Sea salt aerosol from blowing snow on sea ice – modeling vs observation

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Blowing snow over sea ice, through a subsequent sublimation process of salt-containing blown snow particles, has been hypothesized as a significant sea salt aerosol (SSA) source in high latitudes. This mechanism has been strongly supported by a winter cruise in the Weddell Sea (during June-August 2013). The newly collected data, including both physical and chemical components, provide a unique way to test and validate the parameterisation used for describing the SSA production from blowing snow events. With updates to some key parameters such as snow salinity in a global Chemistry-transport model pTOMCAT, simulated SSA concentrations can be well compared with measured SSA data. In this presentation, I will report modeled SSA number density against collected data on board of Polarstern ship during the Weddell Sea cruise, as well as modeled SSA massive concentrations against those measured at both coastal sites such as Alert in the North and Dumont d'Urville (DDU) in the South and central Antarctic sites such as Concordia and Kohnen stations. Model experiments indicated that open ocean-sourced SSA could not explain the observed winter SSA peaks seen in most polar sites, while with sea ice-sourced SSA in the model, the winter peaks can be well improved indicating the importance of sea ice-sourced SSA as a significant contributor to the salts (Na+, Cl-) recorded in the ice core.