Geophysical Research Abstracts,
Vol. 10, EGU2008-A-06936, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-06936
EGU General Assembly 2008

Paleointensity study on subaerial volcanic glass

A. Ferk (1), R. Leonhardt (1), D. Richard (2), D. Dingwell (2)

(1) Geophysics, Montanuniversität Leoben, Austria; (2) Mineralogy, LMU Munich, Germany

It has been suggested that volcanic glass is a perfect material for paleomagnetic research, especially for paleointensity studies, as it is often pristine and contains a magnetic fraction in the single domain range. Furthermore, all biasing effects which are usually hard or impossible to detect in other recording media, are either absent or can be corrected for by using mineralogical and rock magnetic constraints. To verify this supposed ideal character, volcanic glass from 1 site at the 7.56 ka Cala di Tramontana on Pantelleria, Italy, as well as from 6 sites on Tenerife, Spain (4 sites at 8 ka Montana Blanca, 2 sites at 800 ka El Pasajiron) and from two 8 ka obsidian layers on Mayor Island, New Zealand, was analyzed. Intensity measurements including different checks, and rock magnetic experiments were done. The anisotropy of thermoremanence was measured and corrected for. Structural properties of volcanic glass, particularly the glass transition and the natural cooling rate across this transition were investigated by relaxation geospeedometry. By additionally determining the magnetic cooling rate dependency of the thermoremanence, a correction of paleointensity data for cooling rate effects could be accomplished. Samples from Pantelleria and Mayor Island are characterized by very low NRM intensities, hampering rock magnetic measurements. Nevertheless, reliable intensity results ($\approx$40 μT) were obtained for 50% of the Pantelleria samples. Intensity measurements of almost all Mayor Island samples agree very good and yield a paleointensity of $\approx$56 μT. NRM intensities are much larger for Tenerife samples. Rock magnetic experiments indicate low Ti- or even pure Magnetite. Very high success rates of 90% for Montana Blanca ($\approx$61 μT) and of 75% for one site at El Pasajiron (EPJ, $\approx$43 μT) are observed, while samples from the second EPJ site yielded no results. For all three locations, anisotropy and cooling rate corrections reduce the within-site scatter and overestimation of paleointensity due to fast laboratory cooling rates. High success rates and good defined paleointensity data

support the good suitability of silicic volcanic glass for paleomagnetic measurements.