

New Palaeosecular Variation Master Records for New Zealand –Applications for Dating and Field Modelling

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We present new palaeosecular variation master records for New Zealand on both archaeological and Holocene timescales. These have been compiled using continuous data from the detrital remanent magnetization of lake sediment cores with high-resolution C-14 based chronology, and are constrained and calibrated using directions and absolute palaeointensities obtained from the thermoremanent magnetizations of archaeological materials and volcanic rocks. All data has been “relocated” to a standard geographical location (40°S, 175°E) using a virtual geomagnetic pole (VGP) transformation. By a reciprocal VGP process, the master records can be used to calculate accurate palaeosecular variation records for all locations within the New Zealand region. The geomagnetic field alternates between active periods of high amplitude swings from 12000 to 8000 BP and over the past 4000 years, and a relatively inactive period between 8000 and 4000 BP. The current field (Dec = 21.5° E, Inc = - 65.4°, F = 55.4 micro T at 40°S, 175°E) represents a rare steep and easterly extreme in direction, but is close to average in intensity. The palaeointensity record mirrors to some extent the variation of the virtual axial geomagnetic moment seen in the global dataset, but shows some notable differences. We also investigate the effect of including the Holocene record in global spherical harmonic-based and regional field models.

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