

Meteosat Third Generation Products and Applications

Volker Gärtner, EUMETSAT

Courtesy of Marianne König
marianne.koenig@eumetsat.int



Current EUMETSAT satellites

METOP A-B

(LOW-EARTH, SUN – SYNCHRONOUS ORBIT)

EUMETSAT POLAR SYSTEM/INITIAL JOINT POLAR SYSTEM

JASON-2 (shared with CNES, NOAA)

(LOW-EARTH, 63° INCL. NON SYNCHRONOUS ORBIT)

OCEAN SURFACE TOPOGRAPHY MISSION

METEOSAT 8-9-10 (2nd GENERATION)

(GEOSTATIONARY ORBIT)

TWO-SATELLITE SYSTEM:

- METEOSAT-10: FULL DISK IMAGERY MISSION AT 0° (15 MN)
- METEOSAT- 8: BACK UP AT 3.5°E
- METEOSAT-9: RAPID SCAN SERVICE OVER EUROPE AT 9.5°E (5 MN)

METEOSAT – 7 (1st GENERATION)

(GEOSTATIONARY ORBIT)

INDIAN OCEAN DATA COVERAGE MISSION AT 57°5 E
(UNTILL END 2016)



MTG to Secure Continuity and Evolution of EUMETSAT Services

1977

↓ MOP/MTP



Observation mission:
MVIRI: 3 channels
Spinning satellite
Class 800 kg

2002

↓ MSG



Observation missions:
SEVIRI: 12 channels
GERB
Spinning satellite
Class 2 tons

2019

and

2021



↓



MTG-I and MTG-S

Observation missions:
Flex.Comb. Imager: 16 channels
Infra-Red Sounder
Lightning Imager
UVN
3-axis stabilised satellites
Twin Sat configuration
Class 3.6 – 3.7 tons

Implementation of the EUMETSAT Mandate
for the Geostationary Programme

Atmospheric Chemistry Mission (UVN-S4):
via Copernicus Sentinel 4



MTG System Concept

MTG Space Segment Configuration

- **Twin Satellite Concept, based on 3-axis platforms**
 - Imaging Satellites (MTG-I)
 - Sounding Satellites (MTG-S)
- **The payload complement of the MTG-I satellite consists of**
 - The Flexible Combined Imager (FCI)
 - The Lightning Imager (LI)
 - The Data Collection System (DCS) and Search and Rescue (GEOSAR)
- **The payload complement of the MTG-S satellite consists of**
 - The Infrared Sounder (IRS)
 - The Ultra-violet, Visible and Near Infrared Sounder (UVN)

UVN is provided as Copernicus Sentinel 4 Instrument

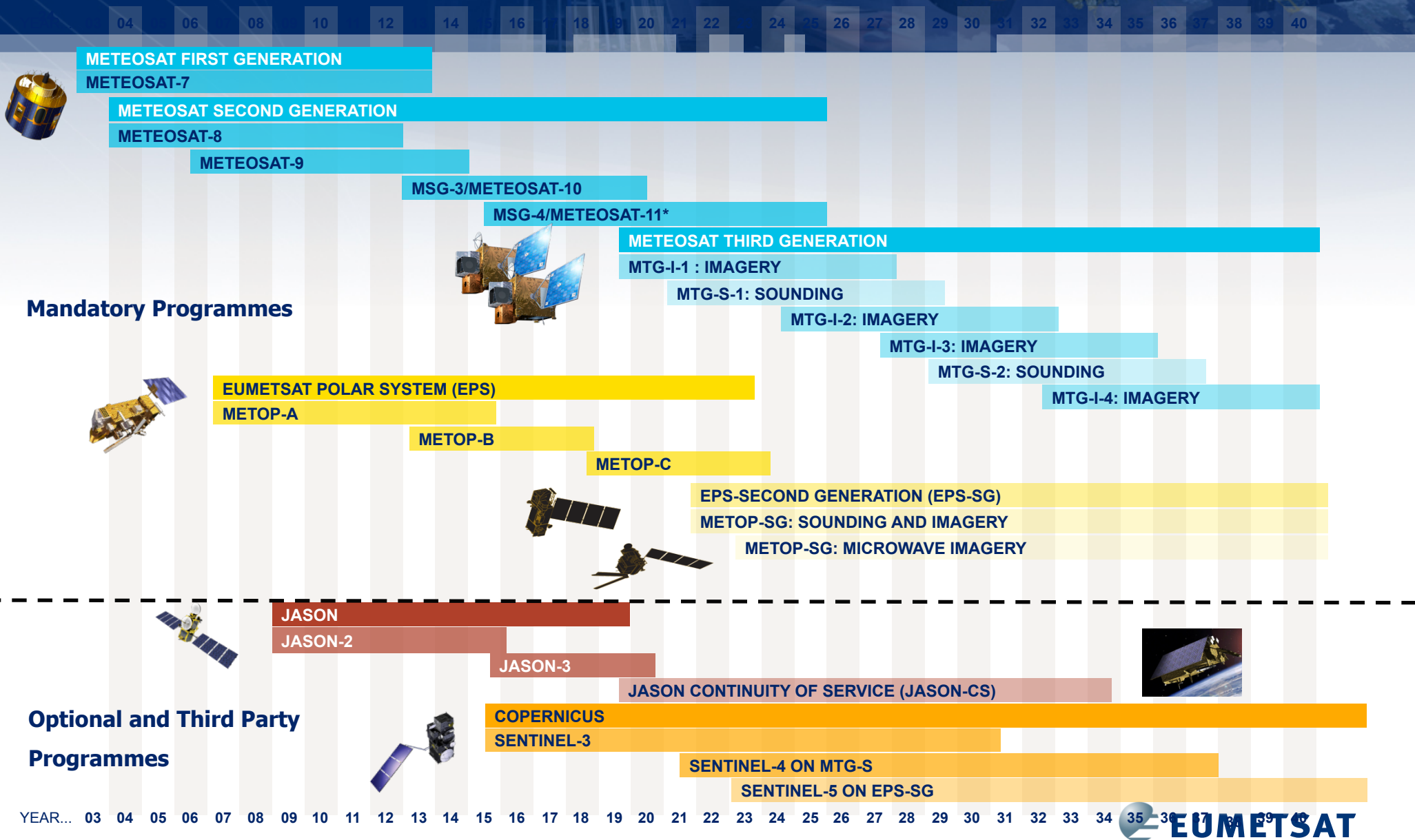


MTG Space Segment – Twin Satellite Concept



Operational services call for long term commitments..

MTG in Orbit Deployment Scenario





From SEVIRI to the FC Imager

FDHSI

HRFI

MTG FCI outbids MSG SEVIRI observations on cloud, aerosol, moisture and fire:

- by adding new channels
- by improving temporal-, spatial-, and radiometric resolution

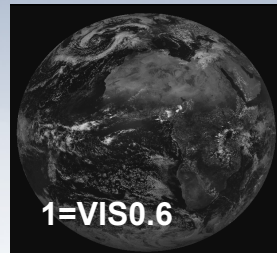
	Coverage	Repeat cycle
FDHSI mission	18°x18°	10 min
HRFI mission	1/4 FD	2.5 min

Full disc high spectral resolution imagery

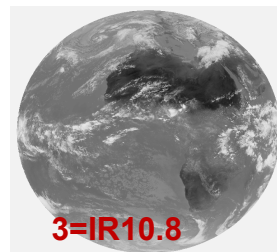
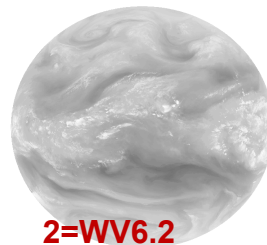
High spatial resolution fast imagery



From MVIRI through SEVIRI to FCI on MTG

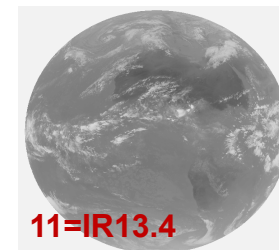
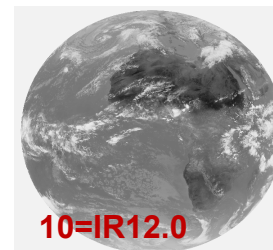
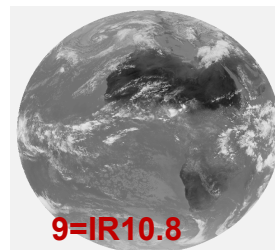
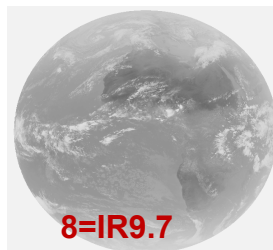
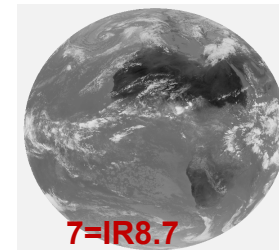
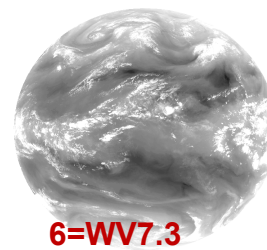
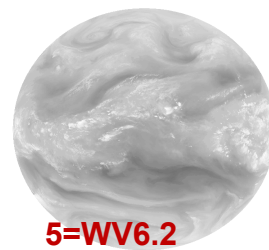
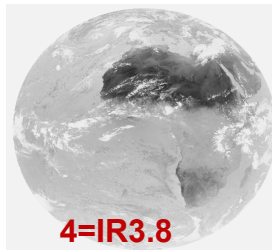
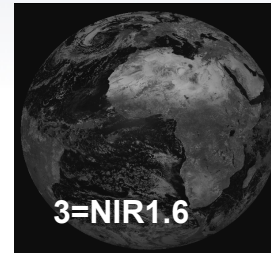
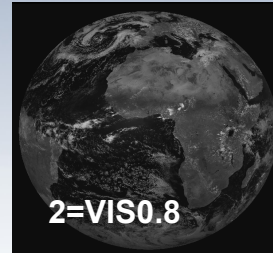
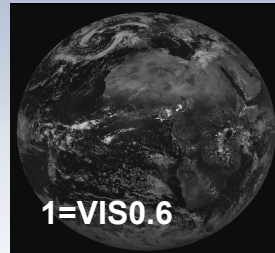


12=HRV



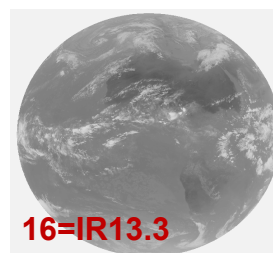
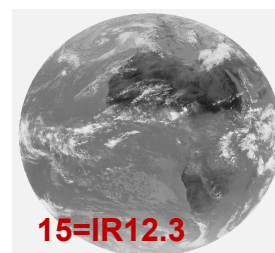
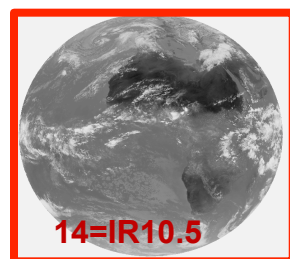
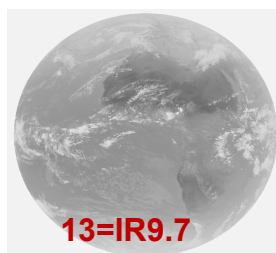
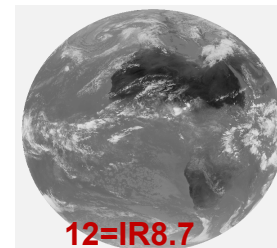
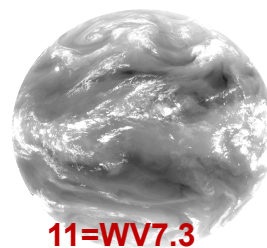
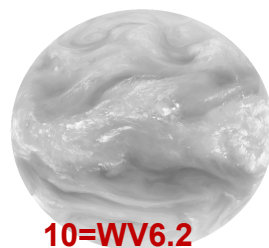
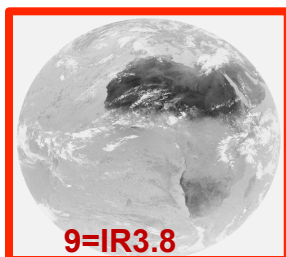
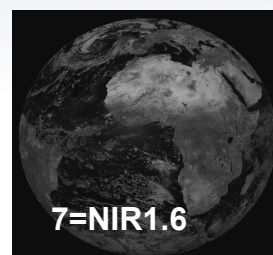
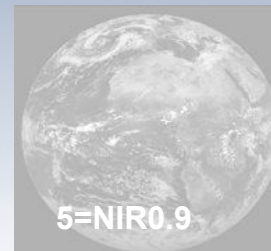
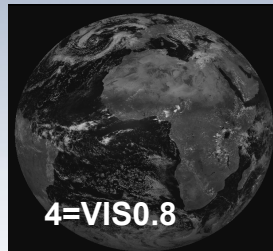


From MVIRI through SEVIRI to FCI on MTG



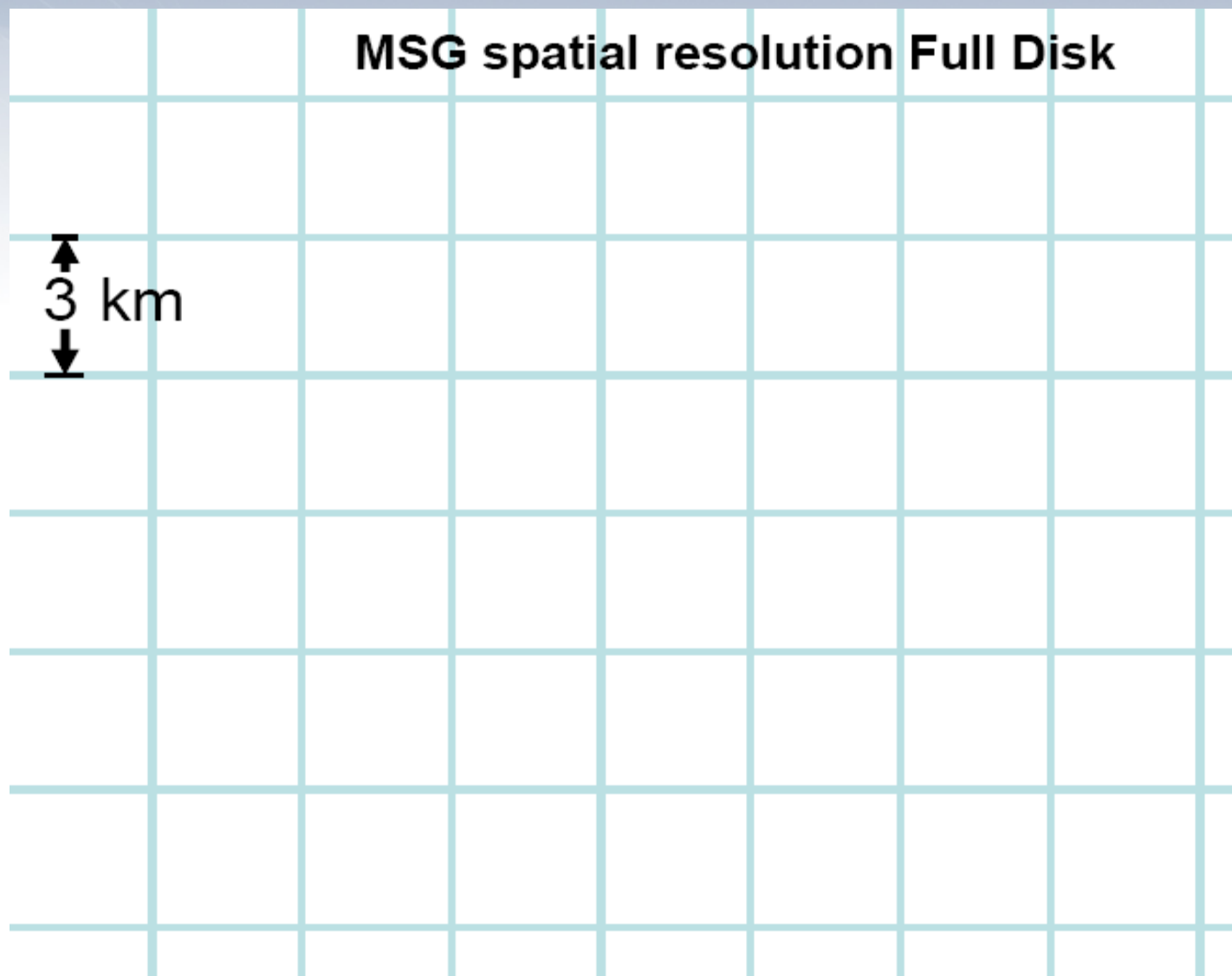


From MVIRI through SEVIRI to FCI on MTG



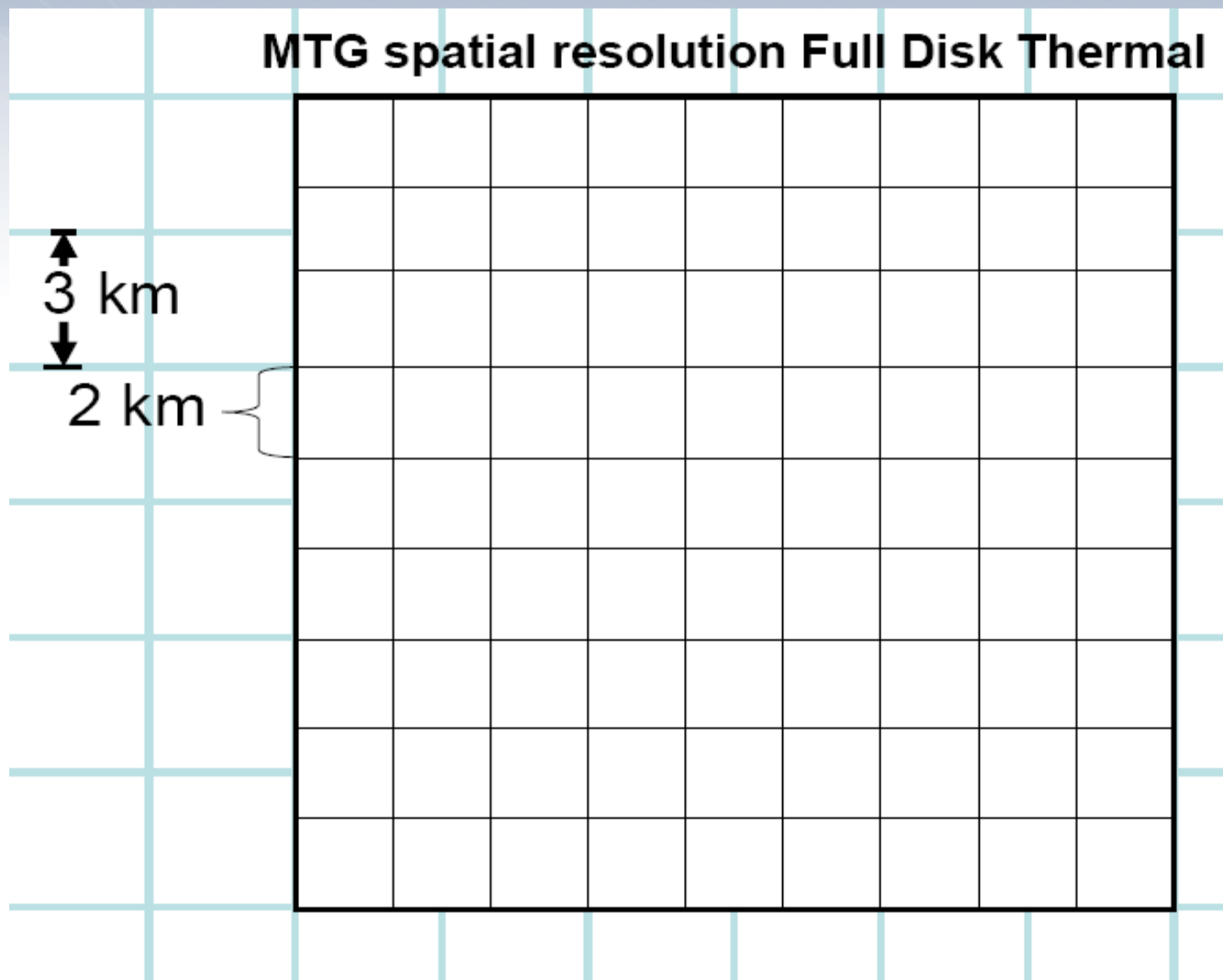


Sampling Distance Issues



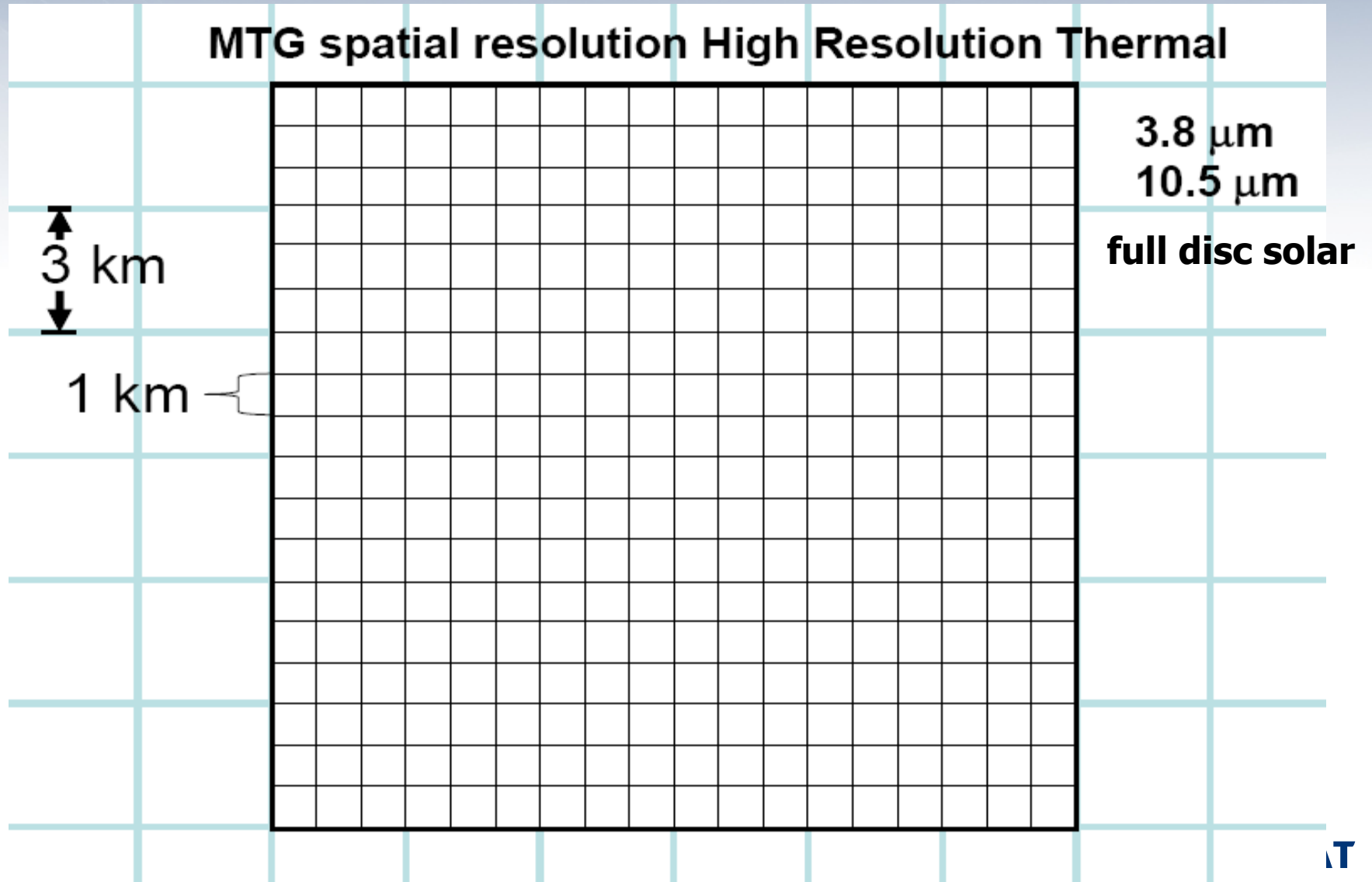


Sampling Distance Issues



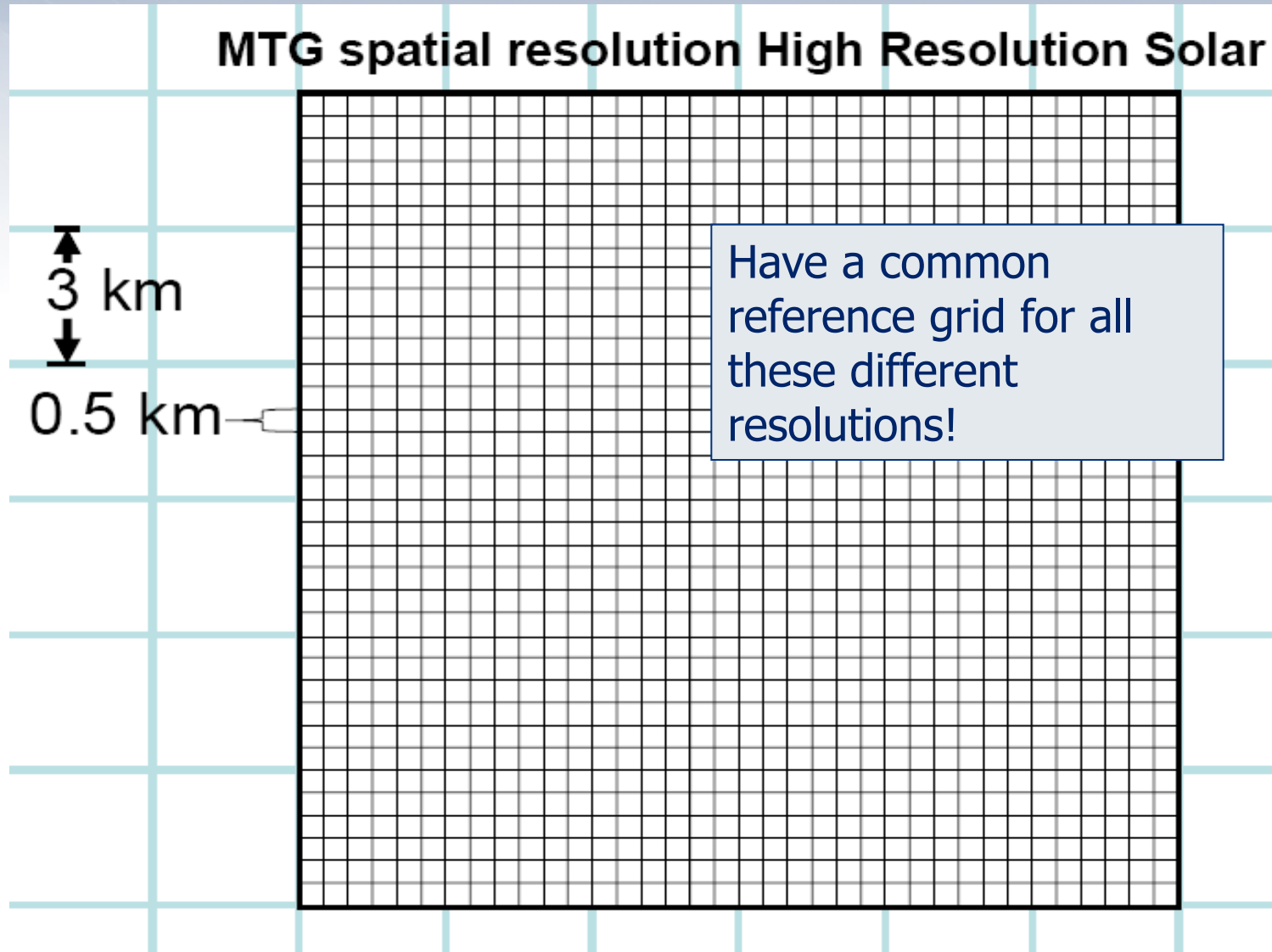


Sampling Distance Issues





Sampling Distance Issues





Background - Summary

MSG:

Instrument of good spectral coverage, good spatial and temporal resolution

MTG:

Better spectral coverage, esp. shortwave VIS and near-infrared

Better spatial resolution

Better time resolution



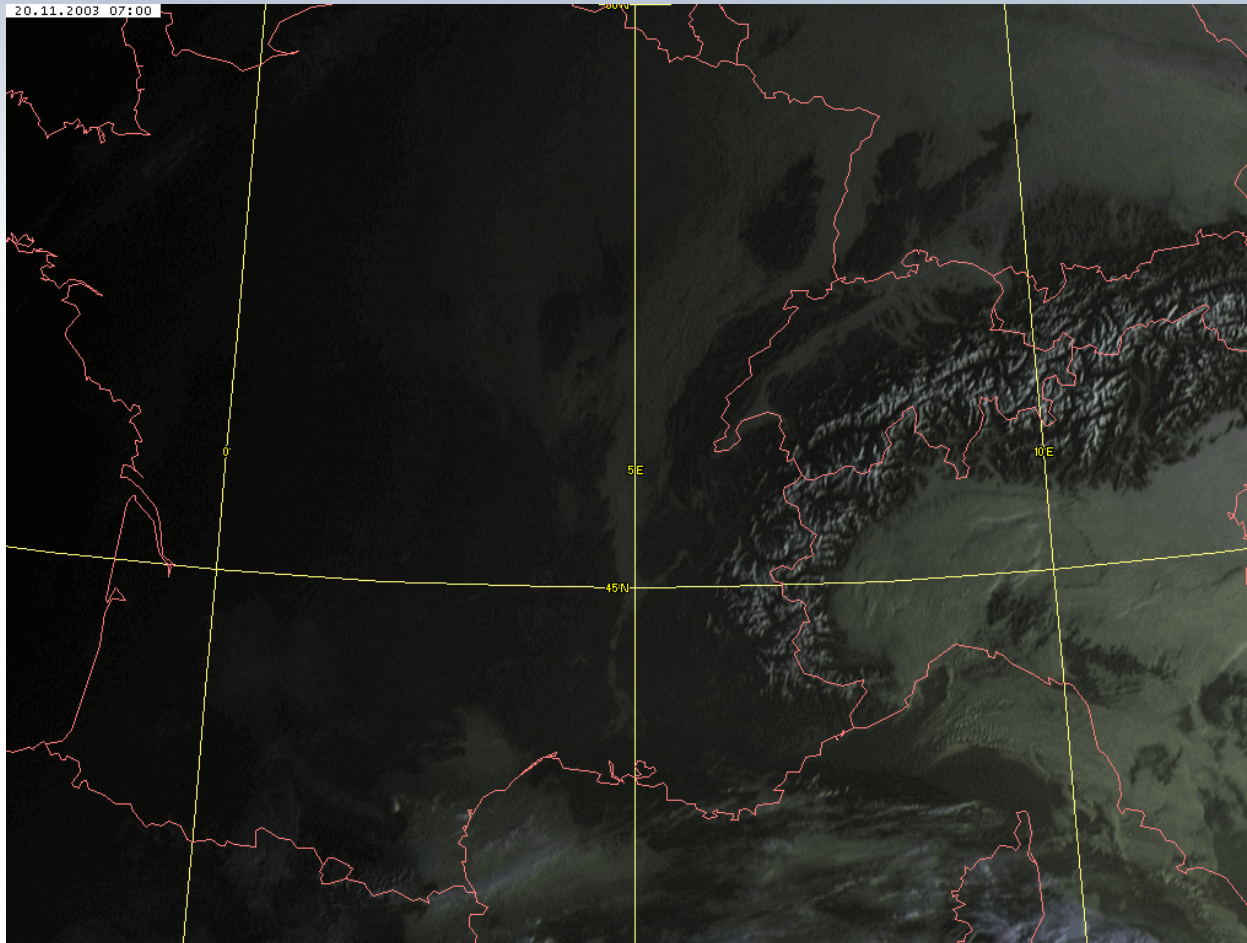
MSG Products and Applications Today

Wealth of RGB applications supporting nowcasting:

- Fog
- Airmass
- Dust / ash
- Cloud microphysics / convection



Fog RGB (animated)

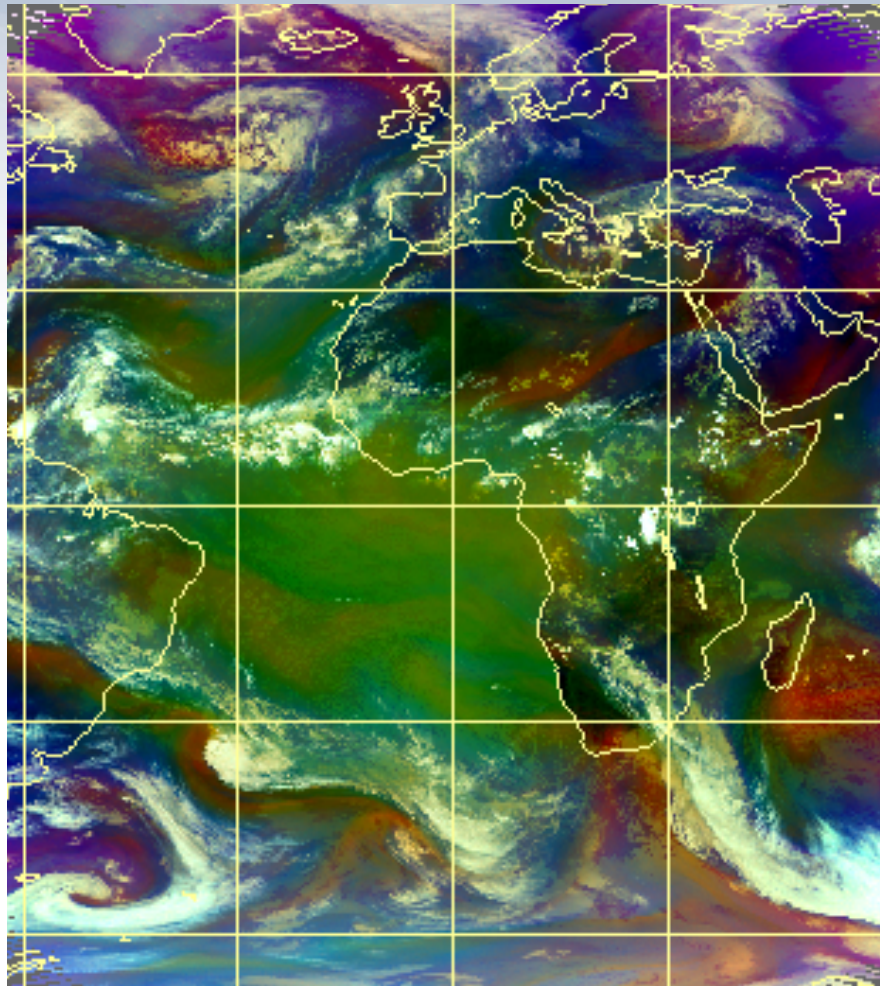


Application:

Nowcasting formation /
dissipation of fog



Airmass RGB

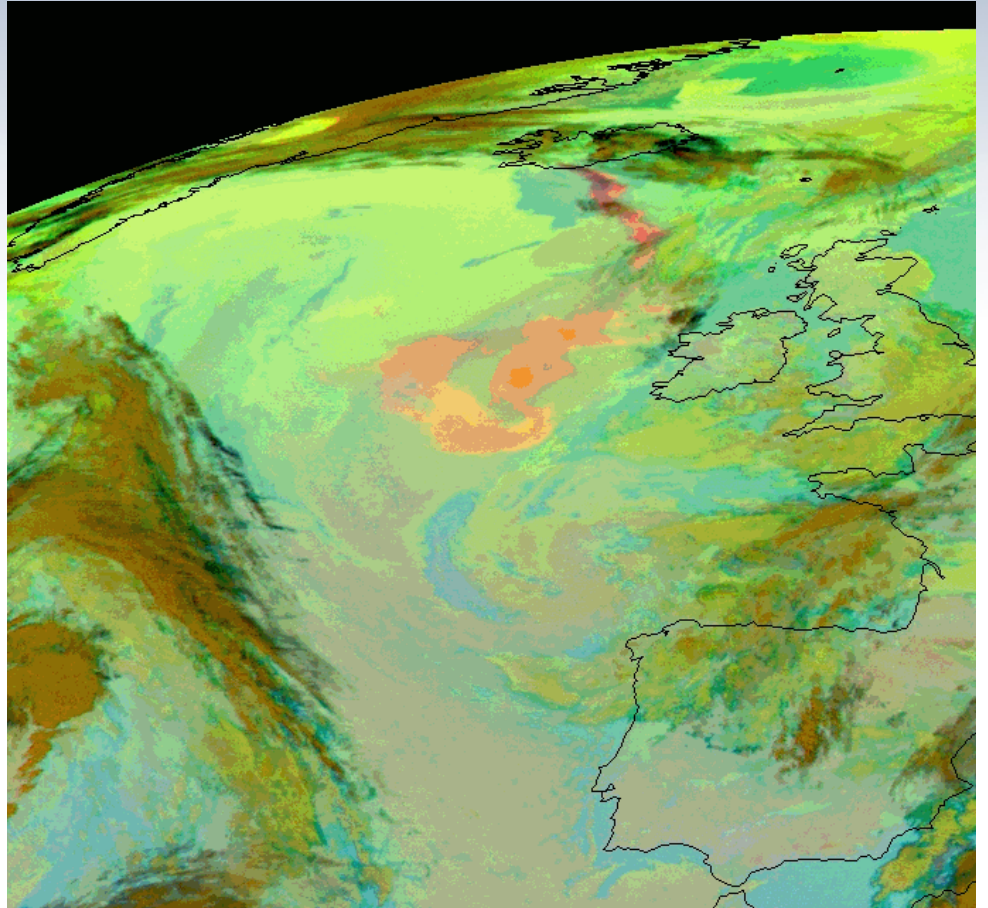
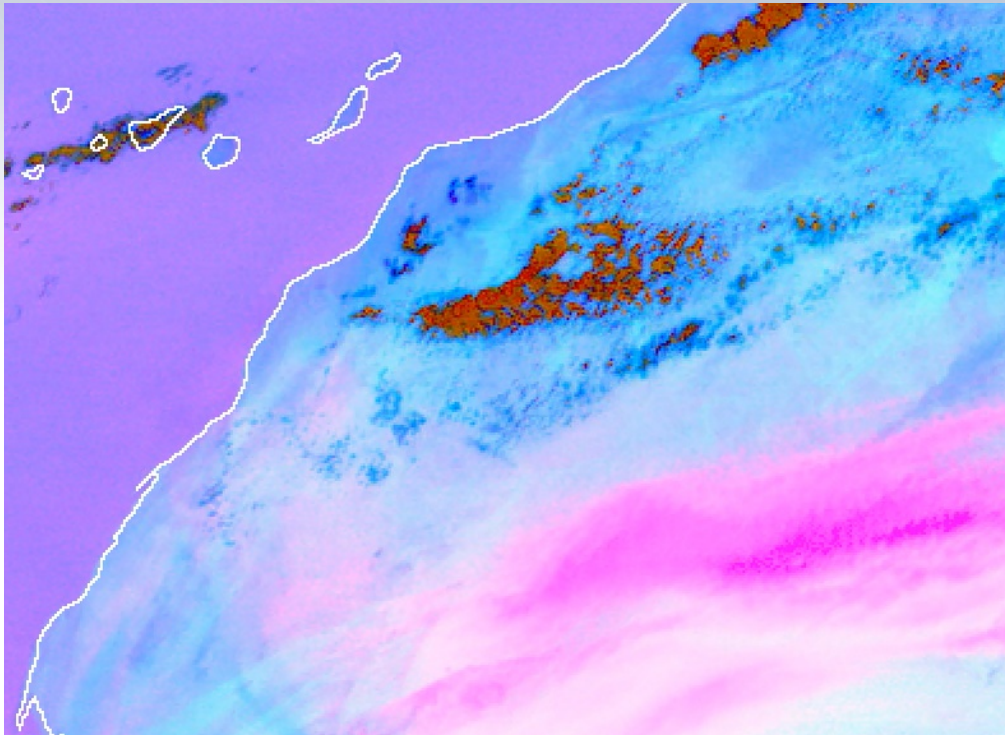


Application:

Temporal evolution and motion of midlatitude frontal systems;
comparison to model forecasts



Dust / Ash RGB



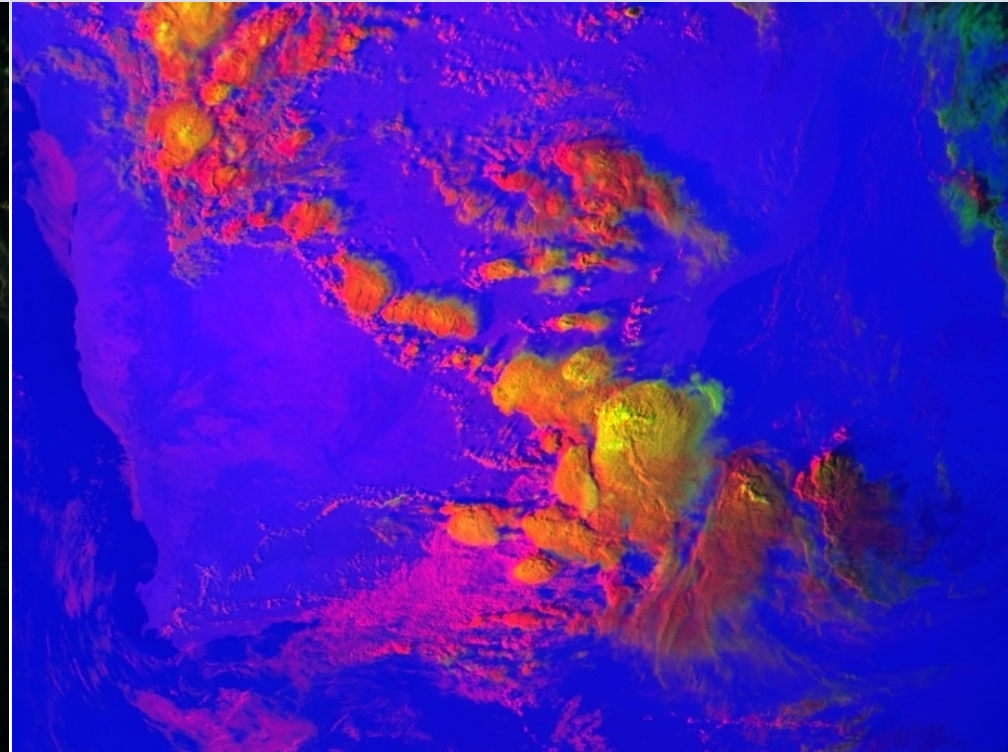
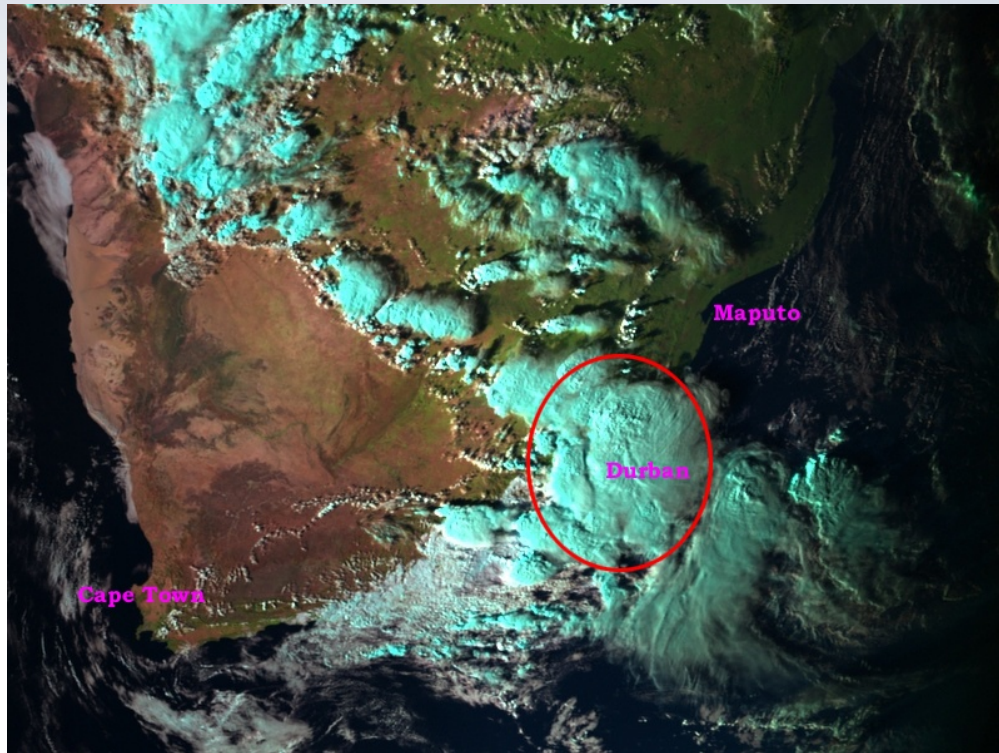
Applications:

Visibility issues

Ash warnings



Cloud Microphysics – e.g. Convection



Application:

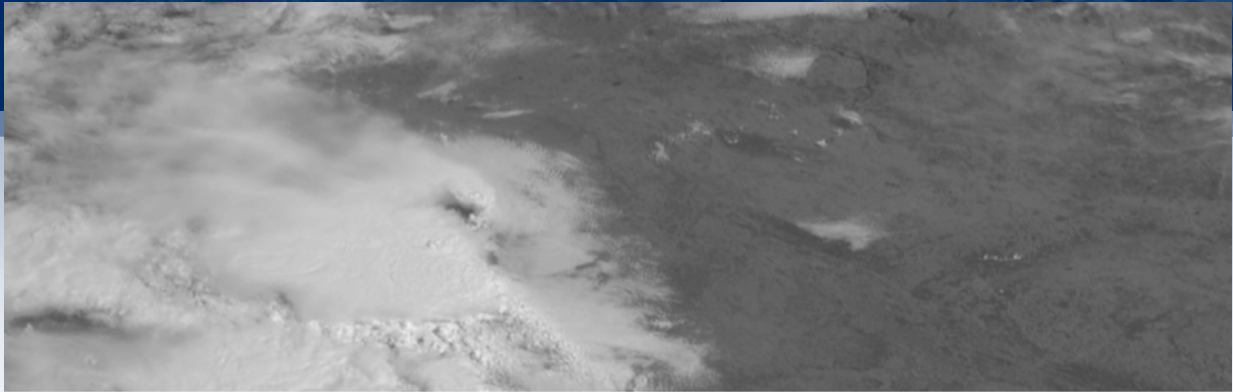
Nowcasting most severe part of convective storms
(aviation, weather on the ground)



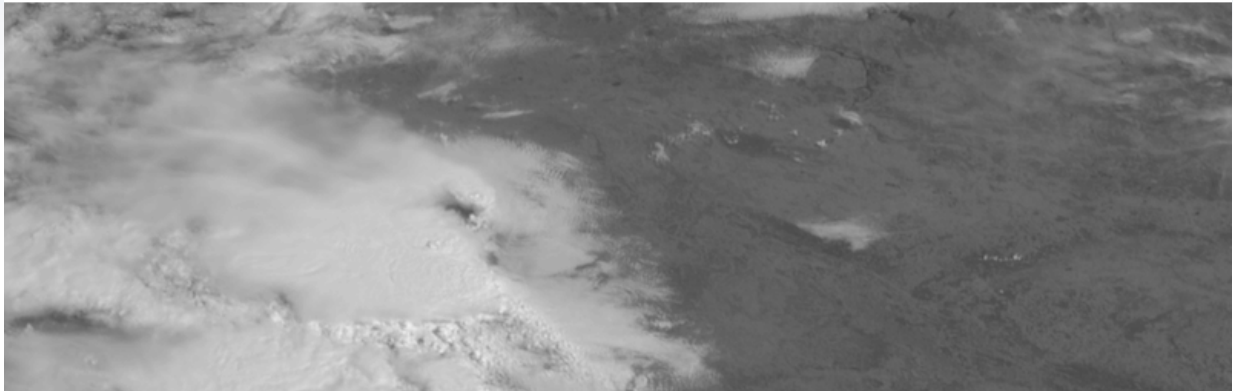
Derived Products in Support to NWP, Nowcasting, Climate

- Atmospheric Motion Vectors
- Quantitative Cloud Information (height, evolution, ...)
- Atmospheric Instability
- Land Surface Information
(temperature, vegetation, albedo, fires, ...)

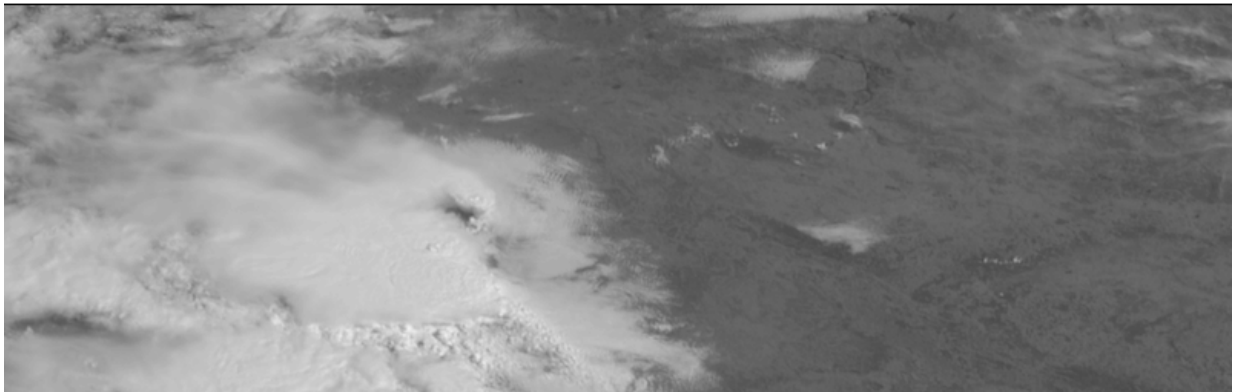
2.5 min Scans



20 JUN 13 09:02:14



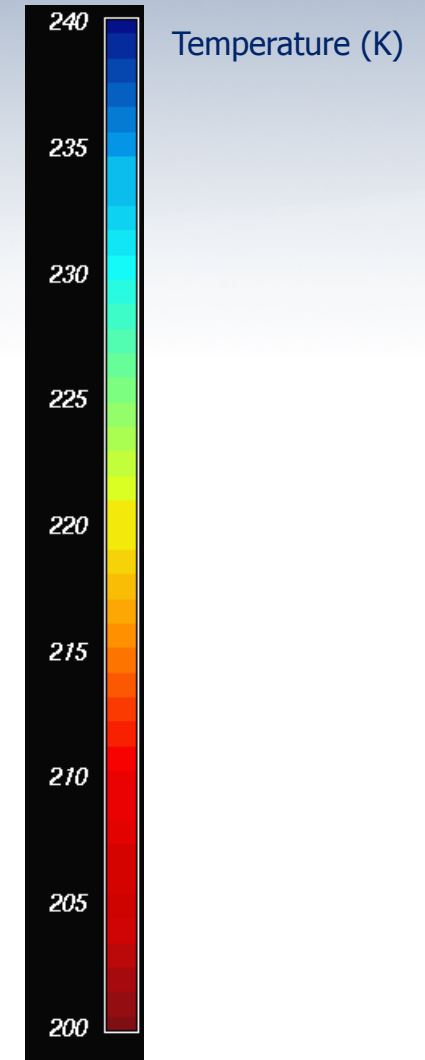
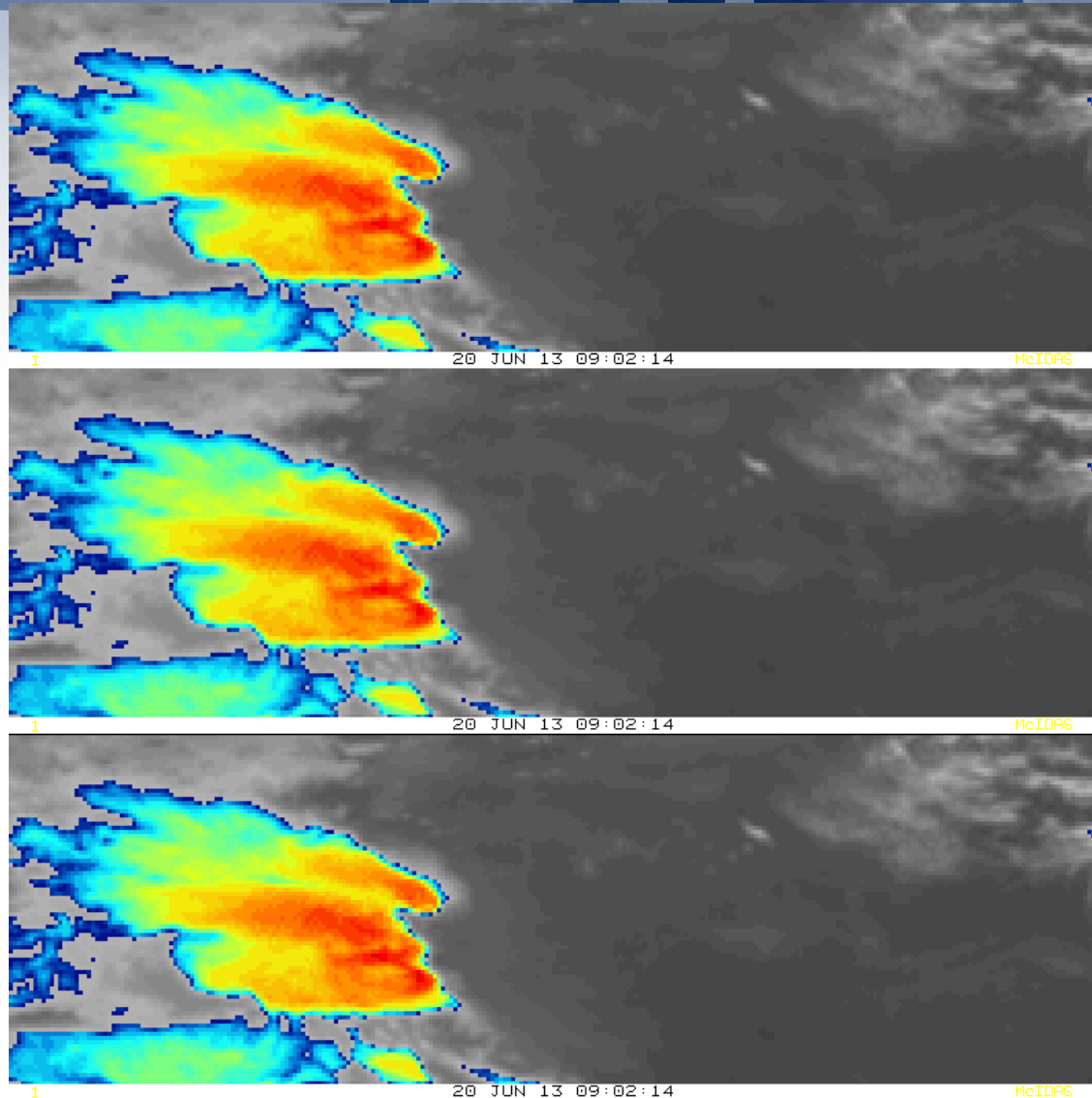
20 JUN 13 09:02:14



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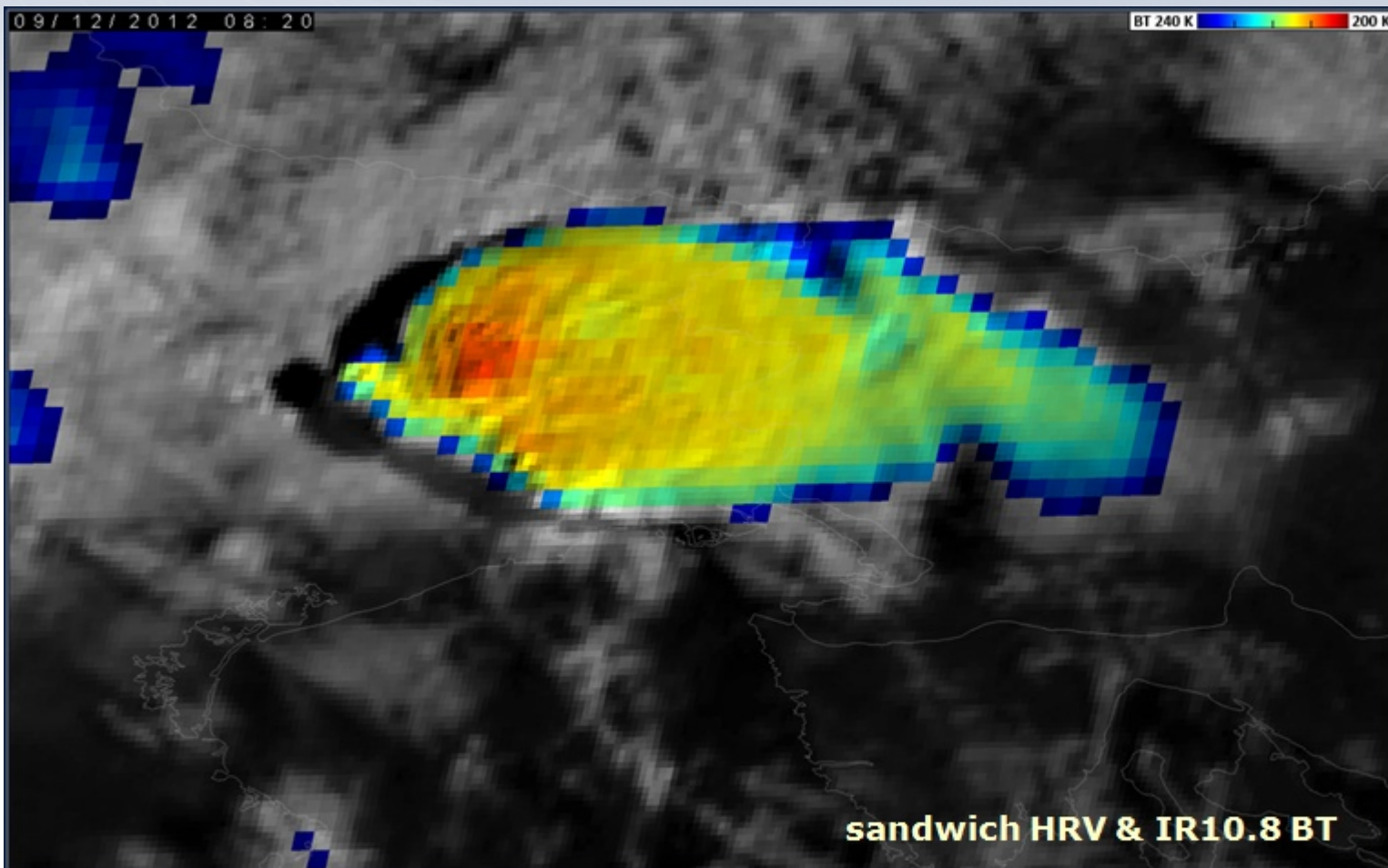


Time Resolution - IR





Spatial Resolution: Channel Overlays

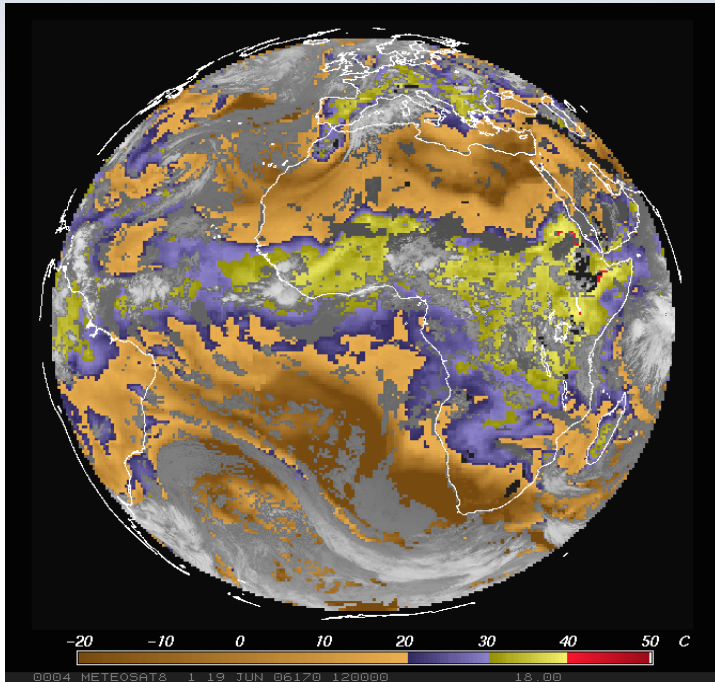


MTG Application:

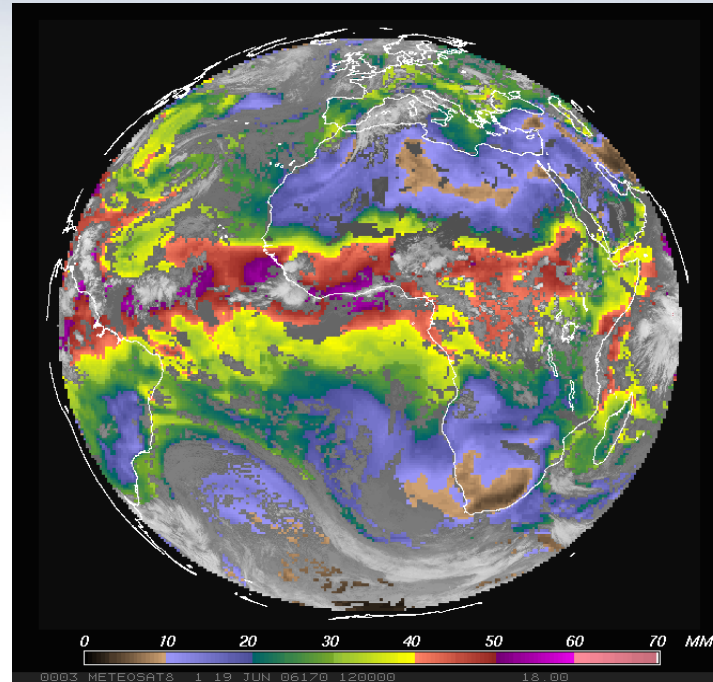
Also useful
because of
channel resolution
differences



Product Using all IR Channels: Instability



K-Index

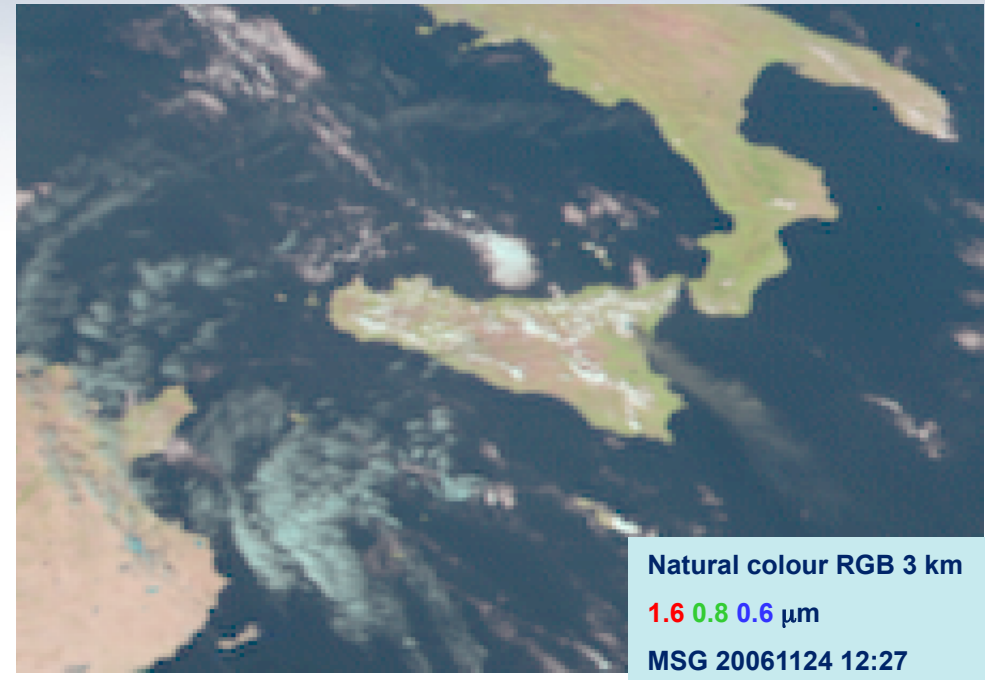
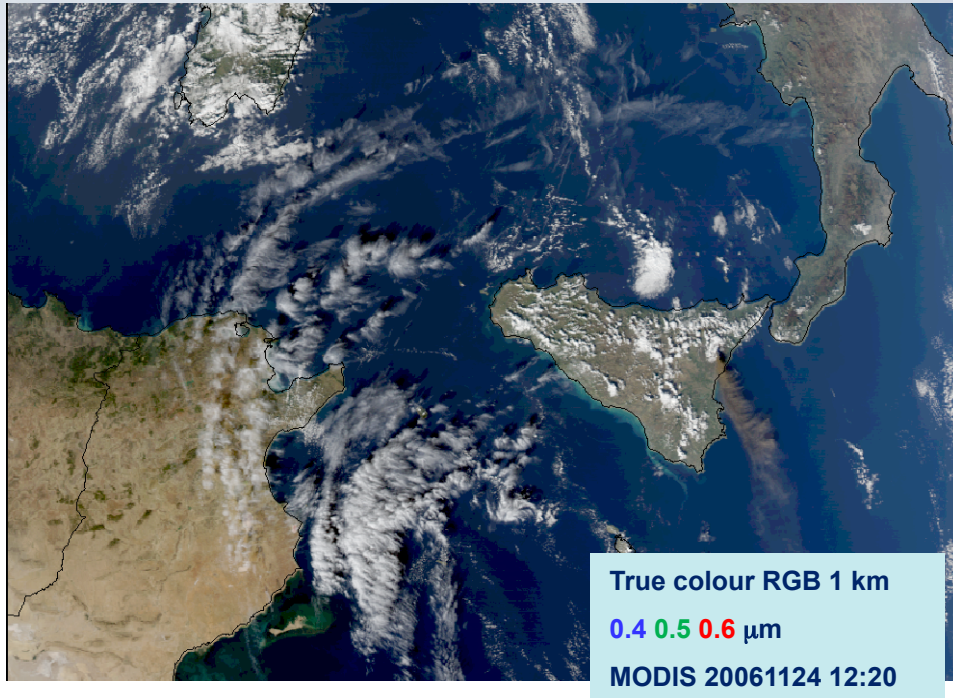


Total Precipitable Water

Physical retrieval of atmospheric profiles using 7 MSG IR channels:
Products are Instability Indices and Total Precipitable Water



Spectral Resolution: “True Colour” RGB Possible



A true “True Colour” image can be produced with VIS06/VIS0.5/VIS0.4 – this is really RGB

“True Colour” from the MSG perspective – acceptable for vegetation, less for dust/smoke

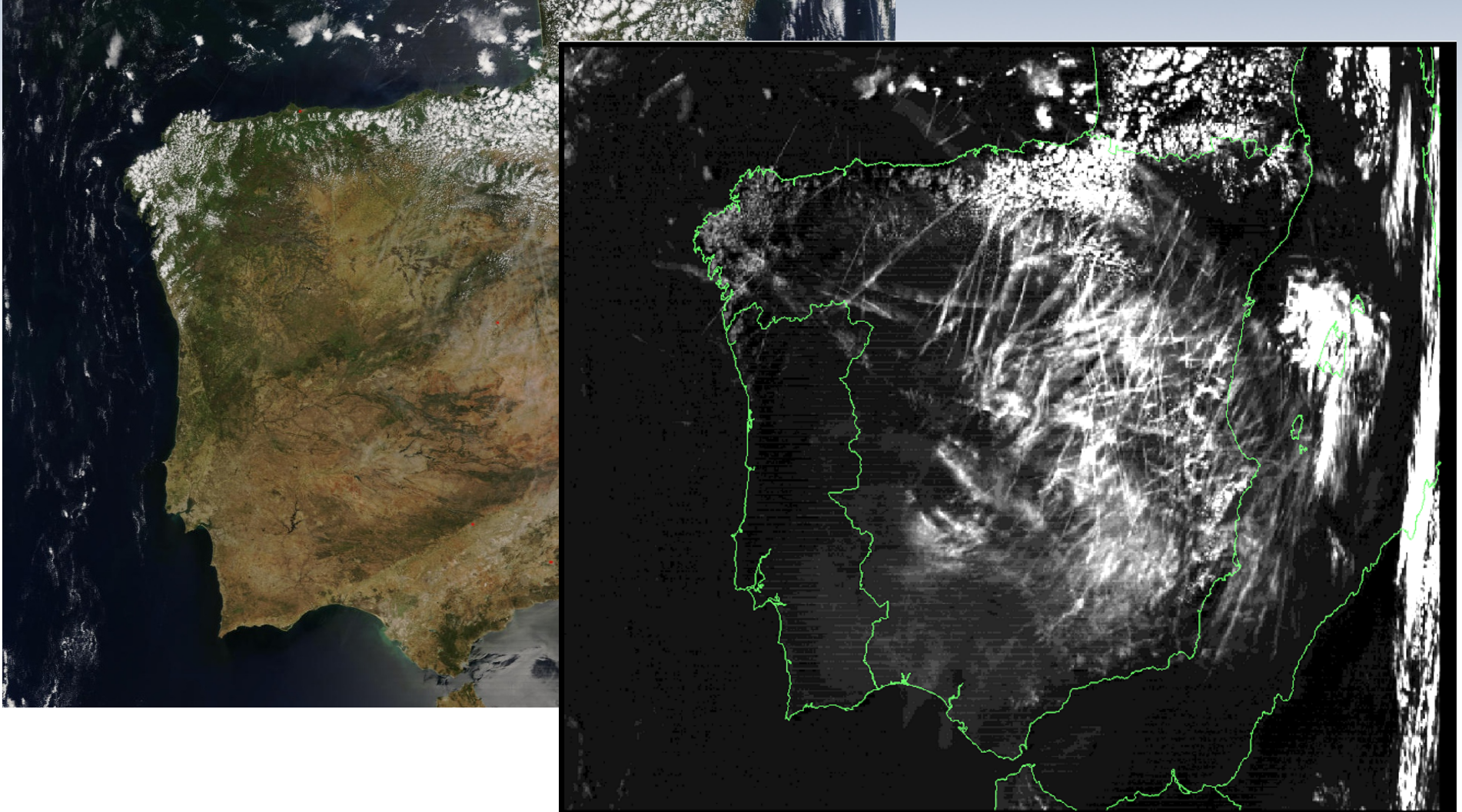
Application:

Weather forecasts for public
Quicklooks for forecasters

courtesy D. Rosenfeld, Univ. Jerusalem

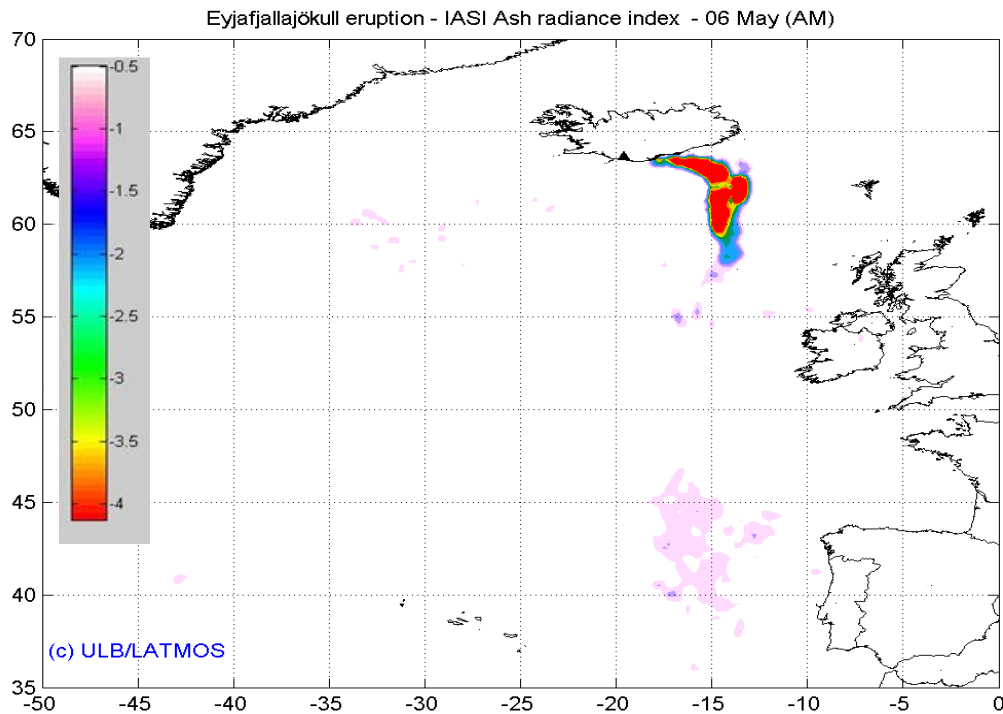


NIR1.3: Another Example





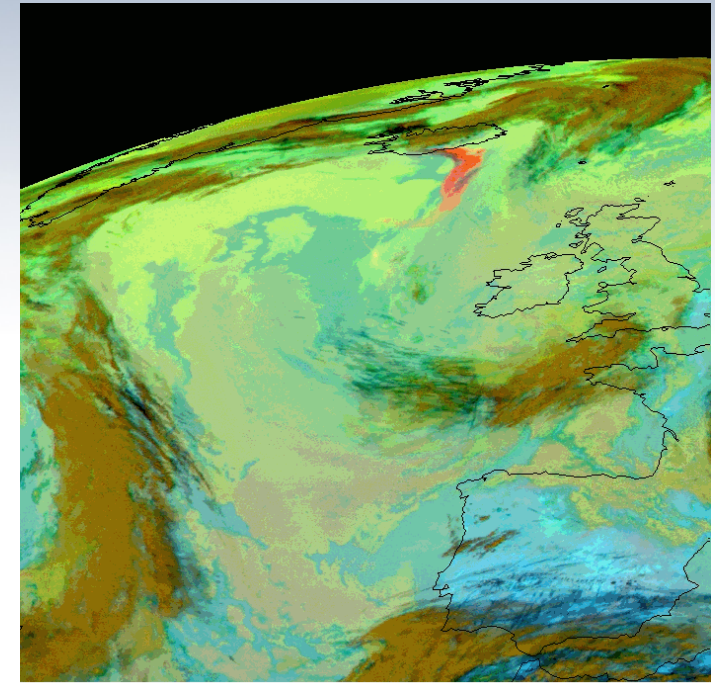
IRS Application: Volcanic Ash



Aerosol absorbing index derived from IASI overpasses:

Higher index – larger particles

Courtesy C. Clerbaux et al., LATMOS/ULB



Qualitative Volcanic Ash RGB - MSG



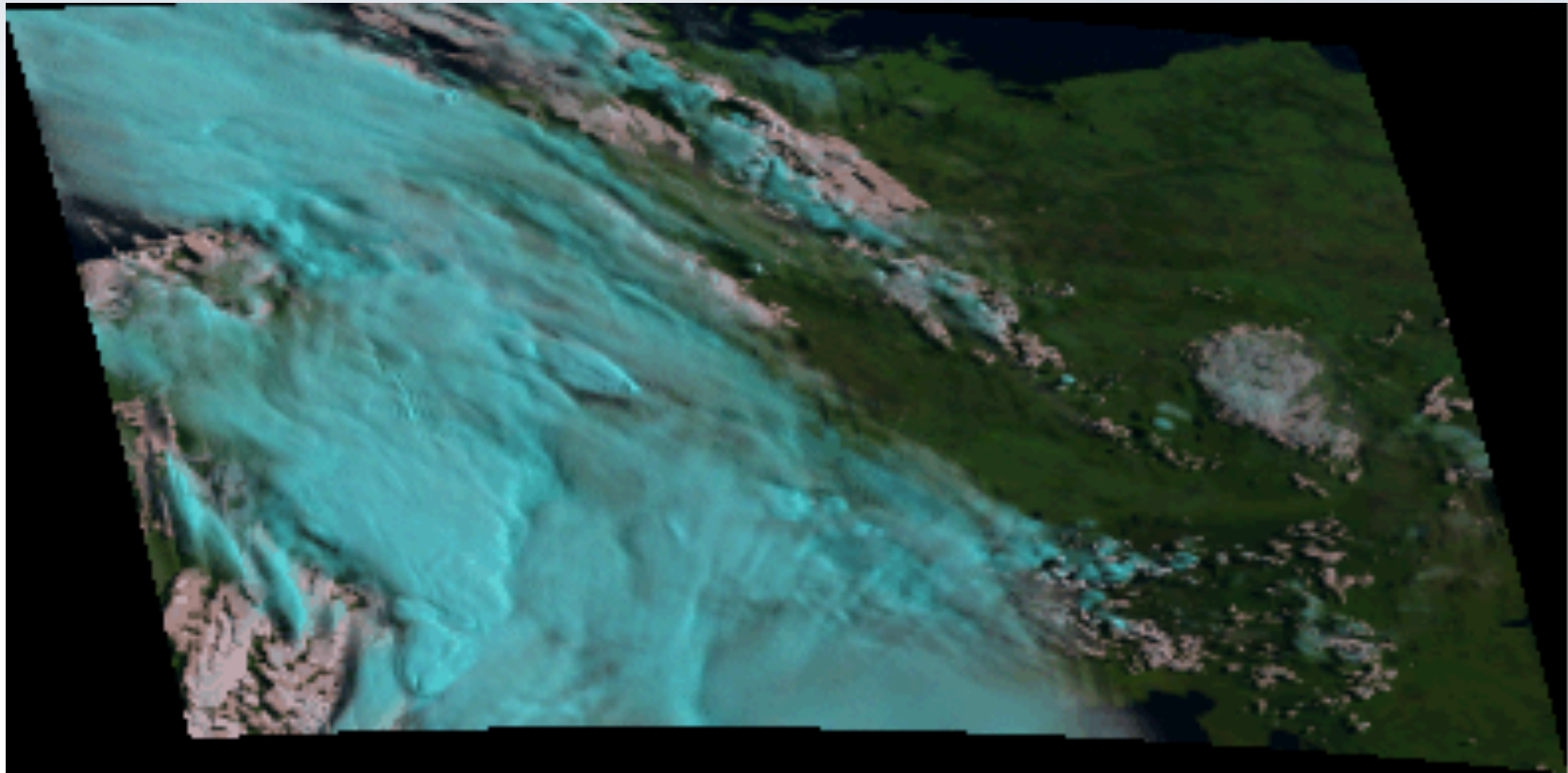
Lightning Imager



Continuous lightning observations from space:
Recording of intra-cloud and cloud-to-ground lightning



Simulations over Daylight Hours (MSG Natural Colour RGB)





MTG User Preparation Milestones

Phase I

Make available through the website all available information on the MTG satellites, services and Programme planning **On-going**

Begin interaction with selective user groups on MTG user applications and initial training events **On-going**

Interview selective NMHSs to discuss their preparation plans **Q4-2014**

Establish an internal team to work on the initial user preparation activities
Q4-2014

Initiate discussion with SAF Managers regarding user preparation activities
Q3-2014

Present Project Plans to EUMETSAT Delegate Bodies **Q2-2015**



MTG User Preparation Milestones

Phase II

Internal resources will be utilized according to the project breakdown and work packages **2015 onwards**

Test data to be developed, packaged according to user needs and made available **Launch -3 years**

User training material to be developed and training performed as per the agreed Training Plan **Launch -2 years**

Dedicated user information to be generated and made available through the Website / Portals / Apps **2015 onwards**



Thank you