



## 0.1 Polar Stratospheric Ice Cloud above Spitsbergen

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Within the extremely cold and stable polar vortex of the winter 2004/2005, a polar stratospheric ice cloud was observed from NyÅlesund (Spitsbergen) on 26 January 2005. The lidar measurement of a cloud with backscatter ratios up to 23 and volume depolarization larger than 50% is unique in our 15-year lidar data record. In addition, simultaneous balloon-borne water vapour measurements indicate the presence of mesoscale ice clouds nearby. During winter, Spitsbergen is commonly situated well inside the vortex where low horizontal wind speeds prevent vertical wave propagation. In this particular case, the rare coincidence of different meteorological processes occurring during a poleward breaking Rossby wave event caused favorable conditions for the vertical propagation of mountain waves excited by the flow past Spitsbergen. The detailed meteorological analysis shows that ice particle formation processes on 26 January 2005 were most likely provoked by mesoscale stratospheric temperature anomalies, leading to a local reduction in water vapour.