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Mesoscale breeze circulation over Spitsbergen (Svalbard Archipelago)

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We analyze data series (1992-2013) of wind measurements from meteorological stations in Ny-Ålesund and Hornsund in Svalbard and compared them to surface layer winds from the NCEP/NCAR reanalysis. We show large discrepancies between the local wind direction and directions of wind compatible with analysis of the large scale pressure fields. We show that frequency of simultaneous breeze events on northern and southern fjords of Spitsbergen and is highly correlated with sea-land temperature difference on monthly timescales. We argue that one of the most important factors controlling wind directions in the Svalbard fjords is the temperature difference between the neighboring glaciers and surface sea temperatures of open waters warmed by the West Spitsbergen current. This creates atmospheric circulation patterns similar to night breeze in temperate climates.