

Fig 2: Height profile of flight

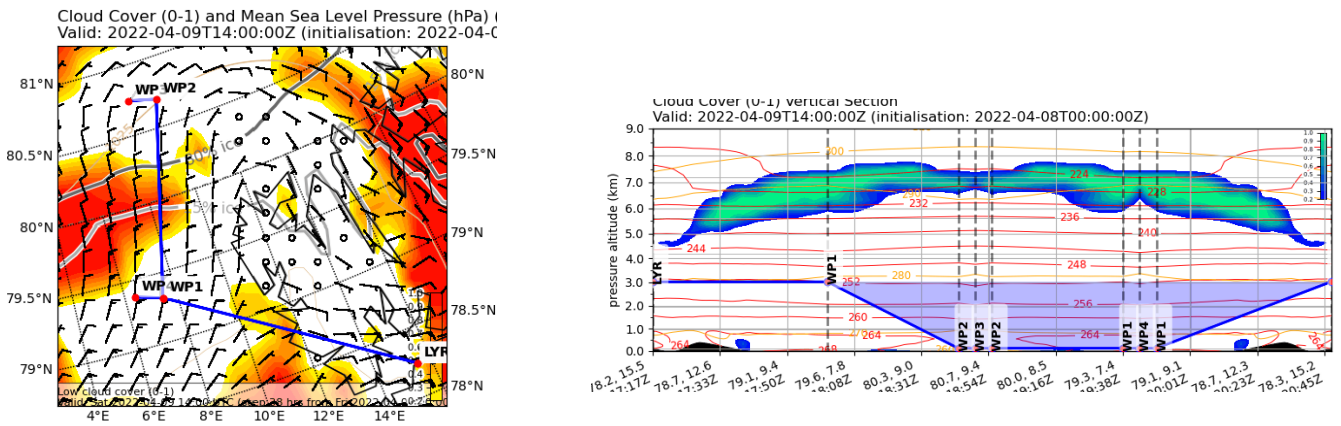


Fig. 3: Predicted clouds (low clouds, ECMWF) (left) and side view (right).

Weather situation as observed during the flight (compare to forecast):

The cloud situation differed from the prediction in three points: 1) during take-off, there were many low clouds over Svalbard (unpredicted) leading to snowfall in the morning hours. These clouds disappeared during the day. 2) A convergence line with convective clouds is missing in the ECMWF and ICON prediction, probably due to the coarser resolution of the models (compare Figure 3 with satellite image, Fig 4). 3) The Cirrus clouds were not as dense as Figure 3 may suggest. Mostly, they were not at all visible.

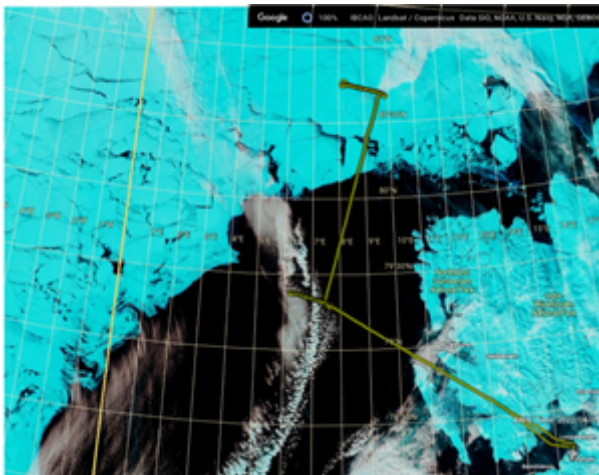


Fig. 4: Satellite image showing the convergence line, in which the southern stack was flown. It was present already on the day before this flight as a part of a polar low.

Overview:

The goal of the flight was to investigate off-ice flow in clear sky conditions and turbulent fluxes over the marginal sea ice zone and open ocean. Also, the connection to the polar low of the preceding day should be investigated.

To that aim a saw tooth pattern was first flown from WP1 to WP2, then a stack with horizontal legs. Then, a 200 ft leg followed between WP2 and WP1. WP1 marked the eastern edge of the convergence line. Since the next stack was flown in westerly direction, all these legs crossed the convergence line. The latter had a complex structure consisting of 2-3 layers of thin cumulus clouds in different altitudes (the highest in about 2500 ft).

Instrument Status:

All instruments were working well, no problems reported.

Detailed flight logs

Many low clouds over Svalbard, which disappear over the ocean, but cloud streets are visible towards WP1 (see photo below).



Near WP1

WP1 is only a few kilometers away from the eastern edge of the convective clouds.

Estimated cloud tops are at 2500 ft. A saw tooth pattern follows in northward direction with tops at 3000 ft.



Ice edge

After reaching the compact ice edge at 80.17 N, the next sawtooth is flown to 5000 ft and we return to 200 ft at the WP2. Sea ice cover is almost 100 % but several wide, but overfrozen leads are observed (white an grey nilas).



No clouds are visible but some haze is visible (humidity emitted from leads (?), but no sea smoke really visible).

Horizontal legs between WP2 and WP3 are flown in 200 ft, 200ft, 500 ft, 700 ft, 1000 ft, 1300 ft . A small part of the leg follows a wide overfrozen lead (almost no open water).

During the leg back in 200 ft from WP2 to WP1 slight sea smoke develops at the ice edge and cirrus is visible, but no low clouds exist except those from the convergence line described above. Some very wide leads are overflowed near the ice edge with grey nilas and shortly before we arrive the edge, there is also open water on the leads.





WP1 is now under cumulus clouds (photo left)

At WP1, the first leg is in 200 ft, cloud base goes down to 300 ft at the eastern end of the leg. Next leg back to WP1 in 300 ft. During this leg, it is clearly found that the cloud base increases strongly towards East. Further legs are flown in 600 ft, 1000 ft, 1400ft, 2400 ft. It becomes clear that we have at least two cloud layers, the highest leg passes the center of some clouds (roll like-structure).



The photo shows the complex structure of different cloud layers.

Trace gas measurements at the end towards Svalbard in 14000 ft 12000 ft 10000 ft 8000 ft

Quicklooks:

Not yet available