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METEOROLOGISKA INSTITUTET
FINNISH METEOROLOGICAL INSTITUTE

High Latitudes Event Week 2023

Case Study:

Dense Fog in Helsinki 11.9.2021 from a FCI point of view

(FCI= Flexible Combinated Imager)

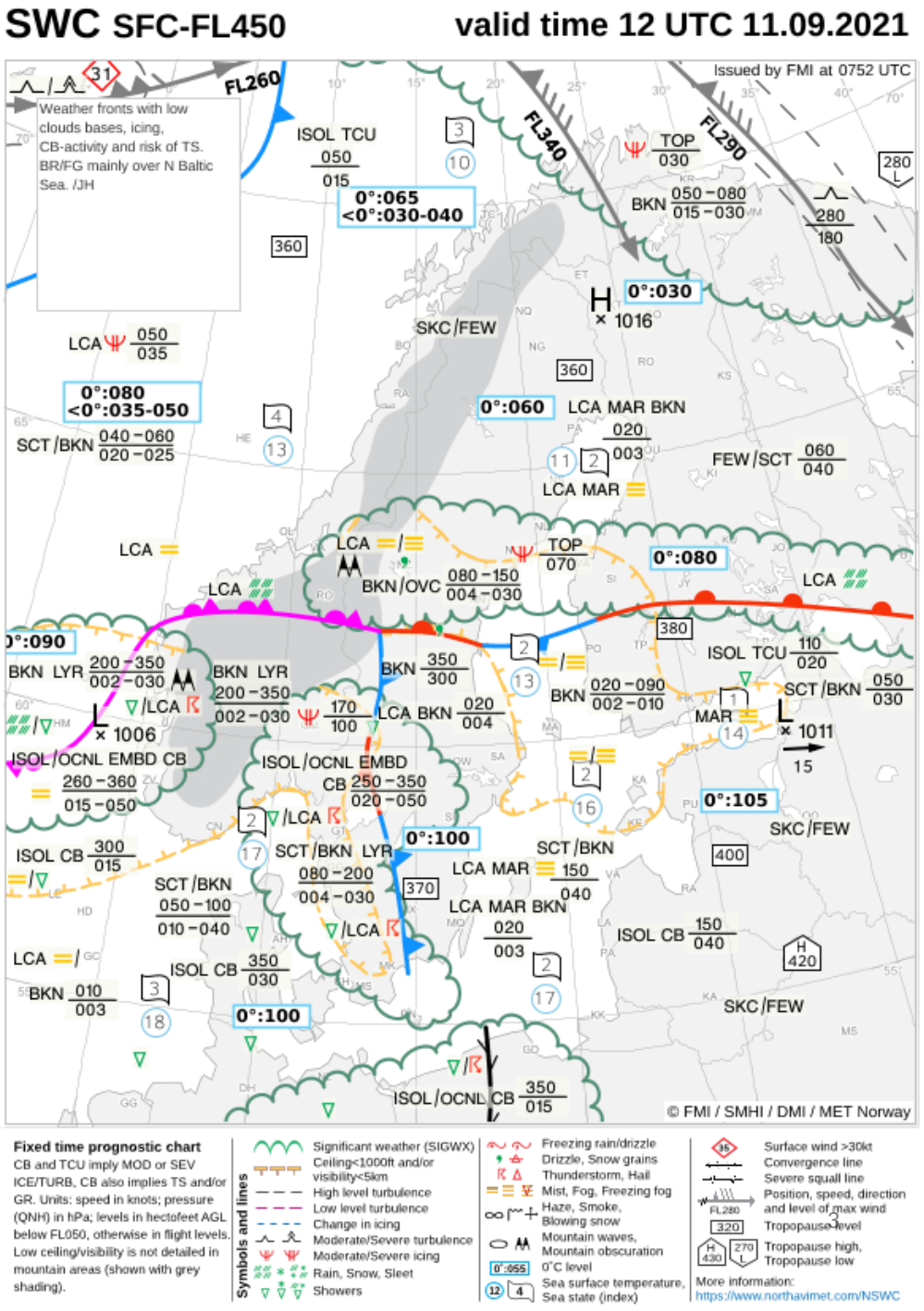
30.1.2023 **Robert Mäkitie (Pia Isolähteenmäki)**

Content

1. General synoptic situation
2. Observations south of Helsinki-Vantaa
3. Weather development in Helsinki-Vantaa
4. Comparison of different weather satellite images

General synoptic situation:

- Almost stationary frontal system over southern Finland.
- Moist air over southern Finland and a large stratus (fog) cloud over the central Baltic Sea and the Gulf of Finland.
- A lot of different layer clouds along the frontal system.



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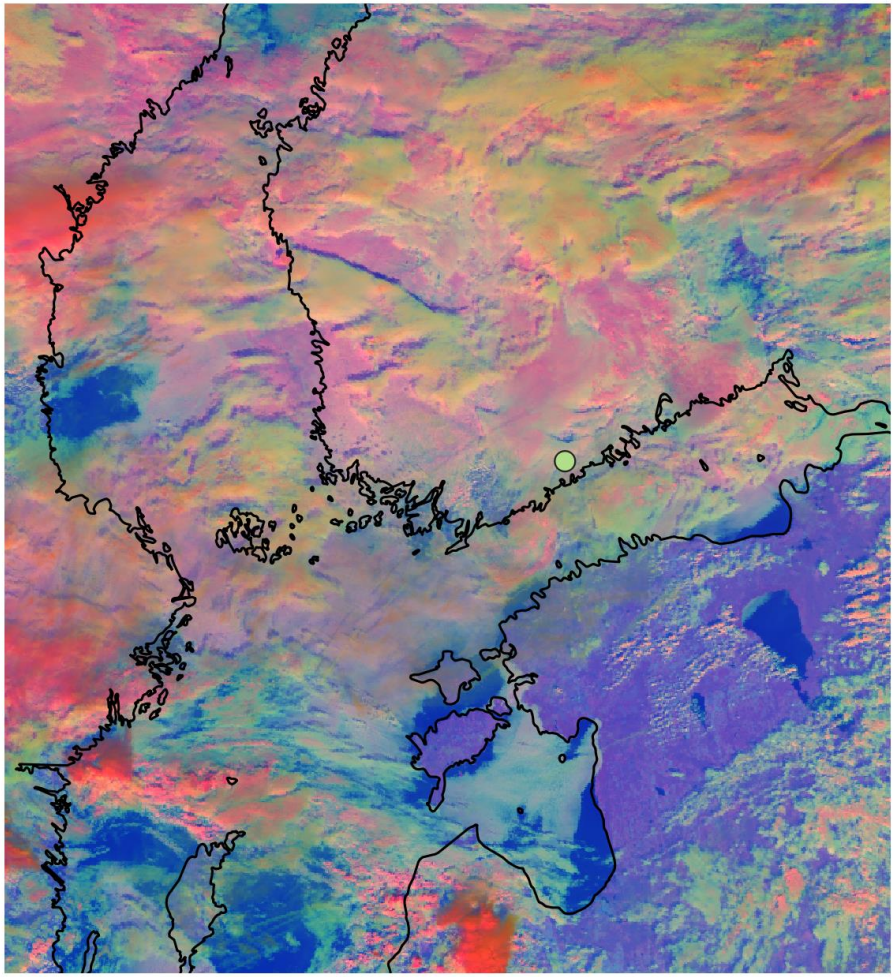
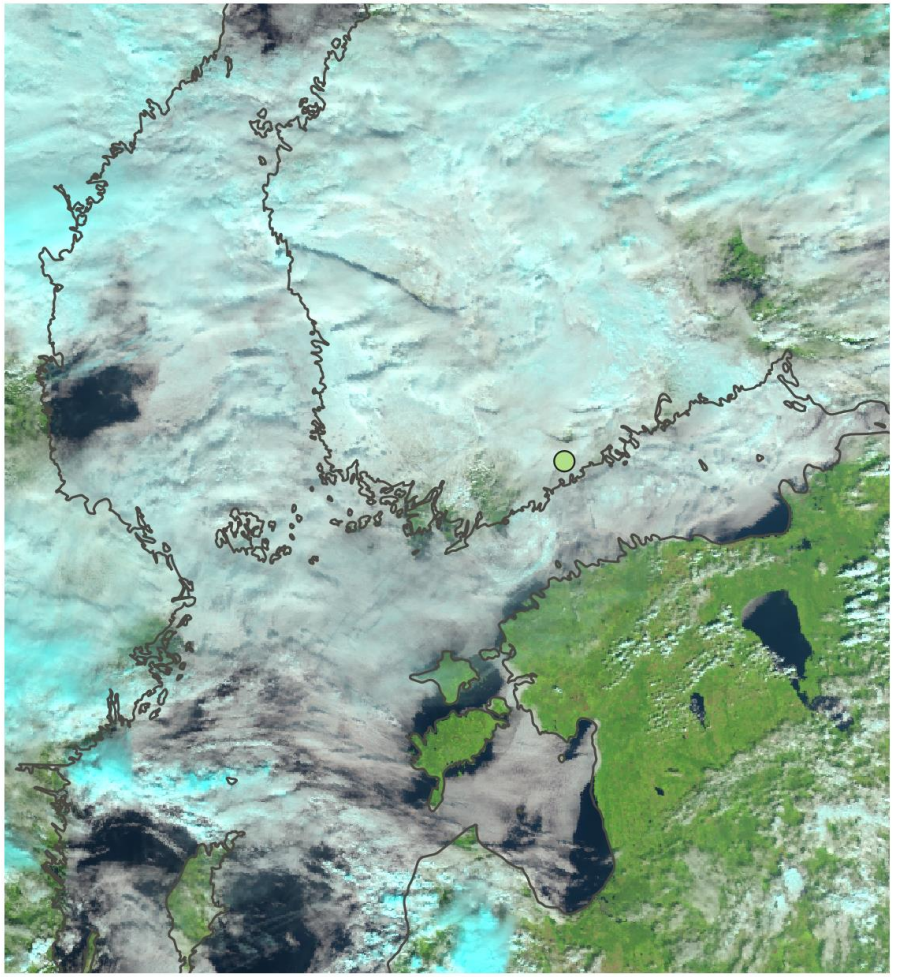
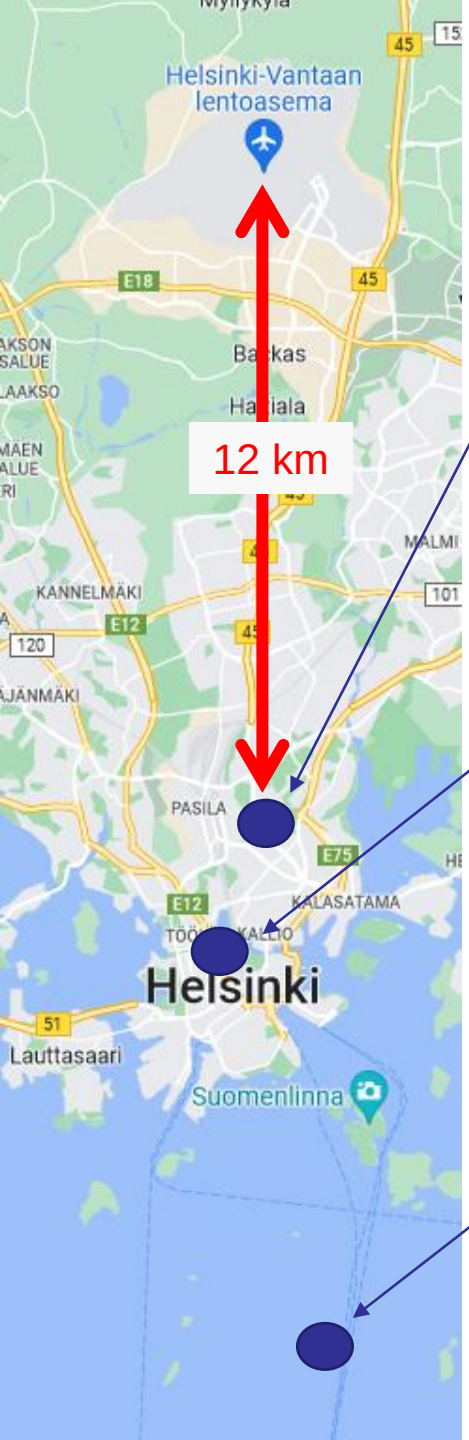
Satellite observations

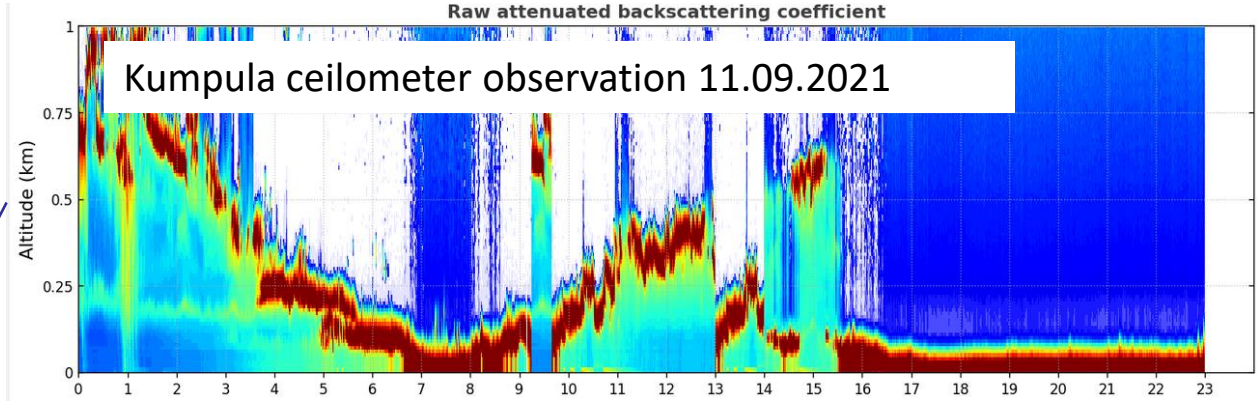
VIIRS Day Microphysics
11.9.2021 11:56 UTC

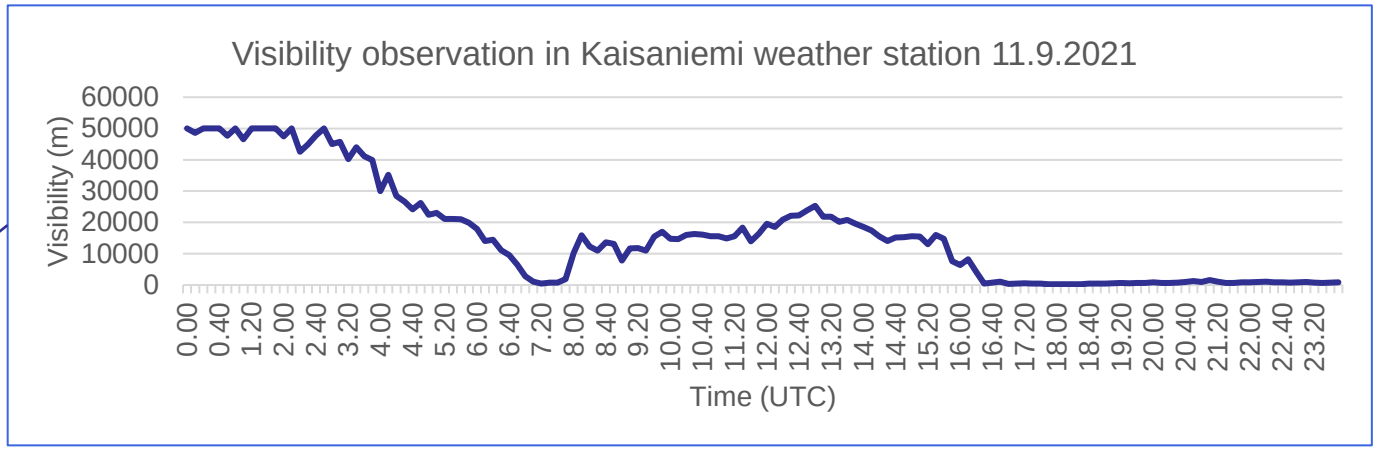


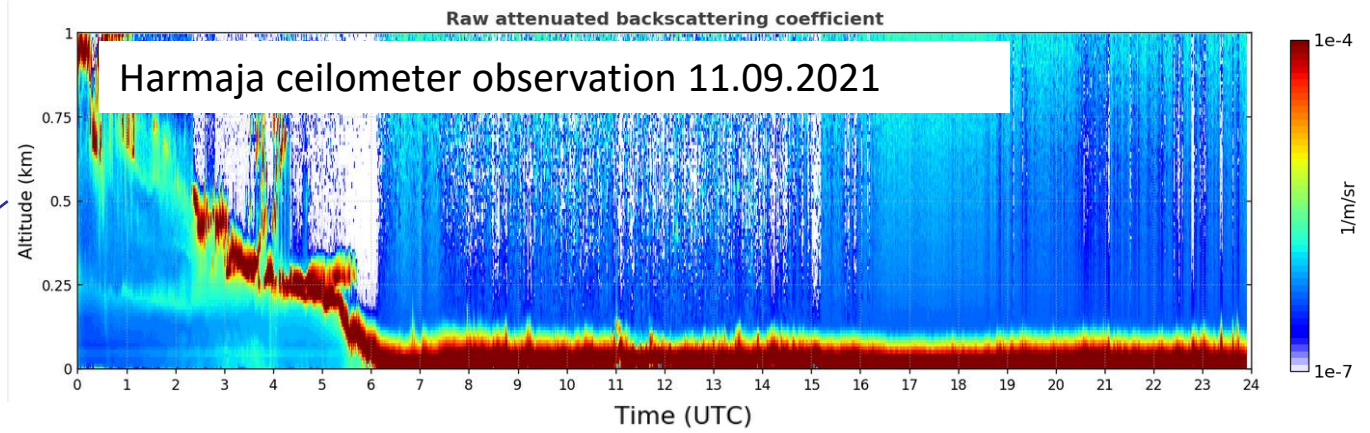
VIIRS Natural Colour with IR Clouds
11.9.2021 11:56 UTC




Helsinki-Vantaan lentoasema
12 km
Helsinki
Lauttasaari
Suomenlinna
PASILA
KALASATAMA
KANNELMÄKI
MALMI


Raw attenuated backscattering coefficient
Kumpula ceilometer observation 11.09.2021
Altitude (km)


Visibility observation in Kaisaniemi weather station 11.9.2021
Visibility (m)
Time (UTC)


Raw attenuated backscattering coefficient
Harmaja ceilometer observation 11.09.2021
Altitude (km)
Time (UTC)
1e-4
1e-7
1/m/sr

When the fog reached Kumpula

- Warning call to Helsinki-Vantaa air traffic control
- Amendment to the forecast products

TAF EFHK 111737Z 1118/1218 14005KT 9999 SCT009

BECMG 1118/1120 2000 BR OVC002

TEMPO 1121/1202 0400 FG VV001

BECMG 1202/1204 3000 -RA BR

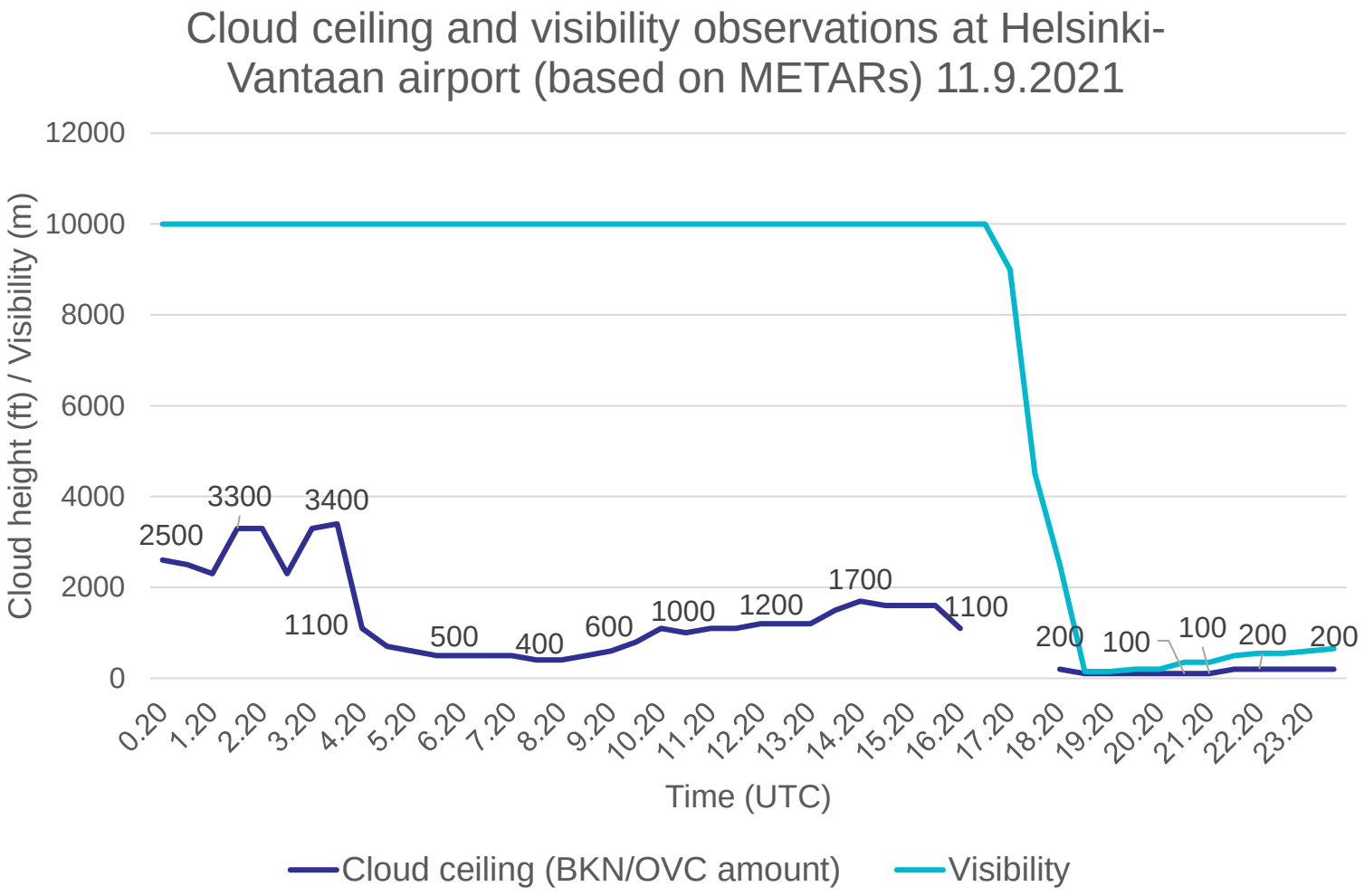
TEMPO 1205/1211 8000 TSRA BKN008 SCT040CB

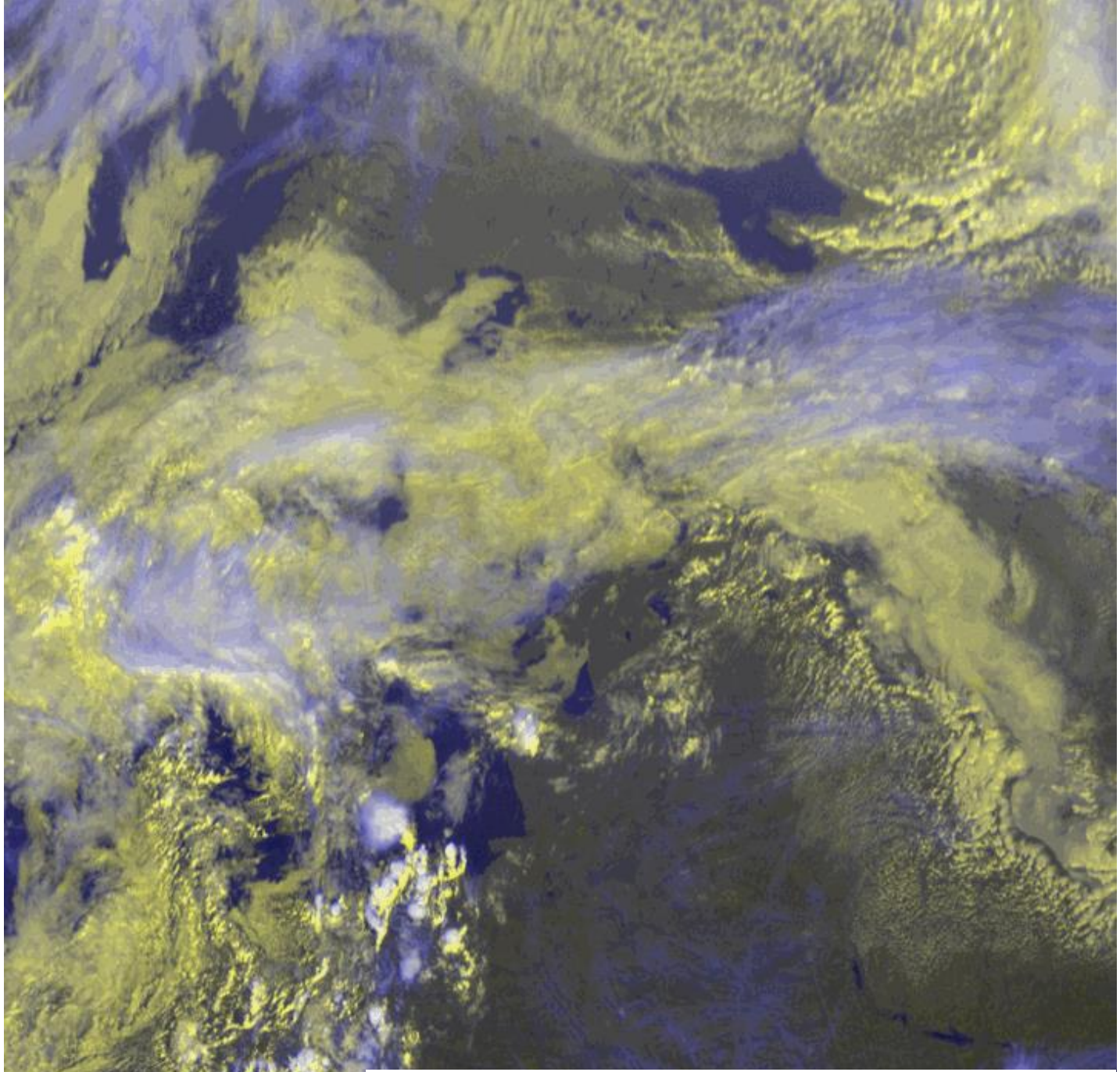
TEMPO 1211/1218 2000 -DZ BR=

BECMG 1118/1119 0400 FG VV001

BR = Mist
FG = Fog

Cloud ceiling and visibility at EFHK

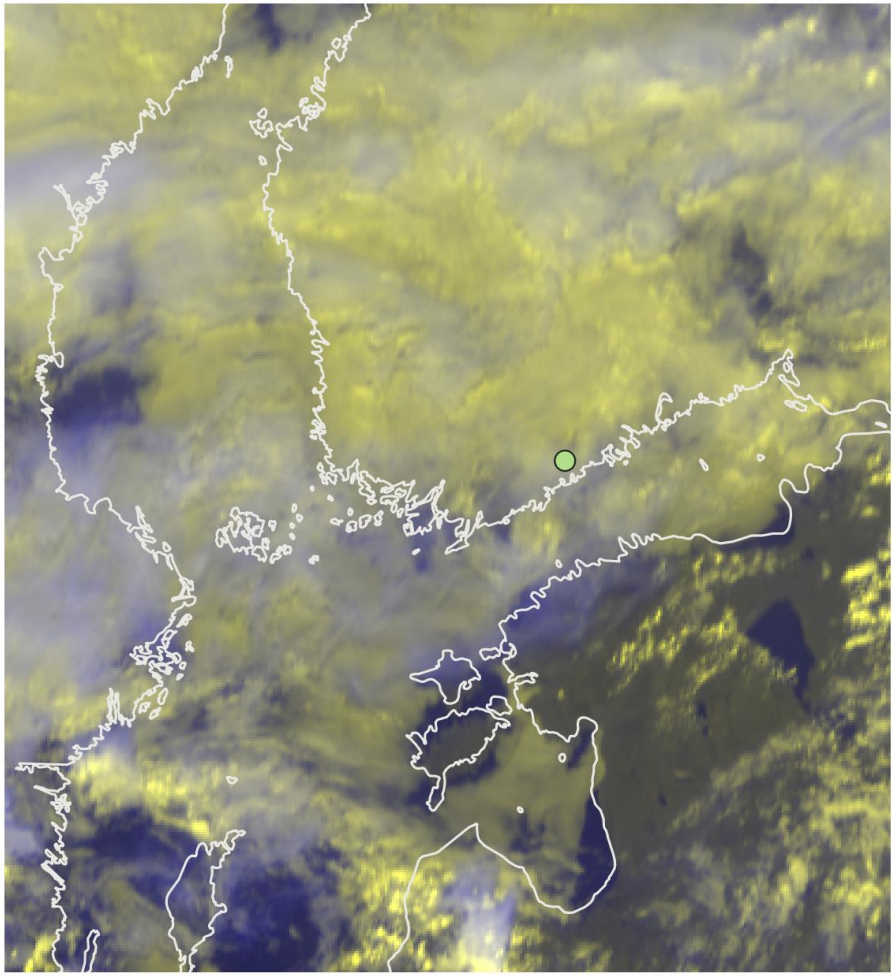




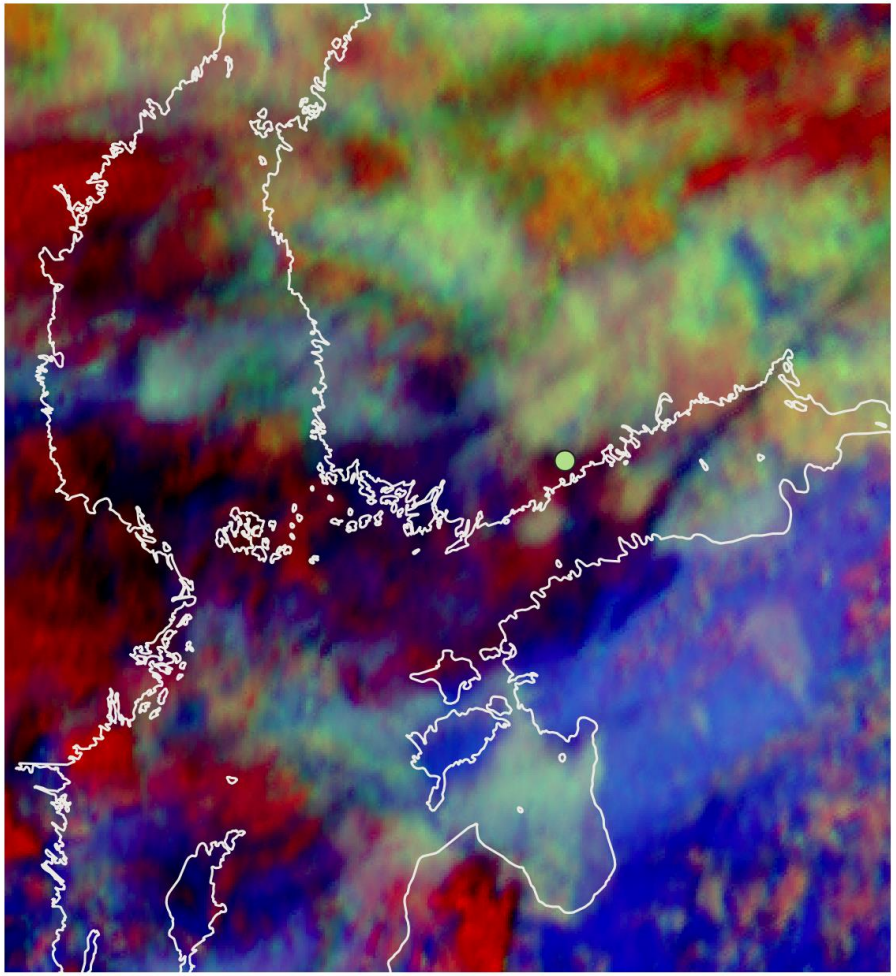
SEVIRI HRV Clouds 11.9.2021 11:30-14:30

HRV Cloud vs 24h Microphysical

If there is not day light available…

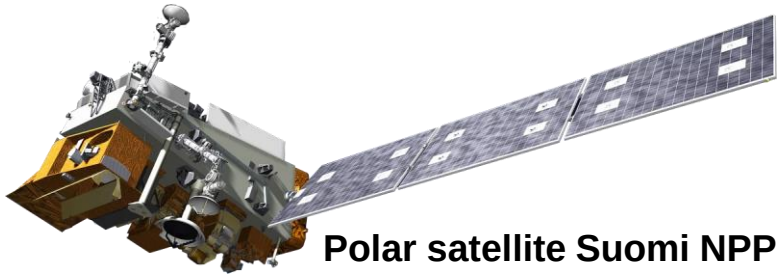


SEVIRI HRV Clouds
11.9.2021 12 UTC



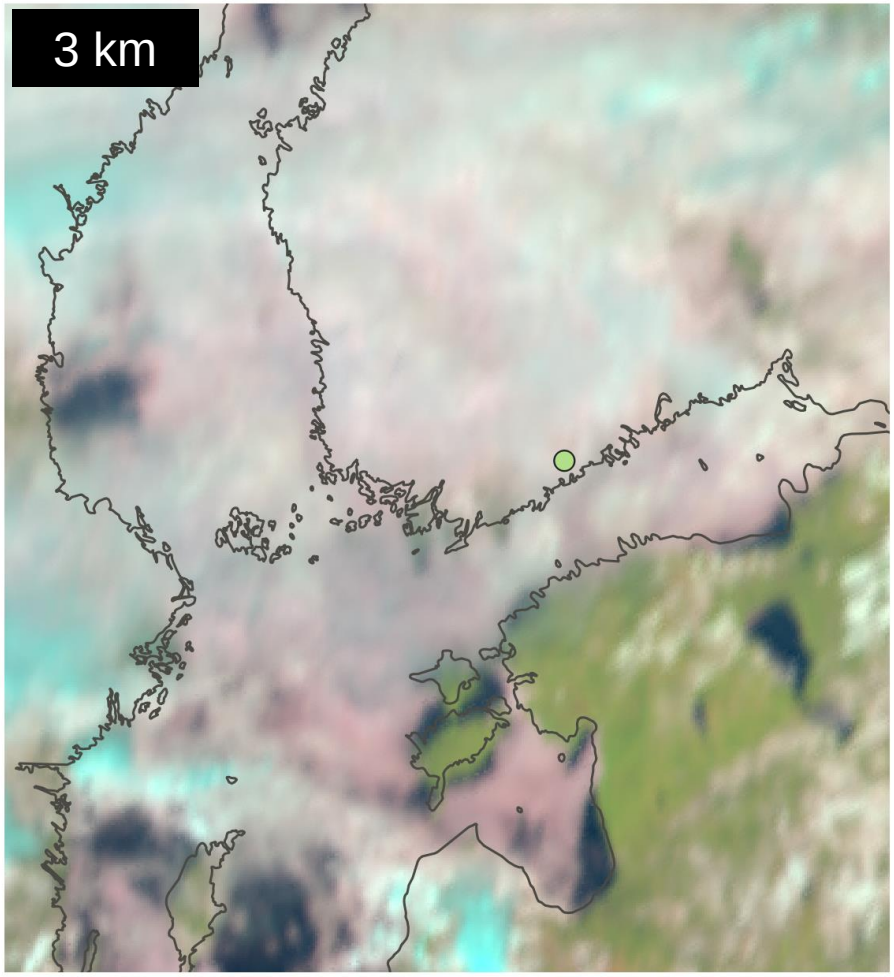
SEVIRI 24h Microphysical
11.9.2021 12 UTC

SEVIRI vs VIIRS

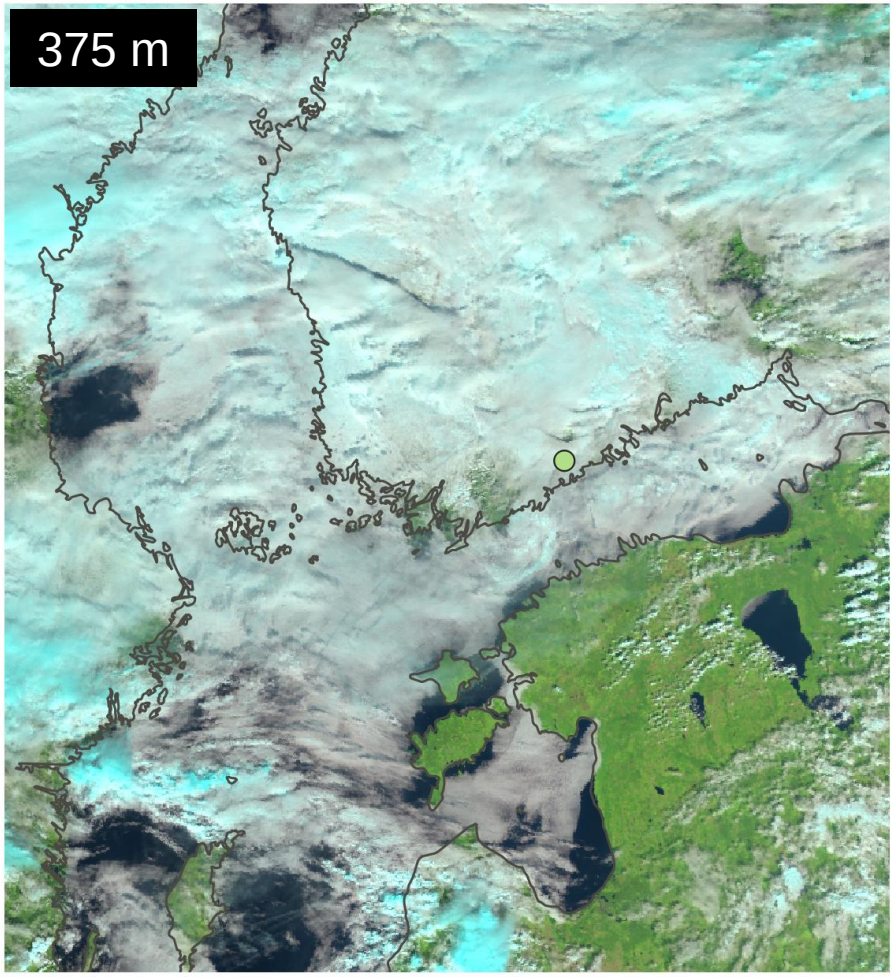


Polar satellite Suomi NPP

Geostationary satellite Meteosat-11



SEVIRI Natural Colour with IR clouds
11.9.2021 12 UTC

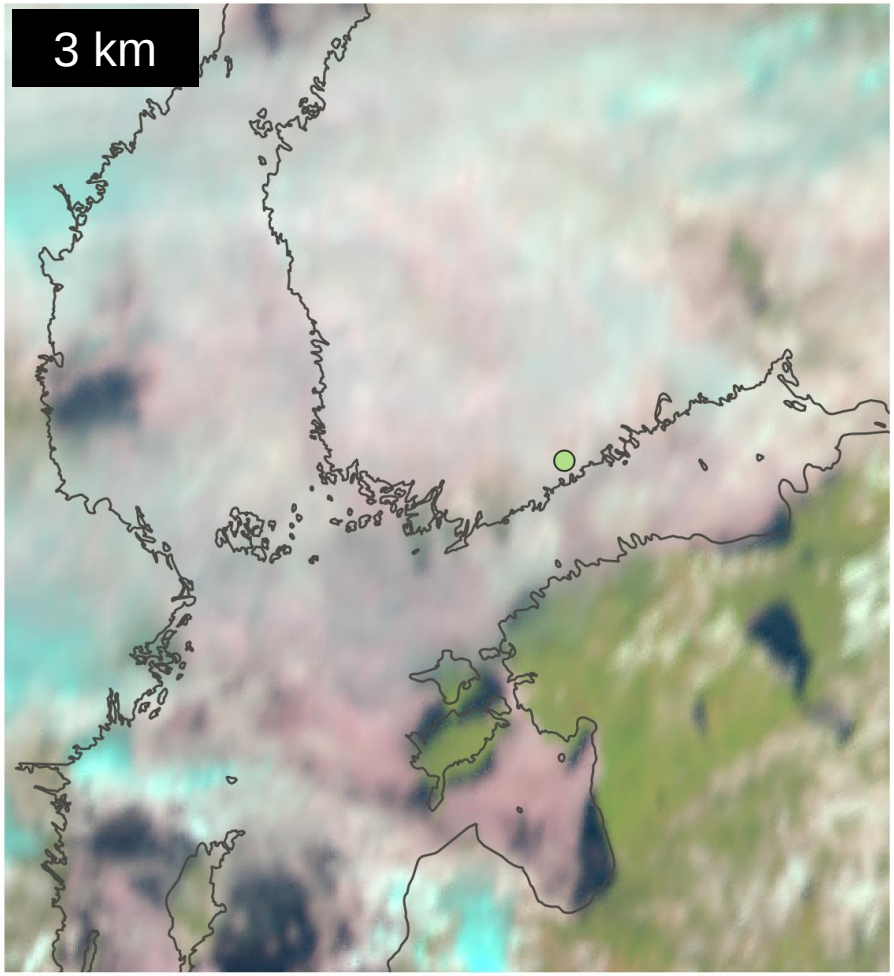


VIIRS Natural Colour with IR Clouds
11.9.2021 11:56 UTC

METOSAT THIRD GENERATION (MTG)
FLEXIBLE COMBINATED IMAGER (FCI)

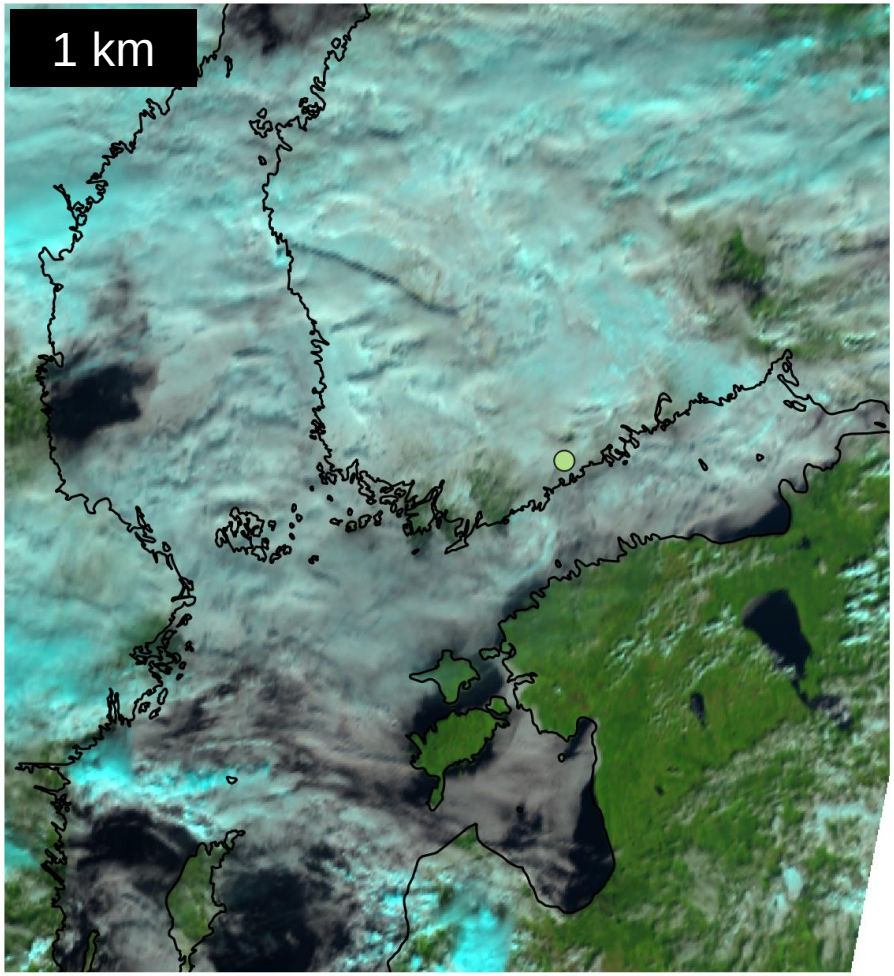
SEVIRI vs FCI

Was available in 11.9.2021



SEVIRI Natural Colour with IR clouds
11.9.2021 12 UTC

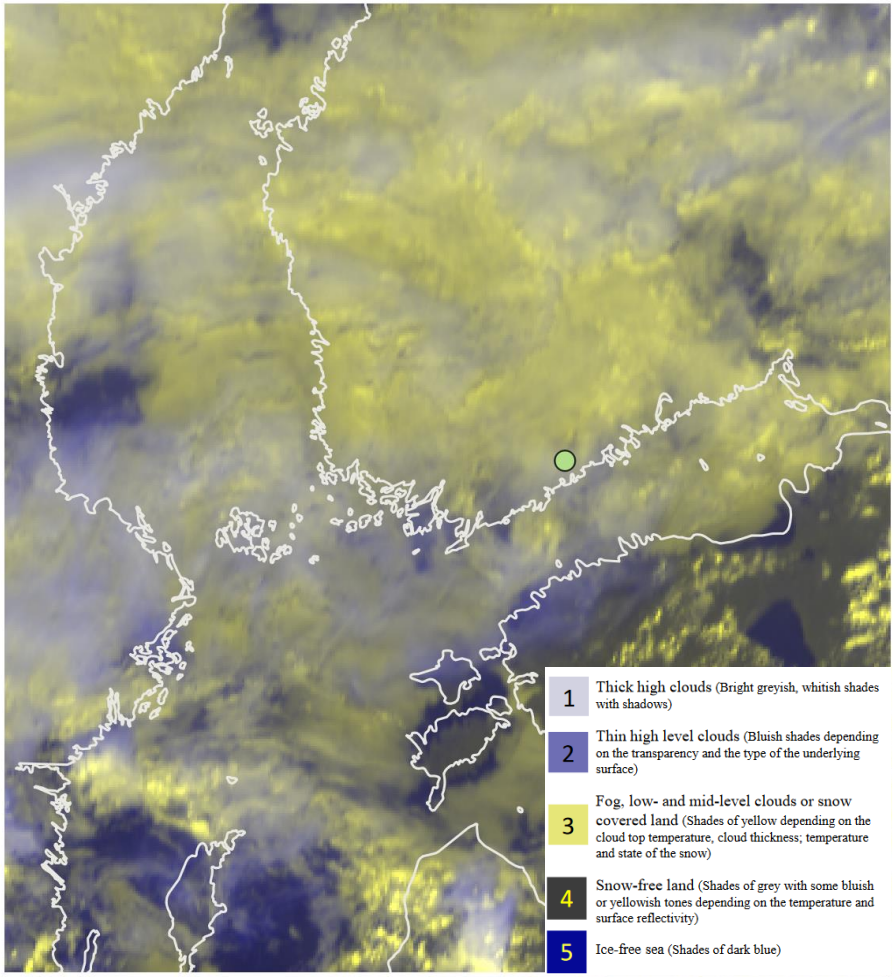
Will be available in future



FCI (**simulated** from VIIRS) Natural Colour with IR clouds 11.9.2021 11:56 UTC

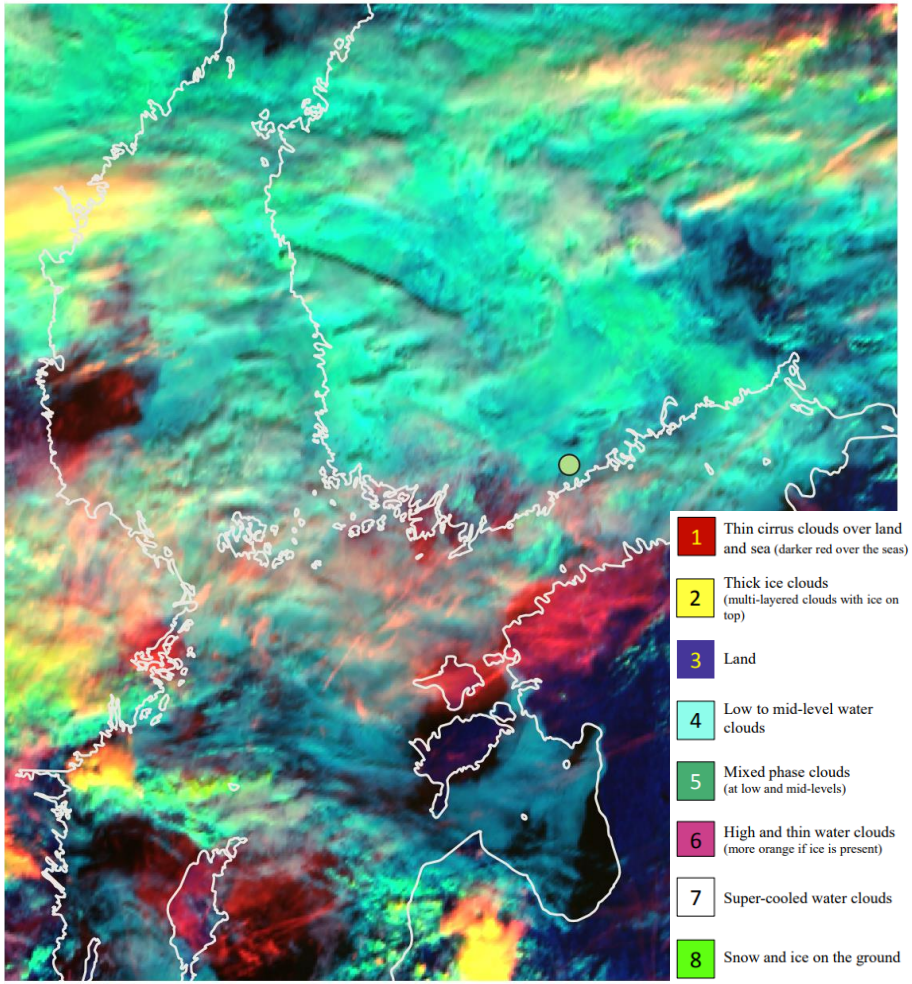
SEVIRI vs FCI Cloud Type

Was available in 11.9.2021



SEVIRI HRV Clouds
11.9.2021 12 UTC

Will be available in future



FCI (**simulated** from VIIRS) Cloud Type
11.9.2021 11:56 UTC

Summary

- Fog is tricky to forecast. Combination of different observations are needed for the best nowcasting result

- The new generation of satellites bring major improvements
  - The spatial and temporal resolution will significantly increase

- The new Cloud Type RGB image could have been useful in 11.9.2021, and possibly increase the quality of forecast

- Polar satellite images will be useful also in the future due to high spatial resolution.

Thank you!

More interesting case studies from satellite point of view are availabe in Eumetsat website

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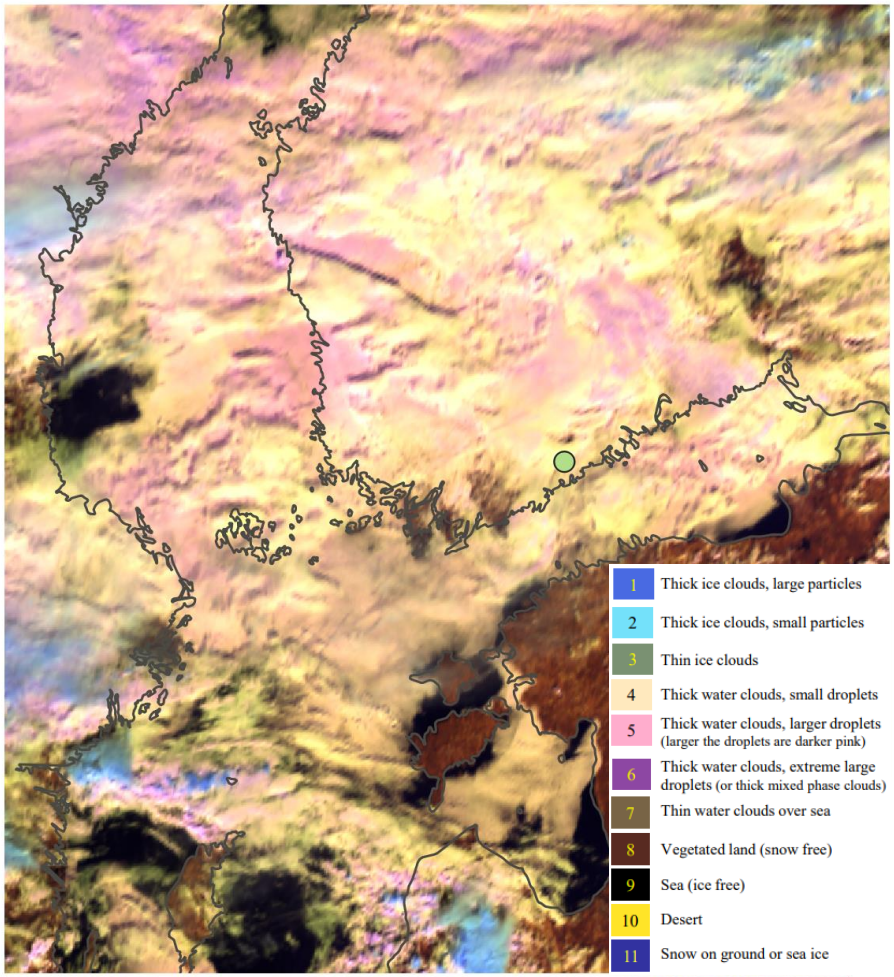
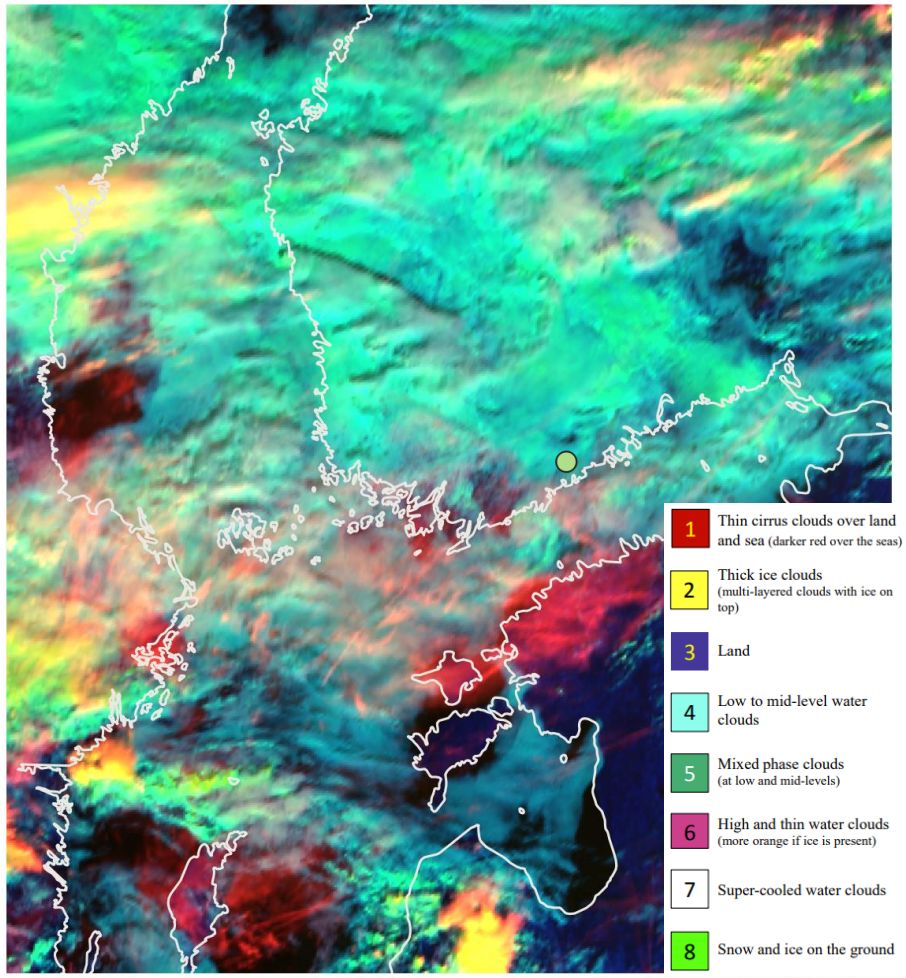
Cloud Phase ja Cloud Type



FCI (**simulated** from VIIRS) Cloud Phase
11.9.2021 11:56 UTC



FCI (**simulated** from VIIRS) Cloud Type
11.9.2021 11:56 UTC