

AGU FALL MEETING

San Francisco | 14–18 December 2015

GP23A-1293: Full Vector Geomagnetic Field Variation during the Holocene registered by Hawaiian Lava Flow

ABSTRACT



Tuesday, 15 December 2015

13:40 - 18:00

Moscone South - Poster Hall

Hawaii is an ideal place to study the secular variation (SV) of the Earth's magnetic field in central Pacific region, thanks to its long and continuous volcanic activity. We present here a compilation of well-dated palaeomagnetic data from Hawaiian lava flows that allow a complete description of the full geomagnetic field vector (declination, inclination and intensity) in this area. All available radiocarbon ages have been uniformly calibrated using the IntCal13 calibration curve and the most probable radiocarbon ages have been used for further considerations. A total of 323 directional and 98 intensity data have been collected for the last 10 000 years, most of them coming from the Big Island (data from lava cores have not been included). The data cover almost continuously the last 5 millennia while data from older periods are still scarce. The directional data are well consistent with each other while the intensity data are less abundant and show a higher dispersion. For the last 5000 years, where the majority of the data are concentrated, continuous secular variation curves for both direction and intensity have been calculated using the moving window technique with windows of 200 years shifted by 100 years. The obtained curves clearly show some characteristic features of the geomagnetic field variation in the central Pacific. Low inclination values are well documented around 500 AD, 1000 BC and 2500 BC while high inclinations are observed around 3000 BC and 1500 AD. Declination shows an eastward trend from 1000 AD to the present while a declination low is registered around 500 BC. The intensity curve is highly influenced by the important dispersion of the reference data points. The obtained curves have been compared with the predictions of the CALS10k.1b and pfm9k.1a global geomagnetic field models. Such comparison shows a good general agreement even though the models show much smoother variations mainly regarding intensity. Nevertheless, both the Hawaiian SV curves and the pfm9k.1a model show abrupt variations in both direction and intensity of the field around 300-100 BC which seems to be a very interesting feature of the geomagnetic field in the Pacific region.

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Day: [Tuesday, 15 December 2015](#)

