COMPEX-EC Flight RF03 – Polar 5 – 2025/04/07

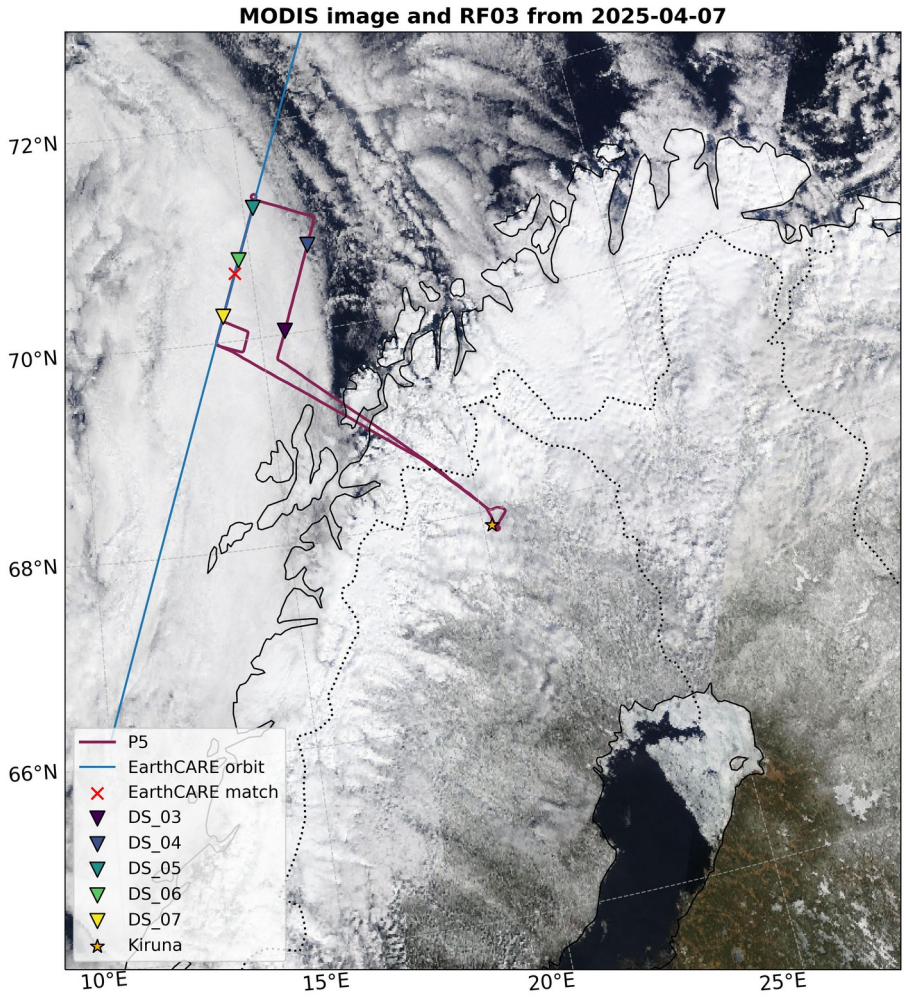
Pilot	**Kyle McLenaghan**
1st Officer	**Bailey Pegels**

Mission PI	**Mario Mech**
Basis Data	**Eduard Gebhard**
SMART/ Eagle/Hawk	**Joshua Müller**
MiRAC-A / HATPRO	**Lars van Gelder**
AMALi / Dropsondes	**Lena Bruder**

Flight times:

Take off	**12:06 UTC**
Touch down	**15:59 UTC**

Objectives: EarthCARE underflight - MSI leg

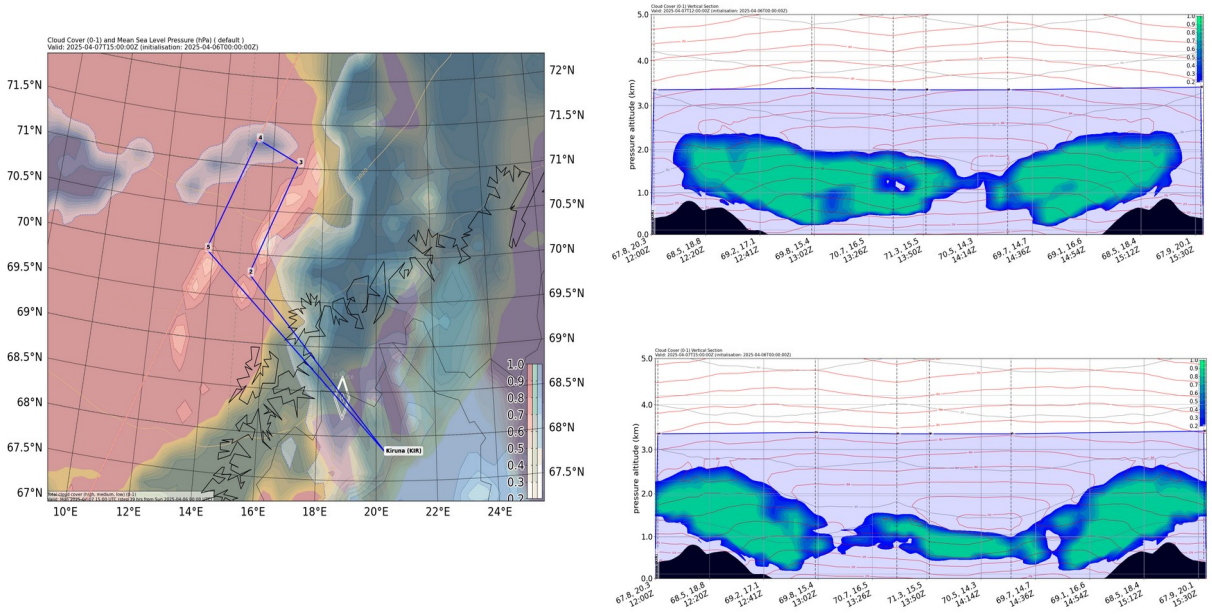


Flight and satellite track and dropsonde locations over MODIS RGB composite satellite image for RF03 on 7.4.2025.

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

The weather situation for RF03 on Monday showed a strong area of high pressure over the Atlantic at height and on the ground. With a more westerly flow, slightly milder air masses reached northern Scandinavia than the days before. The observed area west of Kiruna over the Norwegian Sea was already in the area of influence of a warm front of a weak low-pressure system south of Svalbard with temperatures in 850 hPa of -4°C to -6°C. This meant that low-level clouds up to cloud top heights of around 2 km were to be expected. The forecast was very well reflected in the observations. In some cases, the clouds were somewhat higher than previously simulated, which is why a flight altitude of approx. 4 km was again selected.

Overview:



Forecast for the flight time issued by ECMWF on 6.4.2025 00UTC. Left: total cloud cover of low-, mid-, and high-level clouds for 7.4.2025 15 UTC. Right: cross section at 12UTC (top) and 15UTC (bottom).

The idea was flying West off the Norwegian coast to meet EarthCARE on its descending orbit including a MSI leg on the way to the Northern track entry point. The MSI leg was planned to be 35nm East of the EarthCARE underflight. Due to restrictions by the Norwegian Authorities, the active remote sensing instrumentation will be switched on once we left the coast. Radiation square was not planned, but has been included.

Communication, timing, and all other operation worked quite well. Releasing dropsondes over the ocean was no problem.

Instrument Status:

Polar 5	
Basis data acquisition	
MiRAC-A	
HATPRO	
AMALi	
SMART	
Eagle/Hawk	
Dropsondes	5/5

Instrument status as reported after the flight for all instruments on Polar 5.

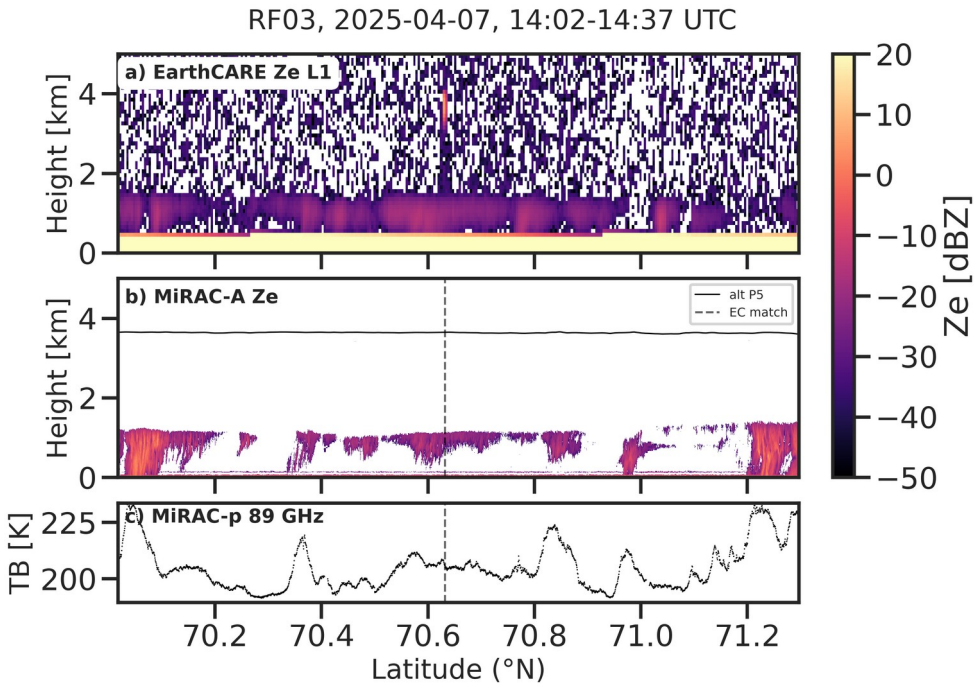
Comments:

- AMALi laser had no heat up time, since RUN has not been pressed at the beginning. Should cause no issues.
- SMART lost alignment on the last leg of the radiation square.

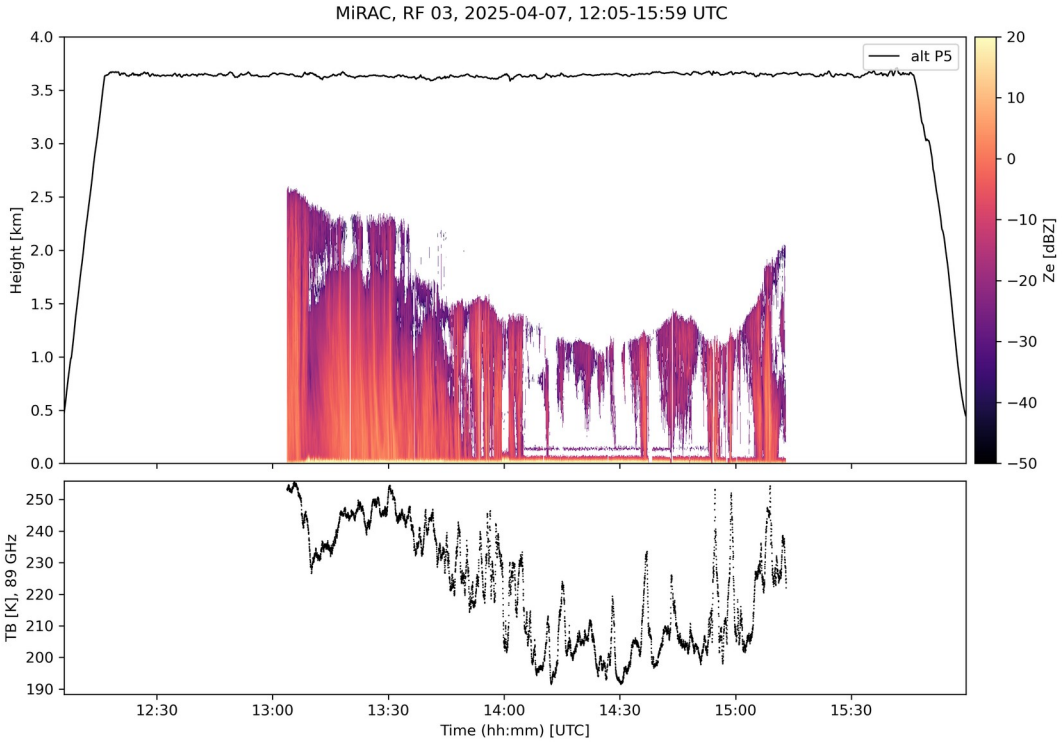
Detailed flight logs (all times UTC):

12:06 Take off
12:16 Survey altitude 12000ft reached
12:30 Clouds start over the mountain around 68.54, 18.97
12:47 Over strato cumulus cloud deck
13:03 Radar start over open ocean - not operated over land due to too many restricted areas.
13:03 AMALi start - first failed due to not switched RUN button.
13:10 WP1 - short turn to start MSI leg
13:16 DS1 launched
13:38 DS2 launched
13:44 WP2
13:50 Wave-like cloud patterns in homogeneous stato cumulus deck
13:51 No cirrus above us throught out the flight
13:56 Strong head winds 30kts
13:59 WP3 - long turn to get on the satellite track
14:02 WP3 on satellite track
14:04 DS3
14:17 DS4
14:31 DS5
14:33 Radiation square - last leg not 90° aligned
14:57 WP4
15:13 AMALi and radar off
15:59 Landing

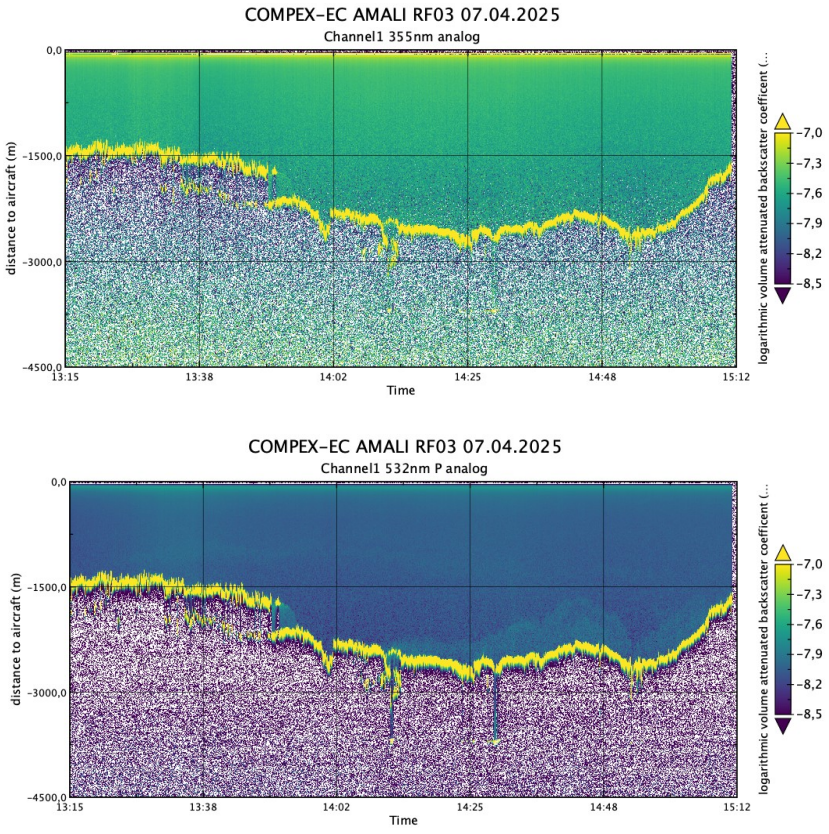
Quicklooks:



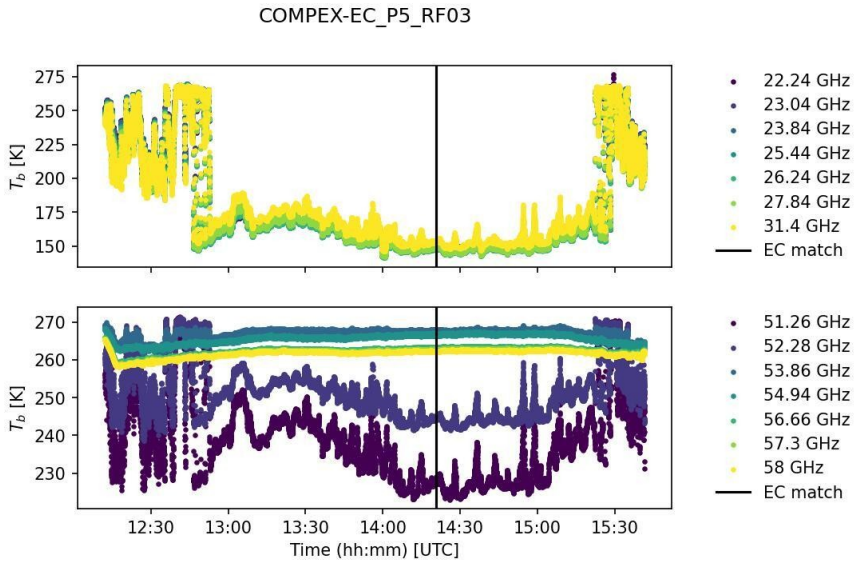
Comparison between EarthCARE Ze and MiRAC-A Ze together with the passive channel at 89 GHz for the direct overpass section.



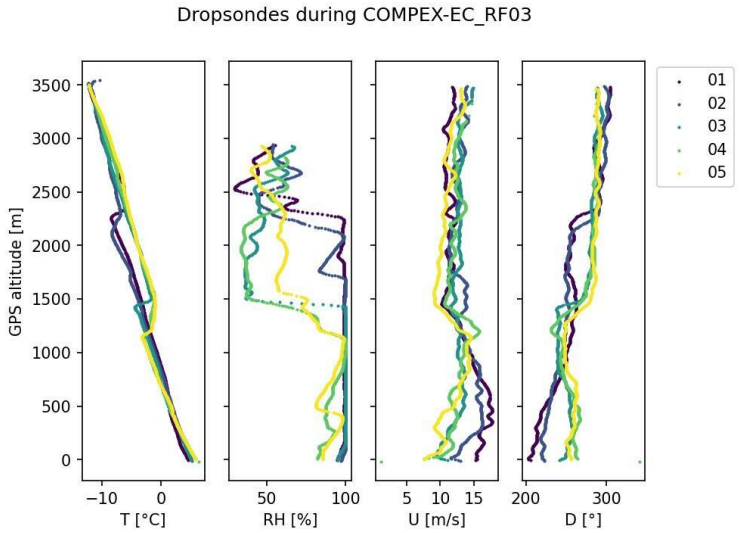
MiRAC-A radar reflectivity and 89 GHz passive channel for the whole flight.



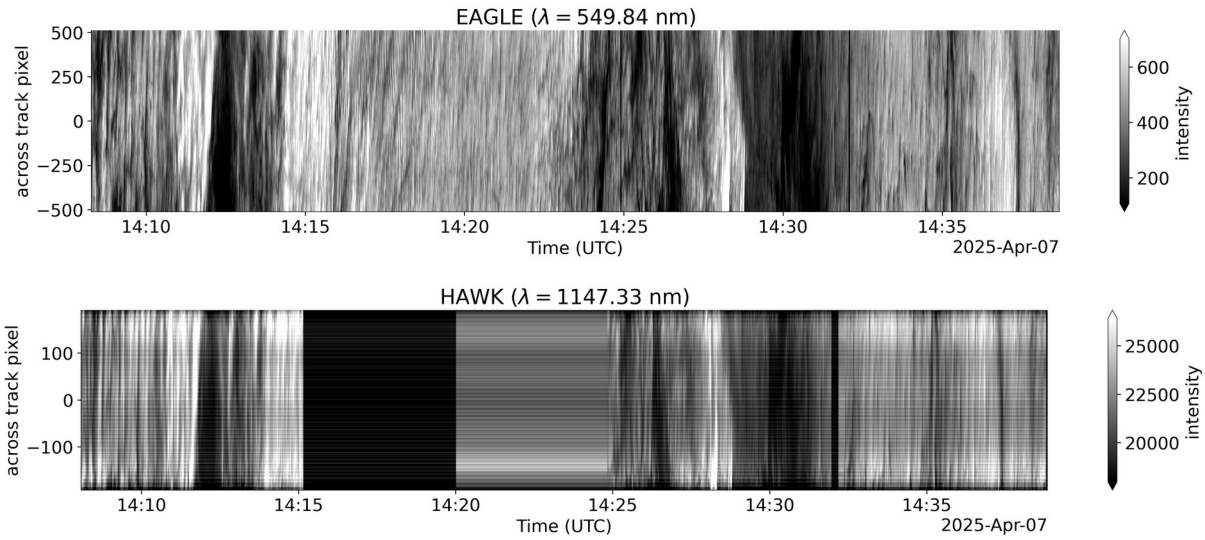
355 nm (top) and 532 nm parallel (bottom) analog for the whole flight.



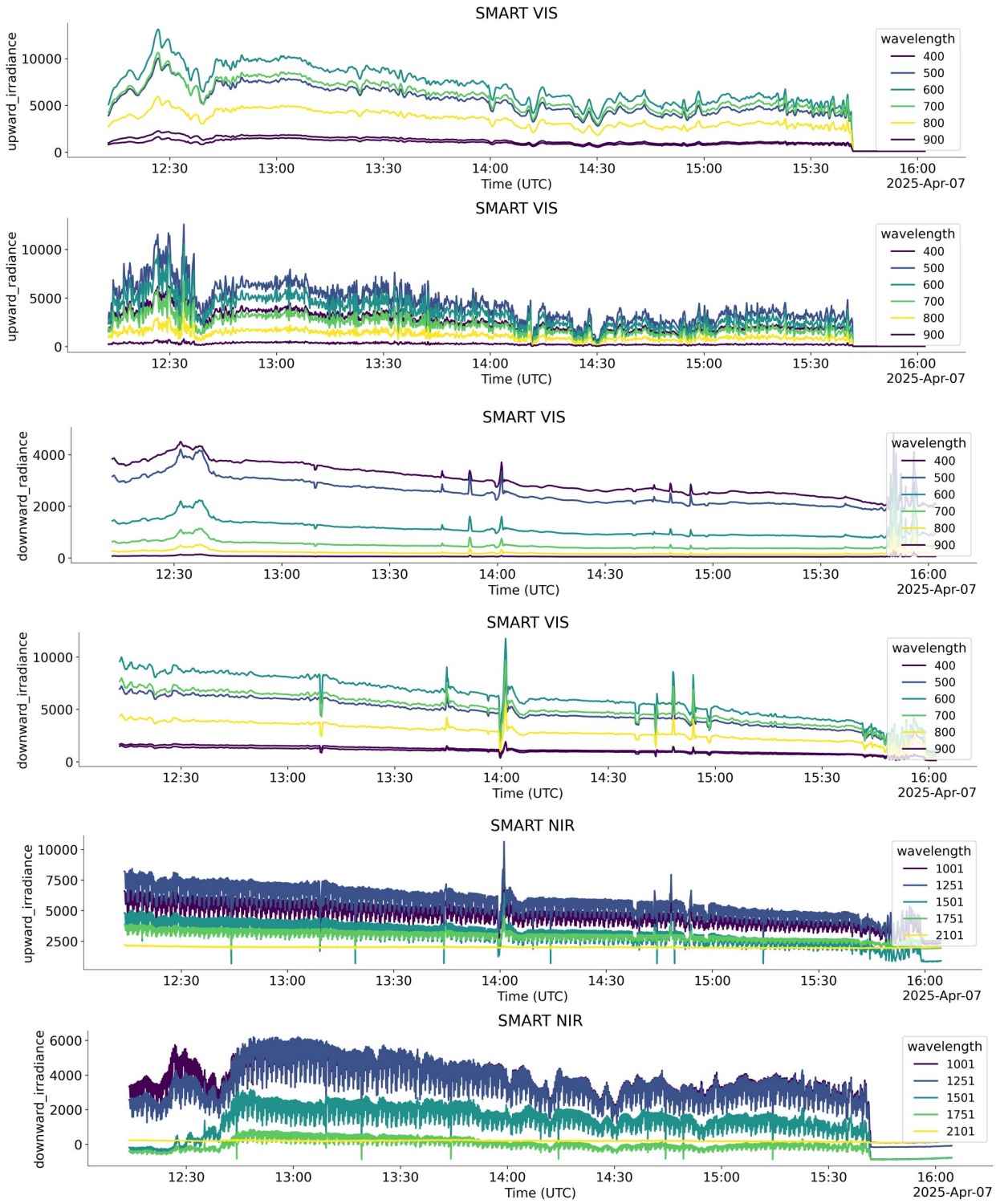
HATPRO channels at K- (top) and V-band (bottom) for the whole flight.



Dropsonde profiles from the flight.



EAGLE VIS (top) and HAWK NIR (bottom) for the whole flight.



Up- and downlooking, radiance and irradiance of SMART VIS for the whole flight. Lower panels show the NIR up- and downlooking SMART channels.