2. WEATHER CONDITIONS DURING PS122_4 (DWD)

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At the start of leg 4, RV Polarstern lied at anchor in the Adventfjord. High pressure influence dominated. The centre of the high pressure system shifted towards the Barentssea on Friday 5th June. Foehn effect resulted due to a easterly airflow which lasted until Monday 8th June. The foehn dried foremost the air in lower levels which generated a strong and dry southeasterly channeled through the fjord and peaked at 8 Bft (37 KT). On Monday afternoon, RV Polarstern left the fjord and sailed towards the arctic ice again in search of the former research floe. On the cruise it crossed the eye of a weakening storm (990 hPa) located Northwest of Svalbard.

The winds turned from South to North on the way towards North. Due to a cold airflow at the rear of the low, showery weather including low cloud bases had been generated. In the meantime, sea calmed from 2.5 to 1 m. On Tuesday the 9th June RV Polarstern reached the ice edge. The first couple of days in the ice had been characterized by lows and highs alternating quickly.

From 13th June, RV Polarstern was influenced by an extensive low between the North Pole and Franz-Josef-Land. On this day, the coolest temperature of this journey (-5 °C) had been measured. A fresh to strong northeasterly breeze dominated the weather which peaked on the 15th June (6 Bft, 26 KT). Snowy showers with moderate cloud bases occurred.

On 17th June, a high pressure zone expanded from Greenland across Svalbard towards Lapland. In a westerly airflow at 3-4 Bft (10-15 KT) mild and very humid air had been advected. Therefore, mist and freezing drizzle with low cloud bases prevailed. On 20th June the high pressure zone shifted towards RV Polarstern. The air mass dried which resulted in a long lasting sunny period with South to Southwesterly winds around 5 Bft (15-20 KT).

Later, the high pressure zone weakened und shifted slowly to the East. Fog and low stratus limited the flyable weather conditions again from the 23rd June. A low pressure trough emerging from the Wandelsea initiated a northwesterly airflow as well as some freezing drizzle.

On 28th June, a high pressure zone expanded from the western Fram Strait towards the North Pole. The wind turned North. Due to polar air advection cloud bases lifted temporarily. Some snowy spells appeared as well. The high pressure zone moved towards RV Polarstern and resulted in fog developing again. On 30th June the centre was situated directly over Polarstern. The strong descending processes cleared the sky. A couple of almost cloud free and calm days followed.

On 2nd June, a secondary low shifted from the Barentssea across Svalbard towards the Greenlandsea. Winds turned to Northeast and a dense fog layer build up. The winds shifted

further East on the 4th July due to intensifying foehn effect over Svalbard. The entrainment of the foehn dried air lifted the cloud base only temporarily.

From 14th July, RV Polarstern was situated between a high over the North Pole, a second high over the Greenlandsea and a low pressure zone stretching from northern Canada towards Novaja Zemlia. Freezing fog and drizzle at times dominated the weather conditions. The calm winds (around 3 Bft) veered slowly from Southwest over North to Northeast.

From the 18th July, the influence of a low over the Greenlandsea expanded towards RV Polarstern. The cloud base lifted due to a slightly intensifying northeasterly (5-10 KT). Weak high pressure influence followed with RV Polarstern located between a low over the North Pole and a second low over the Greenlandsea. On the 22nd July, the centre of the high had been situated directly above RV Polarstern. Therefore, the boundary dried temporarily with calm to moderate westerly winds. A sunny and almost cloud free day resulted.

On Wednesday night, the wind turned to northerly directions around 3 Bft. Fog and drizzle at times occurred. Between a low, which moved from the Lofoten towards Greenlandsea, and an extensive high over the Karasea exceptional warm air had been advected from East Europe towards Svalbard and the Arctic. This led to a heat record in Longyearbean with maximum temperature at 21.7°C on the evening of 26th July. On RV Polarstern still drifting in the ice 4°C had been measured at the mast (29 m AGL) and 14°C in 300 m AGL. Fog trapped underneath a significant surface inversion lasted until 5th August.

Due to the melting sea ice and the further drift southeastwards approaching the ice edge swell could be observed for the first time again on 29th July. The movement of the sea surface and the mild temperature broke the floe on 31st July.

On 5th August, a high pressure zone stretched from the North Pole towards Norway. The core area shifted slowly towards RV Polarstern. The advection of lower dew points with a northerly airstream ended the long foggy period.

On the last weekend of leg 4, a stormy low moved from Iceland along the eastern coast of Greenland towards the Wandelsea while weakening. The winds were forced to speed up and peaked on Sunday at around 6 Bft (25KT).