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Dynamics of surface melting over Amery and Ross ice shelf in Antarctic using OSCAT data

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Abstract. Antarctic sea ice sheets play an important role in modulating the climate system. The present study investigates the dynamics of melt/freeze over Amery and Ross ice shelf located in Eastern and Southern part of continent using OSCAT, the microwave scatterometer data from OCEANSAT2. The study utilizes the sensitivity of backscatter coefficient values of scatterometer data to presence of liquid water in the snow caused due to melt conditions. The analysis carried out for four austral winters from 2010–2013 and five austral summer from 2009–2014 showed spatial and temporal variations in average backscatter coefficient over Amery and Ross shelf areas. A dynamic threshold based on the austral winter mean and standard deviation of HH polarization is considered for pixel by pixel analysis for the shelf area. There is significant spatio-temporal variability in melt extent, duration and melt index as observed in the analysis. Spatially, the melt over Amery shelf moves from South to North along coast and West towards inner shelf area. Maximum mean melt occurs on 9th January with January 1–15 fortnight accounting for 80 % of the melt. Extreme low melt conditions were observed during summer 2010–11 and 2011–12 indicating cold summer. Summer 2012–13 and 2013–14 were warm summer. Year 2014 experienced melt only in the month of January with entire shelf under melt conditions. Practically no melt was observed over Ross ice shelf.

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