Geophysical Research Abstracts
Vol. 14, EGU2012-5397-1, 2012
EGU General Assembly 2012

Behavior of the transitional field during the miocene (9 Ma) Akaroa polarity reversals, New Zealand: High paleointensities and clustering of VGPs ?

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We resampled two polarity reversals of late Miocene age ($\sim$ 9 Ma) recorded successively in the Akaroa volcano. Our main objectives were twofold. Firstly, we wanted to check the validity of old paleointensity determinations that yielded stronger values during the transitional period than during stable periods that preceded and followed these reversals (Sherwood and Shaw, 1986). This observation is opposite to what is generally observed. An increase in intensity during reversals would provide an extreme example of energy transfer from the axial dipole into other harmonic coefficients. However, the Shaw method, which is the experimental method used for determining the paleointensity, is strongly questioned by the scientific community. A check of these data by the conventional Thellier method and the less-conventional MSP-DSC protocol was required. Secondly, we wanted to complete direction observations of transitional field in order to describe the VGPs paths during the reversals. Indeed, studies of polarity transitions of the Earth's magnetic field recorded over the past few million years, especially in Autralasia, suggest a long-lived mantle control over the Earth's core, manifested by a clustering of virtual geomagnetic poles (VGPs) at locations common to several younger reversal datasets from about the globe. To achieve these two objectives, we also carried out a comprehensive magnetic mineralogy study (Ore-microscopic observation, KT curves, FORCs) in order to validate and strengthen our conclusions.
By means of the Thellier-Thellier and MSP-DSC methods, we obtained paleointensities which do not confirm an increase of the intensity during the reversals. However, they show more scattered values of the intensity even during the stable periods between 15 and 86 μT and low values, about 12 μT, during the transitional period. Moreover, the VGPs paths obtained are clustered under two regions under America and Australasia, an observation in agreement with a possible mantle influence over the geodynamo during the last tens million years.