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Preliminary data analysis from a permanent seismic station newly installed in the Sør Rondane Mountains, East Antarctica

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Officially inaugurated in early 2009, the new Belgian research station, the Princess Elisabeth base, was established in Queen Maud Land, East Antarctica (71°57'S, 23°20'E). Operated and maintained by the International Polar Foundation, the base was designed and built to harness solar and aeolian renewable energy for year round functioning. Located 200 km inland at the edge of the Antarctic plateau, it lies on a nunatak outcropping in the Sør Rondane Mountains, a belt raised during the Proterozoic Pan-African orogeny. A wide range of research initiatives have now been initiated at the site of the Princess Elisabeth base and within the surroundings of the Sør Rondane mountain chain. The GIANT-LISSA project, conducted by the Royal Observatory of Belgium in collaboration with Luxembourg University is an ambitious project dedicated to the investigation of present day ice mass balance in relation with the past and ongoing geodynamics of Antarctica. In this contribution, we present the site conditions of the Princess Elisabeth base and the scientific goals of the GIANT-LISSA project. We describe the geodynamic observatory established near the base and comprising GPS and gravity instruments and a borehole broadband seismic sensor installed at a depth of 13 m into the granitic rock. We focus our contribution on the quality assessment of the ambient seismic noise and provide an inventory of the available recorded data and the event dataset collected to date. In a short term perspective, we expect to benefit from a set of high quality teleseismic data in order to investigate the lithospheric rheology providing clues to understand the elastic response of the ice sheet changes. Detailed imaging of the crustal and upper-mantle structure will contribute to the recognition of various terranes amalgamated into former Gondwana. Deeper structure such as the Earth core will be investigated through the analysis of antipodal PKP phases propagating along the Earth rotation axis. In addition to the collection of teleseismic events, further analysis will be performed to detect possible local tectonic or ice-related events which will contribute to better understand intra-plate seismicity, outlet glacier mechanism and ice sheet stability.