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Joint Japanese-German airborne geophysical surveys around Syowa Station, East Antarctica

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The area around Syowa Station, the Japanese Antarctic wintering Station in Lutzow-Holm Bay, is a key area to investigate the formation of Gondwana, because this area is considered to be a junction of Africa, India, Madagascar, and Antarctic continents from the reconstruction model of Gondwana. However, the tectonic evolution is still speculative because geological evidence is limited to a few isolated outcrops and the coverage with geophysical surveys in this area is poor. Joint Japanese-German airborne geophysical surveys around Syowa Station had been conducted in January 2006 during the 47th Japanese Antarctic Research Expedition to reveal the tectonic evolution related to Gondwana formation and breakup in this area. Ice radar, magnetic, and gravity data are obtained using the AWI owned, Dornier aircraft (Polar-2). The airborne geophysical surveys had been made along almost N-S observation lines with spacing of about 20 km.

Several characteristic features possibly related to the tectonic evolution of Gondwana are inferred from magnetic and gravity anomaly maps as well as bedrock topography. Large negative gravity anomalies are observed along the Shirase Glacier and those almost correspond to deep bed rock topography. This structure most likely delineate southwestern boundary of the Lutzow-Holm Complex. Northeastern boundary of the Lutzow-Holm Complex is also deduced from magnetic and gravity anomalies. Moreover, Lutzow-Holm Complex seems to be divided into three segments by the boundaries with almost ENE-WSW strike. We will also introduce the airborne operation around Syowa Station, East Antarctica, and present future plan of the airborne observation around Syowa Station.

Keywords: magnetic anomaly, gravity anomaly, airborne observation, Gondwana, Antarctica