Paleomagnetism and AMS of a slumped fine-grained volcanic ash bed

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A slumped fine-grained volcanic ash bed in central Japan provides an opportunity to investigate the paleomagnetic directions and AMS (anisotropy of magnetic susceptibility) of a slumped deposit. The ash bed, named the Otani volcanic ash, is about 3.6 m thick at its type locality and stratigraphically dated at about 4 Ma. The majority of the bed comprises a lahar deposit that has suffered syn-sedimentary slumping. Oriented cores were taken at five sites at the type locality where attitudes of lamination are significantly different from each other. Rock magnetic experiments show that magnetite is the main magnetic mineral. All samples were subjected to alternating field or thermal stepwise demagnetization, and most have reverse polarity characteristic remanent magnetization components that form a moderate to tight cluster at each site in the geographic (in situ) coordinates, hence failure of a fold test. The magnetization was therefore acquired after slumping, possibly as a post-depositional DRM. Our results suggest that slumped fine-grained volcanic ash beds can be a subject of paleomagnetic directional study. On the other hand, the orientation of AMS principal axes differs significantly between sites both before and after unfolding. This indicates that the alignment of magnetization-carrying magnetites does not control the AMS of the samples and that the AMS has been affected by slumping. Determination of the lahar flow direction is not possible for the Otani ash bed from the AMS results.

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