

THE WEGAS / GEA IV GEOPHYSICAL SURVEY IN EASTERN AND SOUTHERN DRONNING MAUD LAND

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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 gravity, magnetic and ice-penetrating radar data from east and south of Princess Elisabeth station in Dronning Maud Land between 2013 and 2015. Survey lines were spaced 10 km apart. The 2013/2014 and 2014/2015 used different gravimeters; a LaCoste and Romberg AirSea gravimeter (LCR) at constant barometric altitude and a Gravimetric Technologies GT2A gravimeter at constant ground separation. Both surveys used a Scintrex Cs-3 caesium vapour magnetometer mounted in a tail boom with compensation for the airframe calculated using a fuselage-mounted three-component fluxgate magnetometer. The GT2A gravity data reflect the effects of short-wavelength density contrasts between basement rocks and the ice sheet more reliably than the LCR data. Cross-over analysis suggests the repeatability of data collection with the GT2A lies at the sub-milliGal level. A broad subglacial channel that separates eastern Sør Rondane from the Yamato Belgica Mountains is evident in the gravity data. In the south of the survey region, the data reveal a dendritic pattern of subglacial valleys that converge towards the SW.

Strong NS-trending magnetic anomalies coincide with the Yamato-Belgica Mountains. Further west, subtler ESE-trending anomalies confirm proposals that the SE Dronning Maud Land province continues into the region south of eastern Sør Rondane. An unexpected feature of both data sets is the apparent termination of the anomaly patterns associated with the province at a NNW-trending anomaly running south of Princess Elisabeth.