



New palaeomagnetic results from outcrop and drill core samples of the 3.47 billion year old Komati Formation, Barberton Mountain Land, South Africa

Laura Roberts Artal (1), Andy Biggin (1), Conall MacNiocaill (2), Maarten de Wit (3), Cor Langereis (4), Allan Wilson (5), and Nicholas Arndt (6)

(1) University of Liverpool, Geomagnetism Laboratory, School of Environmental Sciences, Liverpool, United Kingdom, (2) Department of Earth Sciences, Oxford University, Oxford, United Kingdom, (3) Department of Geosciences, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa, (4) Paleomagnetic Laboratory, Fort Hoofddijk, Utrecht University, Utrecht, The Netherlands, (5) School of Geosciences, University of the Witwatersrand, Johannesburg, South Africa, (6) ISTERre, Université Joseph Fourier, St Martin d'Hères, France

Palaeomagnetic results obtained in the 1980s and 1990s from the Komati Formation in the Palaeoarchaean Onverwacht Group in the Barberton Greenstone Belt constitute the world's oldest unrefuted palaeomagnetic pole. This pole has been crucial in arguing for the existence of a viable geomagnetic field early in the Earth's history but does not yet have the support of rigorous field tests in constraining its age and viability. Here we present new palaeomagnetic data from a hitherto unexamined locality where these komatiites crop out along the Komati River and where two 400m drill cores have recently been extracted by an International Continental Drilling Programme (ICDP) project. Oriented samples have been taken from both of the deep drill cores and also from surface outcrops allowing detailed comparisons to take place between the new and old datasets. Two ancient components have been identified. One of these is dual polarity and may be associated with widespread intrusive activity at 3.2 Gyr. The other is older and has a direction in agreement with previous results from the Komati Formation. The implications of these new results for our understanding of the early Earth's geomagnetic field will be discussed.