

**TITLE PARTIAL CONSTRAINTS ON THE INFLUENCE OF SUBGLACIAL VOLCANISM BENEATH THE WEST ANTARCTIC ICE SHEET (WAIS) IMPLIED BY OBSERVED NEGATIVE MAGNETIC ANOMALIES WHOSE SOURCES ARE VOLCANIC CENTERS (E.G. MT RESNIK) >780 KA**

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Analysis of a block of aeromagnetic and radar ice-sounding data (from the Central West Antarctica, CWA, aerogeophysical survey) over the WAIS reveals ~100 short-wavelength, steep-gradient, negative magnetic anomalies, or ~10% of the previously reported ~1000 shallow source anomalies caused by "volcanic centers." These negative anomalies indicate volcanic activity during a time of magnetic field reversal at least as old as 780 Ka (the Brunhes-Matuyama reversal). The volcanism is interpreted as caused by late Cenozoic alkaline magmatism associated with the West Antarctic rift system (WR). In earlier papers we reported that the WAIS has removed edifices of subglacially erupted volcanoes; >80% of the residual edifices have <200 m bed relief. The sources of ~18 of the anomalies, half concentrated in the area of the WAIS divide, have high bed-elevation (above sea level after ice removal and glacial rebound), very magnetic topography of high bed relief, up to 2 km. Behrendt et al. (2004) interpreted that these 18 sources are subglacial volcanoes, protected by volcanic flows, which have resisted glacial erosion, erupted subaerially during a period when the WAIS was absent. One of the high topographic features, Mt. Resnik, marked by a complex negative anomaly, is a conical peak 300 m below the surface of the WAIS, and has ~2 km topographic relief. We interpret a magnetic model fit to this anomaly as comprising reversely magnetized (in the present field direction), 0.5-2.5-km thick volcanic flows at the summit probably overlying normally magnetized flows. Models fit to other negative anomalies overlying the <200-m high residual edifices indicate similar structures at these volcanic centers. Published models (1996) reported for the Hut Point anomaly, at Ross Island, Antarctica, a similar anomaly to Mt. Resnik, also required both normal and reversed magnetizations correlated with drill holes into dated volcanic flows (also part of the late Cenozoic WR) crossing the Brunhes-Matuyama boundary (780 Ka). Blankenship et al., (1993) identified an active volcano beneath the WAIS and speculated on its influence on behavior of the ice. Obviously volcanic activity >780 Ka would have no such influence at present.