



Observations of in-situ supercooled water in an Arctic polynya

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In-situ supercooled water down to $0.037\text{ }^{\circ}\text{C}$ below freezing point temperature was found in the Storfjorden polynya in the beginning of April 2006 during the end of a polynya event with vigorous frazil ice formation driven by cold winds from north-east. This is the most supercooled water observed in the Arctic in modern time with reduced instrument uncertainties and improved determination of the freezing point temperature. The large supercooling is connected to the large surface heat flux and the saline brine-enriched shelf water (BSW) in Storfjorden, which is the saltiest water observed in the Arctic. During the observed supercooling event, which lasted for three days, 0.16 m of accumulated frazil ice is estimated to form and 5.5 kgm^{-2} of salt is calculated to be released to the 5 m deep water column with salinity up to 35.7 close to shore in the Storfjorden polynya. The salinity of the water column decreased during the measuring period most likely due to less saline water replacing newly formed BSW flowing down to deeper parts of Storfjorden. The supercooling ceased when the wind direction turned to east with higher air temperatures and accompanying warmer and less saline water was pushed transported into Storfjorden by northward Ekman transport. These results accompany other in-situ measurements and numerical results from the Storfjorden polynya that will also be presented.