During the Austral summer of 2008/09, measurements were taken at 34 magnetotelluric (MT) stations along profiles totaling approximately 180 km in the Prydz Bay region of Antarctica. The primary aim of the MT survey was to image the boundary between the Vestfold Hills and the Rauer Group. The two regions contain rocks with contrasting protolith ages and recorded tectono-thermal events, suggesting that they were juxtaposed probably during the c. 550-500 Ma amalgamation of Gondwana. The contact between the two regions is covered by the Sørsdal Glacier near the coast and by the Antarctic ice cap further inland and can therefore not be sampled directly. To image the contact, broadband and long-period MT measurements were focused over the inland extension of the Sørsdal Glacier with station spacings of 2.5 km to 5 km. The Antarctic environment posed several unique challenges to high-quality MT data collection including source-field effects, electrical noise from statically charged ice particles blowing over the MT electrodes and the high contact resistance of the ice. Data quality was observed to drop dramatically when winds became strong enough to blow snow and ice particles. Inversion of the data has imaged a conductor beneath the Sørsdal Glacier that dips beneath the Rauer Group and has a strike similar to that of the glacier. We propose that this feature is related to the amalgamation of the Vestfold Hills and the Rauer Group and suggest that it may control the present-day location of the Sørsdal Glacier.