van Zijl reversal, named for the researcher who first described it, is the second-oldest well-documented geomagnetic reversal. Such perturbations of the Earth's magnetic field, which tend to take place over about 10,000 years, and possibly much less, have been identified as occurring up to several billion, and as recently as 780,000, years ago. An open question exists about the effect of such reversals on the properties of the Earth's magnetic field, including the structure it takes, and the consequent effects on its shape, size, and strength. Drawing on newly identified records of the van Zijl reversal, Moulin et al. describe the serpentine travels of the transitional magnetic pole and the variable strength of the paleomagnetic field.

Analyzing the orientations of magnetic minerals found encased within rock samples drawn from an ancient lava field in Lesotho, a small country encompassed within South Africa, and from another field in South Africa itself, the authors tracked the shifting geographic location of the ancient magnetic pole. They find that over a short period, possibly only a few centuries, the pole leapt from a location oriented around 45 degrees south to one near 45 degrees north. The paleomagnetic pole then drifted through around 20 degrees latitude as it moved to the southeast. Finally, the pole moved to a stable location centered near the geographic north pole. The authors find that leading up to the magnetic reversal, the

strength of the magnetic field weakened to roughly 10 - 20 percent of its normal value, a depression that only decayed once the pole's location stabilized.

More information: The "van Zijl" Jurassic geomagnetic reversal revisited, *Geochemistry, Geophysics, Geosystems*, doi:10.1029/2011GC003910 , 2012

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