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Investigations of DInSAR derived grounding line migration in Antarctica induced by ocean tides

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The migration of the glacier grounding line, the boundary between grounded ice and floating ice, is an important indicator of tice sheet stability in a warming climate. Ice-shelf thinning induces grounding line retreat, and potentially leads to the collapse of the inland catchment areas in centennial time periods. Therefore, a continuous observation of the grounding line position is of interest for ice sheet modelling also to predict future sea level rise. However, grounding line in nature is not static in position and it is subject to short-term fluctuations which are influenced by changes in ocean tide level and atmospheric pressure. Investigating tidal influence to the grounding line helps separating the tidal signal from the long-term migration because of ice shelf thinning. Also, it helps quantifying ice discharge and ice flow, as well as potential melting underneath the ice, due to intrusion of sea water.

In this study, the correlation between the time series of grounding line, derived from Sentinel-1 double difference interferograms and the ocean tide level computed from CATS2008 tide model and air pressure corrected with NCEP reanalysis data are investigated. Study regions are chosen at the Filchner-Ronne Ice Shelf, the Amery Ice Shelf and Dronning Maud Land based on the availability of coherent interferograms and the large tidal amplitude at these locations. The result is expected to be presented as qualitative description of changes in the fringe belt pattern in double difference interferograms and statistical analysis of the derived changes in grounding line position, depending on the complexity of the grounding line structure and the topography of the bed rock.