



Further K-Ar dating and paleomagnetic study of the Auckland geomagnetic excursions

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Three different excursions paleomagnetic directions were reported from several volcanoes of the Auckland volcanic field: north-down (ND) directions obtained from five volcanoes, west-up (WU) from two volcanoes, and south-up (SU) from one volcano. K-Ar ages have been reported for two of these volcanoes: 27 ± 5 (1σ) ka for Wiri volcano of the ND group and 55 ± 5 ka for Hampton Park volcano of the WU group. In the present study, we carried out further K-Ar age determinations on three other volcanoes and obtained reliable ages for two of them: 30 ± 5 ka for Puketutu volcano of the ND group and 50 ± 6 ka for McLennan Hills volcano of the SU group. The age of Puketutu agrees well with that of Wiri, and these two ages give a weighted mean age of 29 ± 3 (1σ) ka for the ND group. The age of the ND group is distinguishable from those of the SU and WU groups at 2σ level, confirming that excursions occurred at two different times separated by a few tens of thousands of years. These age data combined with the latest age estimate of the Laschamp excursion suggest that at least three excursions occurred in the period between about 60 and 25 ka which seems to be within the broad weak dipole interval. If we compare the virtual dipole moments (VDMs) of the Auckland excursions with the past 5 Myr average VDMs, the reduction of VDM is estimated to be 1/9-1/2.