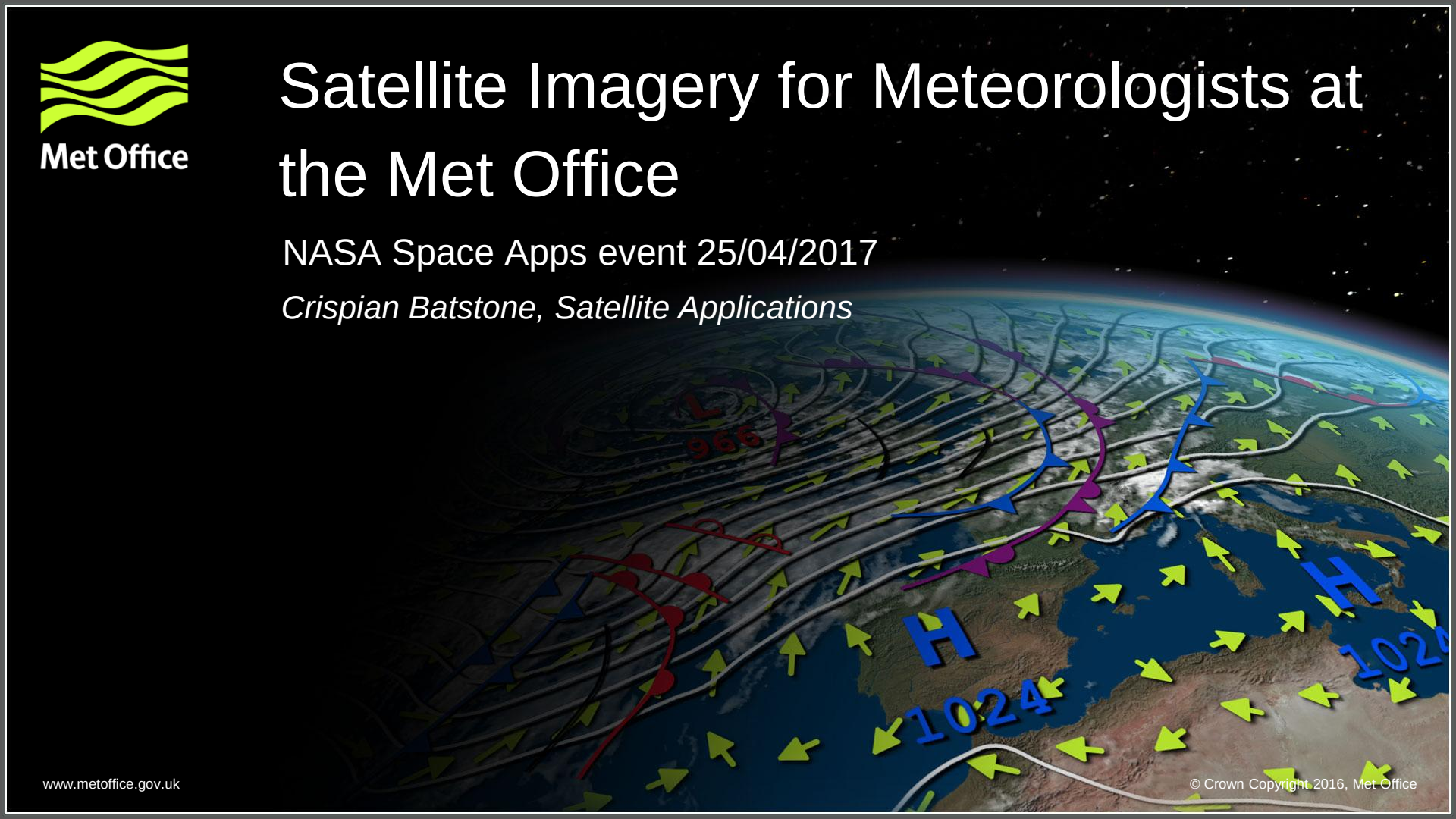
Satellite Imagery for Meteorologists at the Met Office

NASA Space Apps event 25/04/2017

Crispian Batstone, Satellite Applications



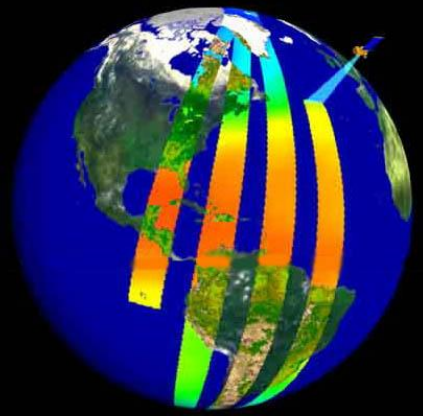

Digital Globe


USGS Landsat


USGS Landsat


USGS Landsat

Polar Orbiting Satellites



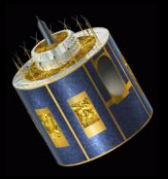
Worldview-4 (DG)
- 31cm pixel resolution
- 13km swath
- 617km orbit height

Landsat-8 (USGS)
- 15m pixel resolution
- 185km swath
- 710km orbit height

Suomi NPP (NASA/NOAA)
- 375m pixel resolution
- 3000km swath
- 833km orbit height

Weather satellites' orbits

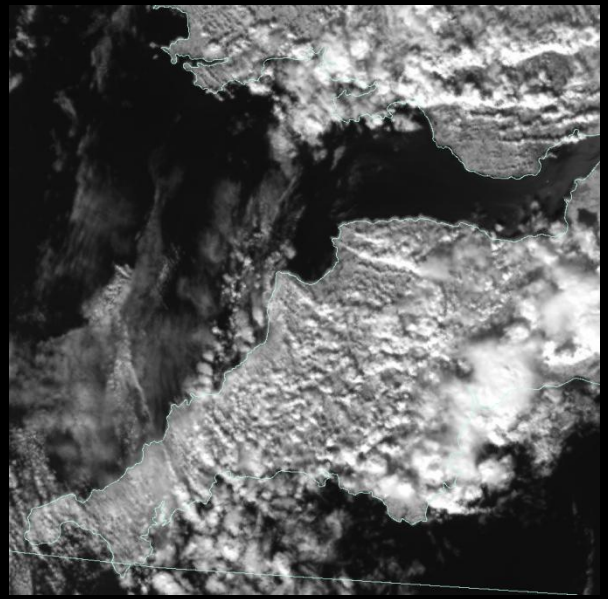
Geostationary orbit (35800km)



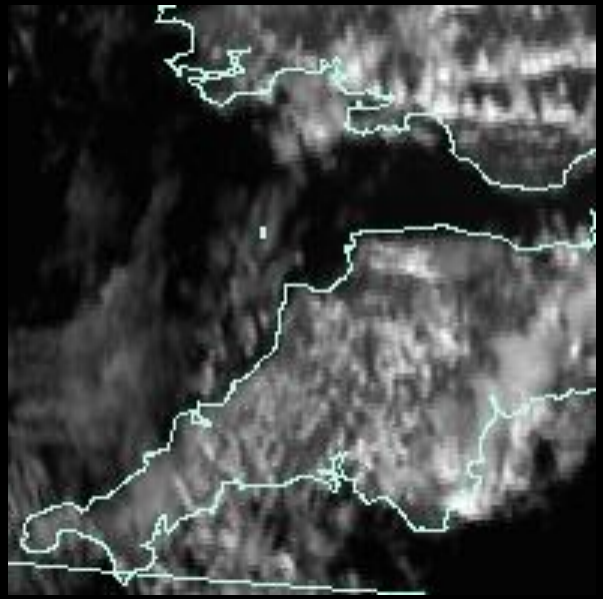
Meteosat-10

Suomi-NPP orbit (833km)

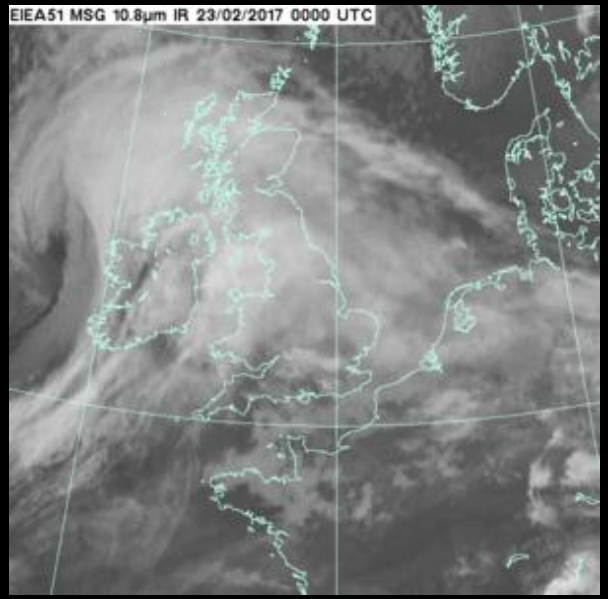
Imager resolution



Suomi-NPP

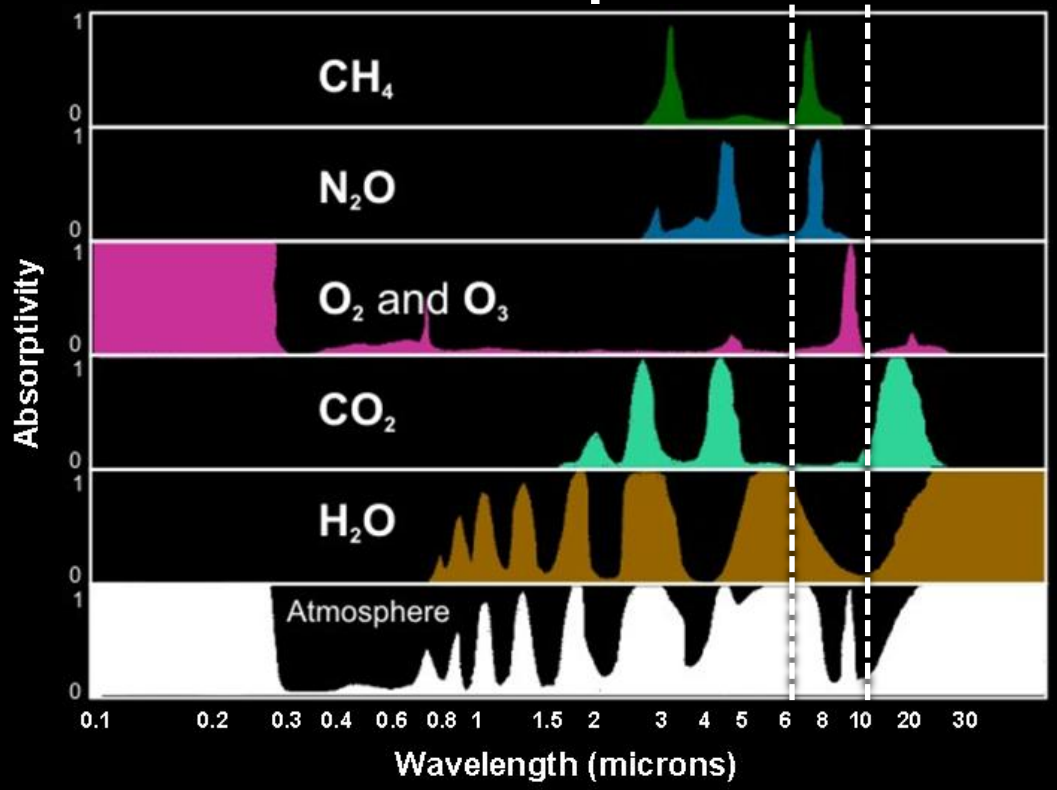


Meteosat-10 (HRV)



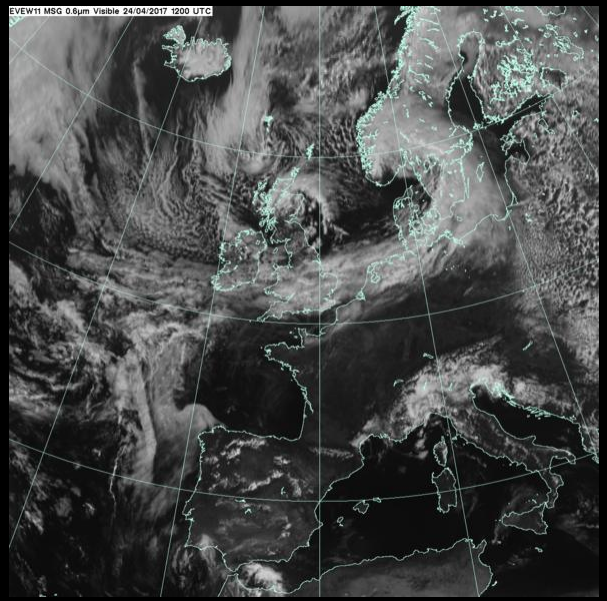
Meteosat-10 (IR)

Atmospheric absorption of radiation

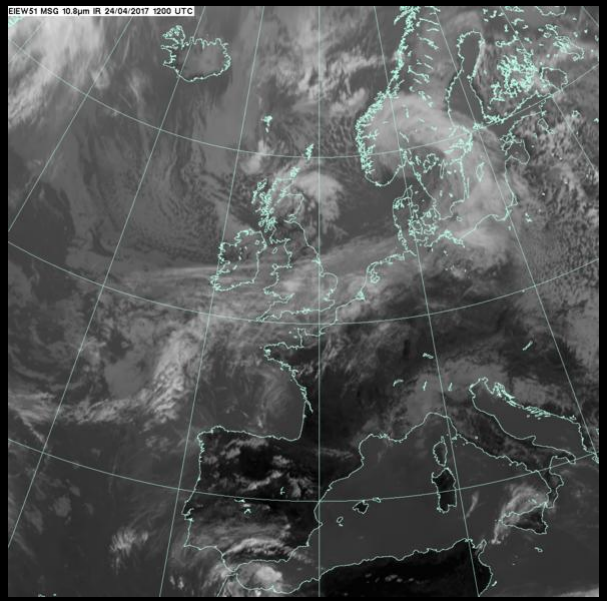


- LW emission from Earth >5μm
- LW absorption by water ~6.3μm
- IR ‘window’ at ~10.5μm

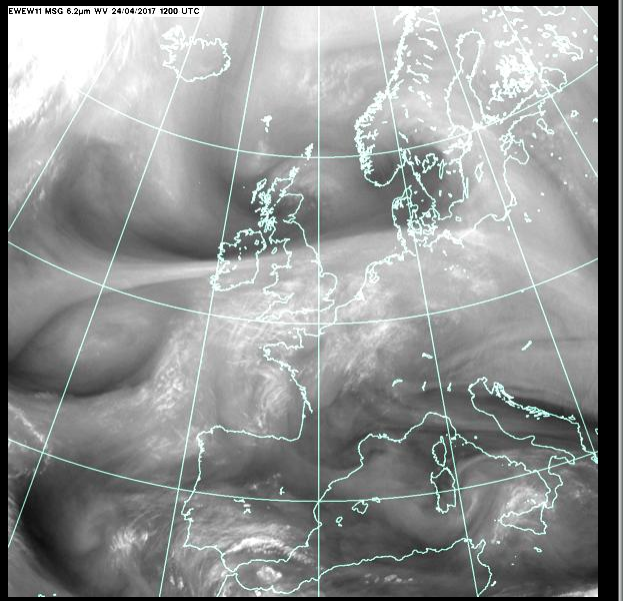
Imagery for different wavelengths



Visible (0.8µm)

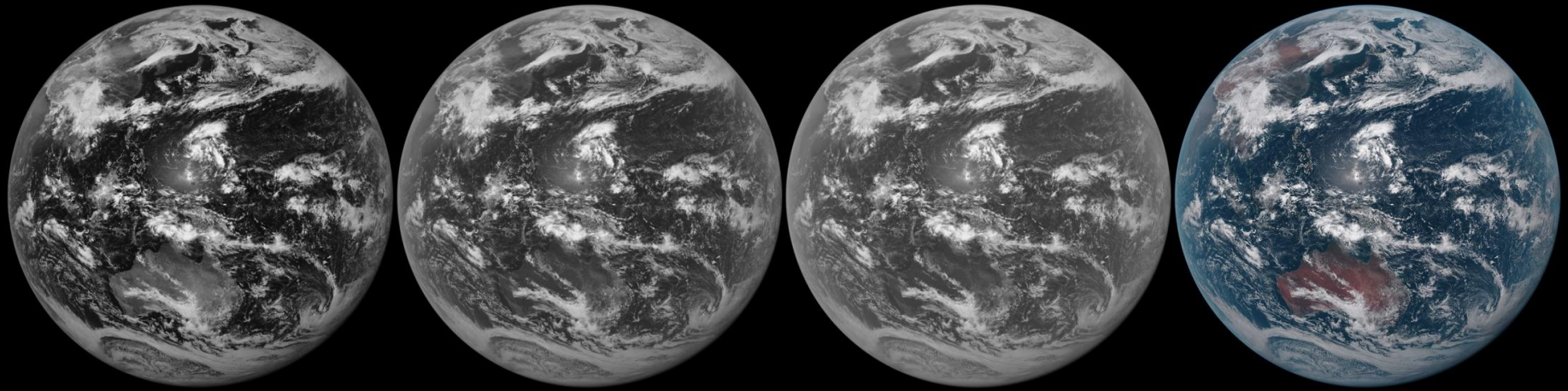


Infra-red (10.8µm)



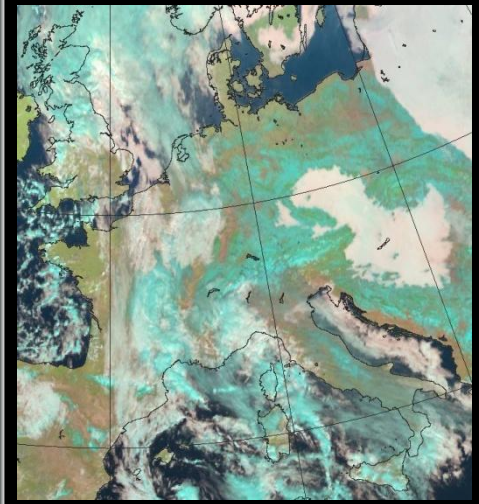
Water vapour (6.2µm)

True colour RGB imagery

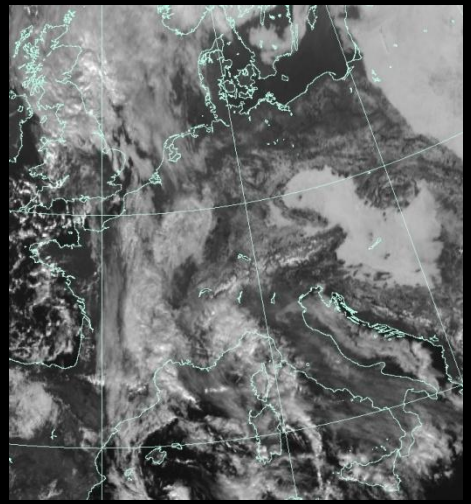


Red (0.7μm) Green (0.5μm) Blue (0.45μm) Himawari-8 / JMA

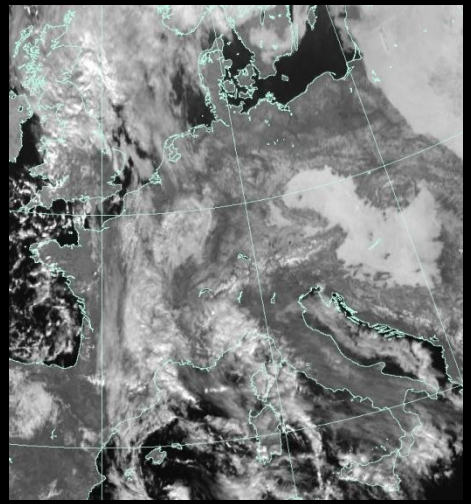
Natural colour RGB imagery



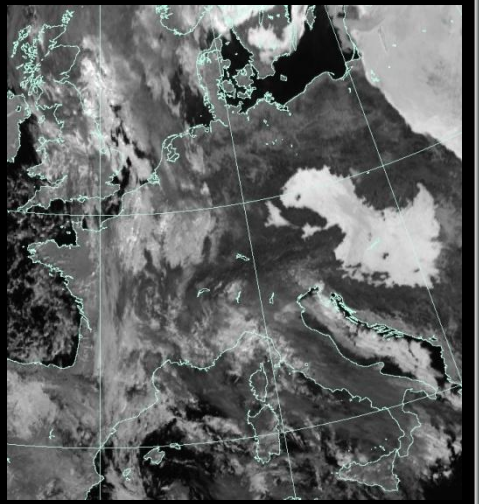
Meteosat-10



0.6μm → Blue



0.8μm → Green

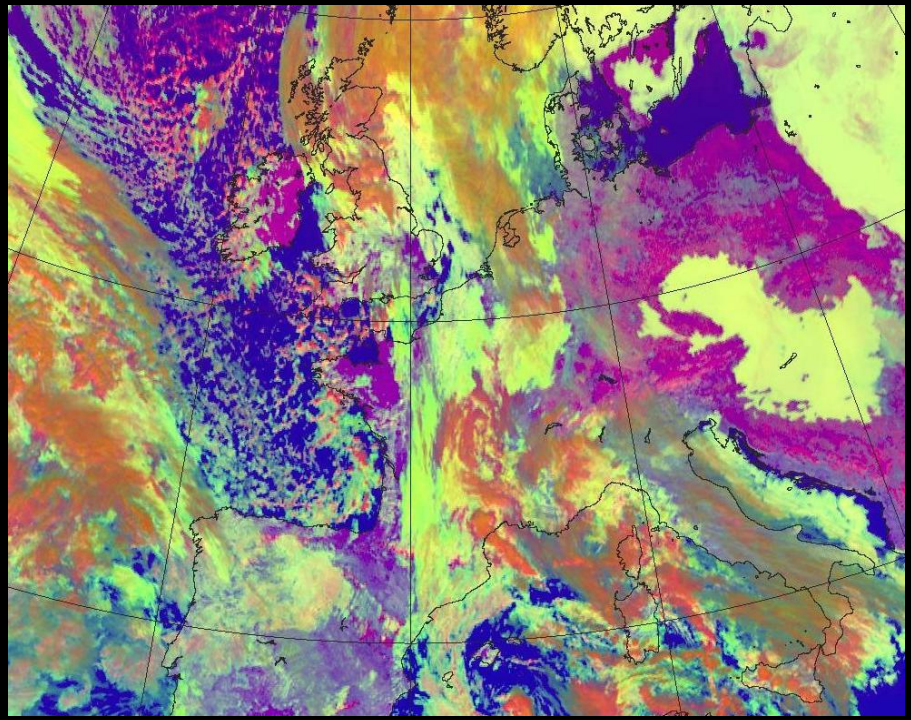


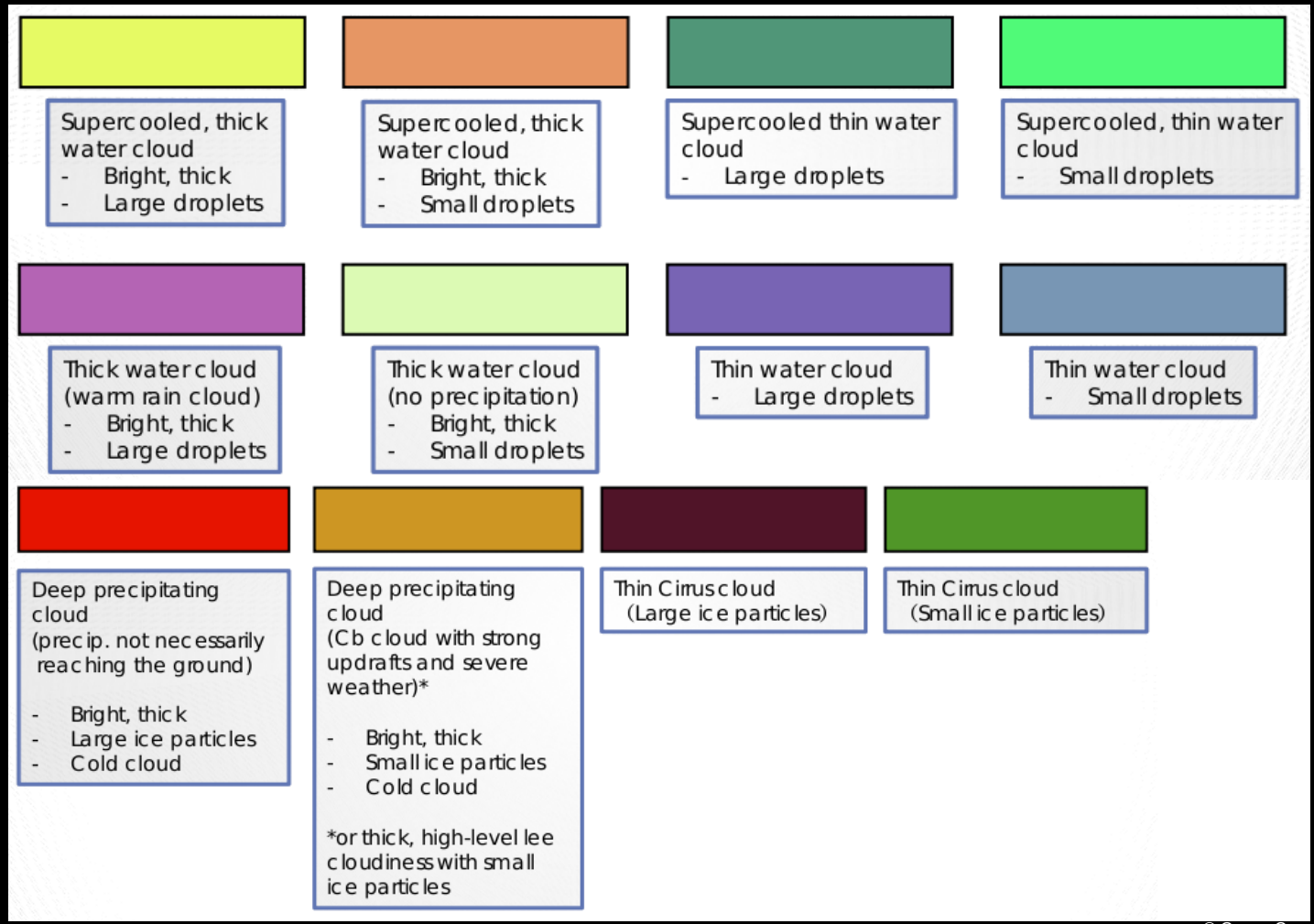
1.6μm → Red

Day microphysical RGB imagery

- 0.8 μm → Red
- 3.9 μm → Green
- 10.8 μm → Blue

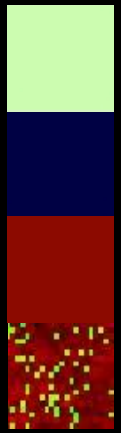
- Cold ice clouds = Orange
  - Cold = low contribution from Blue
  - Ice = low contribution from Green
- Cold liquid water clouds = Yellow
  - Water = more contribution from Green
- Warm liquid water clouds = cream/pink
  - Warm = greater Blue contribution





‘Night’ RGB imagery

- 12.0 μm – 10.8 μm → Red
- 10.8 μm – 3.9 μm → Green
- 10.8 μm → Blue

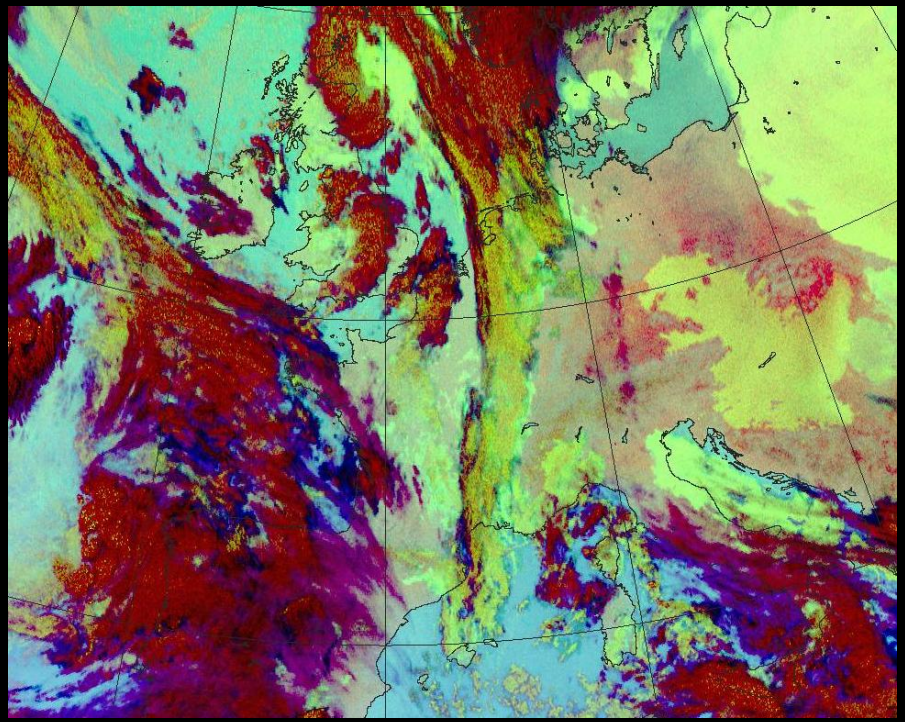


Cold fog/low cloud

Thin high cirrus

Cold, thick, high cloud

Very cold (e.g. Cb)



Any questions?