Geophysical Research Abstracts, Vol. 7, 02811, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02811

Contrasting segments of a magmatic arc terrane over the Antarctic Peninsula, as identified from aerogeophysical data

F. Ferraccioli, A. P.M. Vaughan, P.T. Leat and P. Jones
British Antarctic Survey, High Cross, Madingley Road, Cambridge, CB3 OET (ffe@bas.ac.uk)

The Antarctic Peninsula is a well-recognized example of a subduction system. Terrane accretion processes may also play a role in crustal growth over this region. Specifically, the Palmer Land segment of the Antarctic Peninsula may include three distinct fault-bounded blocks, defined as terranes: an accretionary complex (the Western Domain), a micro-continental(?) magmatic arc (the Central Domain), and the deformed margin of Gondwana (the Eastern Domain). This recent terrane model predicts that the Eastern Palmer Shear zone could represent an arc-continent suture zone, active at about 107-103 Ma. A combined aeromagnetic and aerogravity survey was flown over Palmer Land to help identify possible contrasting crustal blocks over the region, and hence test a terrane model from a new geophysical perspective. Aeromagnetic and aerogravity images reveal that the Central Domain is separated by a crustal fault from the Western Domain, and includes at least two contrasting fault-bounded geophysical zones. The western zone of the Central Domain includes highly magnetic and dense rocks, and is separated from less magnetic, less dense rocks of the adjacent eastern zone by a sharp aeromagnetic lineament. Upward continued aeromagnetic data, isostatic residual maps, and 2D magnetic and gravity models, suggest that a significant component of crust of the western zone of the Central Domain represents juvenile magmatic arc crust. Magnetic signatures over the magmatic arc further north have previously been compared to the Kitakami batholith in Japan. However, our new aerogravity data suggests that the western zone of the Central Domain is distinctly more mafic. The contrasting aerogravity signatures over the two zones of the Central Domain resemble more closely those observed in California, over the Sierra Nevada and Peninsular Ranges batholith, where they have been attributed to contrasting basement underlying the arc. Although structural data suggests that the Eastern Palmer Land

Shear Zone may represent a suture zone, the magnetic signature of this fault is less prominent compared to the boundary between the two zones of the Central Domain. However, low-pass filtered isostatic gravity anomalies indicate the crust of the Eastern Domain is distinctly more mafic than the eastern zone of the Central Domain. Mafic intrusions within the Eastern Domain are interpreted as remnants of a marginal basin, similar to the Rocas Verdes basin of South America.