

Antarctic Peninsula ice surface elevation change – preliminary analysis of CryoSat-2 data

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The Antarctic Peninsula (AP) has recently experienced rapid climate warming, ice shelf thinning and collapse, accelerated glacier thinning and flow, and widespread retreat of tidewater glaciers. These changes have major implications for the regional ice sheet mass balance and for global sea level rise. Geodetic estimates of the AP Ice Sheet (APIS) mass balance indicate that it lost mass at an average rate of 20 ± 14 Gt/yr over the period 1992-2011 (Shepherd *et al.*, 2012); this equates to approximately 25% of all Antarctic ice sheet mass losses, despite occupying only 4% of the continental area. Continued and comprehensive observations of changes to the APIS are therefore essential.

Data from the CryoSat-2 mission has the potential to offer the first comprehensive satellite altimeter estimate of APIS mass balance. The complex topography and the relatively large number of small glaciological systems that comprise the APIS have, in the past, proven an obstacle to altimetry estimates of its mass balance. However, the fine resolution and densely sampled observations possible from CryoSat-2 will enable reliable measurements of surface elevation change in such regions. As part of the European Space Agency (ESA) funded Antarctic Peninsula Mass Balance (APMB) project, we aim to produce time series of dh/dt and dm/dt measurements from CryoSat-2 that will extend the radar altimetry records from the ERS and EnviSat missions. Here we present an initial analysis of the performance of CryoSat-2 data over the Antarctic Peninsula.