



S10 – 172: The structure and evolution of the Antarctic continent in light of recent geophysical and geological investigations

Preliminary Observations from the WEGAS / GEA IV Survey in Eastern and Southern Dronning Maud Land

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Over the course of the 2014 and 2015 seasons, the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI) and the Federal Institute for Geosciences and Natural Resources (BGR) collected around 150 hours of new airborne gravity, magnetic and ice-penetrating radar data in the area of Dronning Maud Land to the east and south of Princess Elisabeth station. Survey was completed at 10 km line spacing. The 2014 survey used a LaCoste and Romberg Air-Sea gravimeter (LCR) at constant barometric altitude. The 2015 survey was completed at constant ground separation with a Gravimetric Technologies GT2A gravimeter. Both surveys used a Scintrex Cs-3 caesium vapour magnetometer mounted in a tail boom and a fuselagemounted three-component fluxgate magnetometer. The GT2A gravity data can be shown to reliably reflect the effects of the density contrast between basement rocks and the ice sheet at much shorter wavelengths than the LCR data. Results of the cross-over analysis are consistent with the advertised sub-milliGal repeatability of data collected with the GT2A. Gravity data reveal a prominent sub-glacial channel separating eastern Sr Rondane from the Yamato Belgica Mountains to the east. The area to the south of eastern Sr Rondane is characterised by a dendritic pattern of valleys that converges away from the prominent channel in the east. At longer wavelength, the data suggest the presence of a compensating root beneath eastern Sr Rondane and thinner crust towards the extended continental margin north of the mountains.

The magnetic data reveal strong NS-trending magnetic anomalies coincident with the Yamato-Belgica Mountains, and a more subdued set of ESE trending anomalies that confirm the eastwards continuation of the SE Dronning Maud Land province into the region. Instead, a new and unexpected feature is a strong NNW-trending anomaly, also present in the gravity data, at which the SE Dronning Maud Land province, which had been suggested to continue much further towards Prydz Bay, appears to terminate. In contrast, the deep sub-glacial valley between Sr Rondane and the Yamato-Belgica Mountains has little or no magnetic signature of its own.