EUMETSAT climate services

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Christine Träger-Chatterjee

EUMeTrain event week on Heatwaves and Droughts
May 2023

Agenda

The SAFs, EUMETSAT

OP/CDR/FCDR datasets

Challenges of space based climate monitoring

Where to find/access EUMETSAT data

The Future

EUMETSAT ...

www.eumetsat.int

... is the intergovernmental organization for the exploitation of meteorological satellites

Member States

AUSTRIA
BELGIUM
BULGARIA
CROATIA
CZECH REPUBLIC
DENMARK
ESTONIA
FINLAND
FRANCE
GERMANY
GREECE
HUNGARY
ICELAND
IRELAND
ITALY
LATVIA
LITHUANIA
LUXEMBOURG
THE NETHERLANDS
NORWAY
POLAND
PORTUGAL
ROMANIA
SLOVAK REPUBLIC
SLOVENIA
SPAIN
SWEDEN
SWITZERLAND
TURKEY
UNITED KINGDOM

Copernicus
Europe's eyes on Earth

The SAFs

- EUMETSAT has a network of different Satellite Application Facilities (SAFs)
- SAFs are dedicated centres of excellence for processing satellite data
  - research, development and operational activities
  - each SAF focusses on specific user communities or application areas

- Each SAF is a consortium of entities from EUMETSAT member states

slido

How many satellites are currently operated by EUMETSAT?

ⓘ Start presenting to display the poll results on this slide.

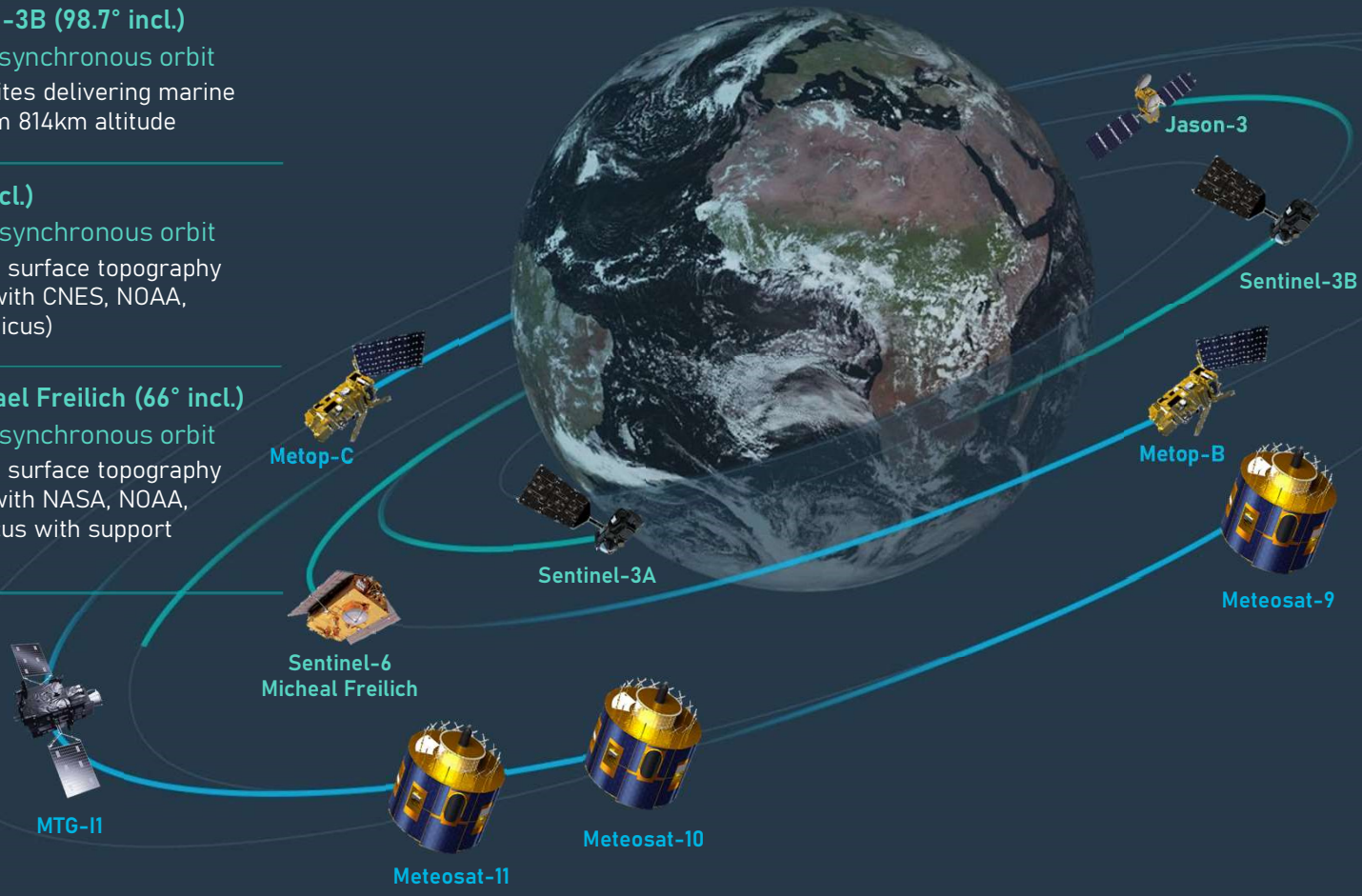
Current EUMETSAT satellites

www.eumetsat.int

SENTINEL-3A & -3B (98.7° incl.)
Low Earth, sun-synchronous orbit
Copernicus satellites delivering marine data services from 814km altitude

JASON-3 (63° incl.)
Low Earth, non-synchronous orbit
Copernicus ocean surface topography mission (shared with CNES, NOAA, NASA and Copernicus)

Sentinel-6 Michael Freilich (66° incl.)
Low Earth, non-synchronous orbit
Copernicus ocean surface topography mission (shared with NASA, NOAA, ESA and Copernicus with support from CNES)



METEOSAT-10, -11
Geostationary orbit
Meteosat Second Generation

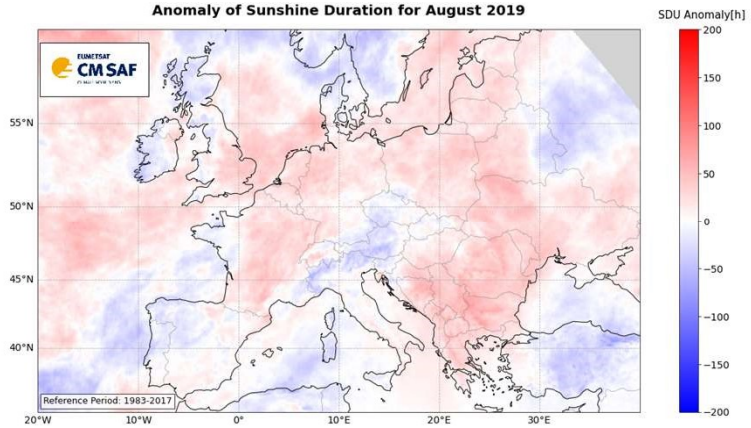
Two-satellite system
Full disc imagery mission (15 mins) (Meteosat-11 (0°))
Rapid scan service over Europe (5 mins) (Meteosat-10 (9.5° E))

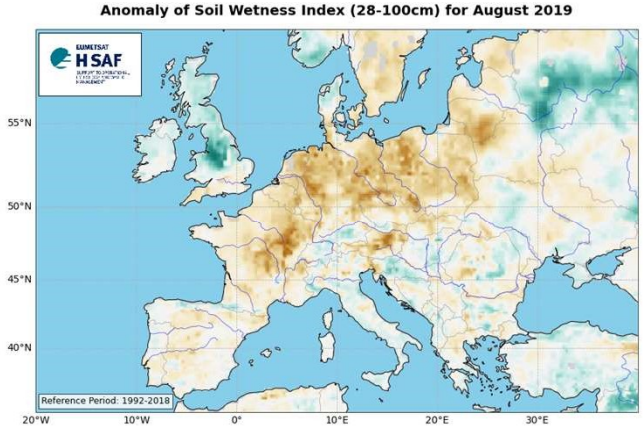
METEOSAT-9 (45.5° E)
Geostationary orbit
Meteosat Second Generation providing Indian Ocean data coverage

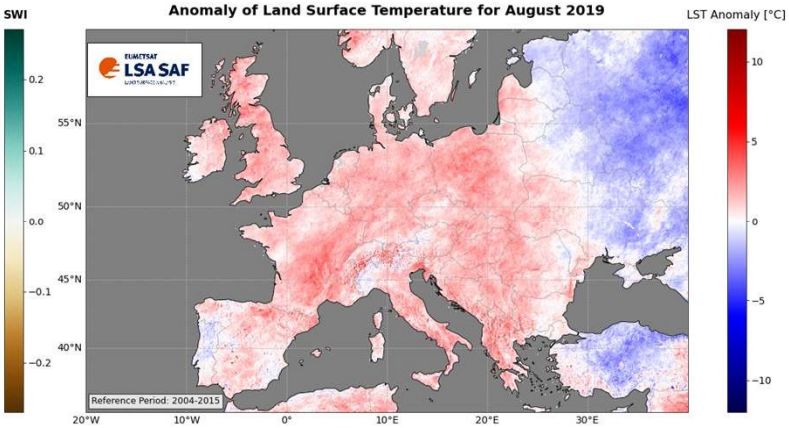
METOP-B & -C (98.7° incl.)
Low Earth, sun-synchronous orbit
EUMETSAT Polar System (EPS)/ Initial Joint Polar System

MTG-I1
Geostationary orbit
Meteosat Third Generation imaging mission, currently in commissioning phase

Heatwaves and droughts







Courtesy: Antonio Vecoli

https://www.eumetsat.int/2018-and-2019-drought-and-heatwaves-europe

Space based Climate Monitoring - Challenges

Satellite Data

Retrieval

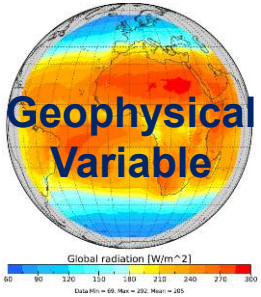
Environmental Data Record / Operational Data / Near Real Time Data

- generated on a regular basis
- First-order satellite calibration
- *Most recent algorithm and input data (i.e. not homogeneous over time)*

Can be used for

Near Real Time Monitoring

Shall not be used for
Longer term climate variability or trend assessment.



Space based Climate Monitoring - Challenges

Short and Intermediate Term

Satellite Data → **Archived Satellite Data Records**

Retrieval

Environmental Data Record / Operational Data / Near Real Time Data
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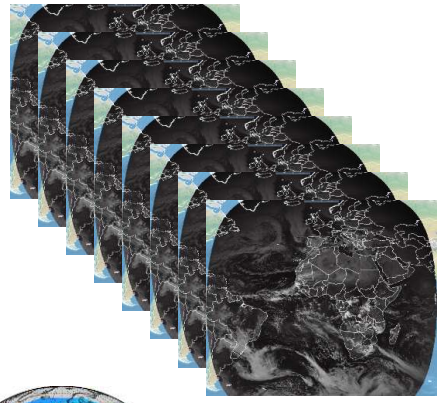

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Shall not be used for
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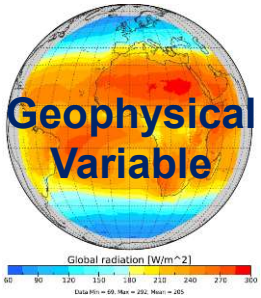

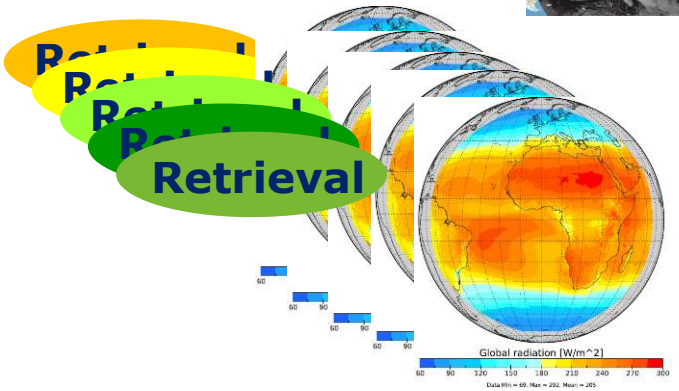

Archived data (produced in NRT)

EUMETSAT

slido

If you wanted to study an event in the past (eg: a Heatwave in Europe), and you had both operational archived data (produced in NRT) and CDR data sets available to you, which one would you choose for your study?

ⓘ Start presenting to display the poll results on this slide.

Space based Climate Monitoring - Challenges

Short and Intermediate Term

Satellite Data → **Archived Satellite Data Records**

Retrieval

Environmental Data Record / Operational Data / Near Real Time Data
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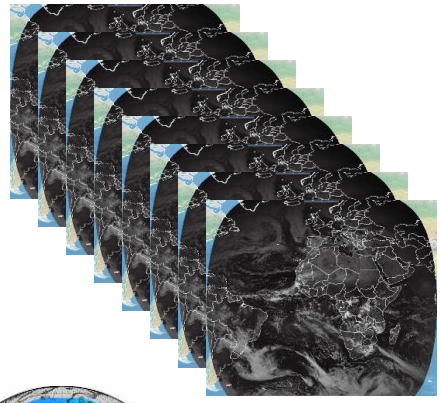
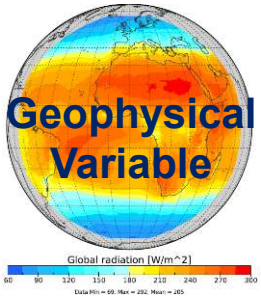
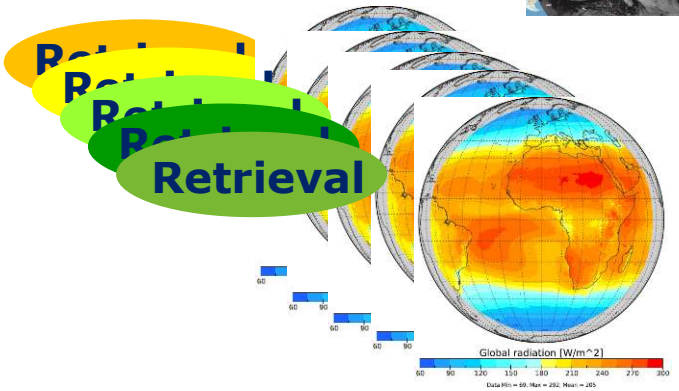


Can be used for

Near Real Time Monitoring

Shall not be used for
Longer term climate variability or trend assessment.





Archived data (produced in NRT)

Production of Climate Data Records

Courtesy: Rob Roebeling

Space based Climate Monitoring - Challenges

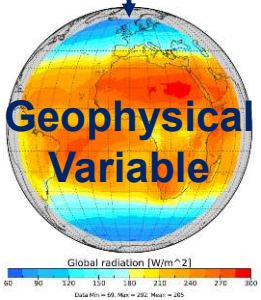
Short and Intermediate Term

Satellite Data

Retrieval

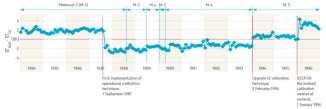
Environmental Data Record / Operational Data / Near Real Time Data
- generated on a regular basis
- First-order satellite calibration
- *Most recent algorithm and input data (i.e. not homogeneous over time)*

Can be use for
Extreme Events Monitoring
Near Real Time Monitoring
Shall not be used for
Longer term climate variability or trend assessment.

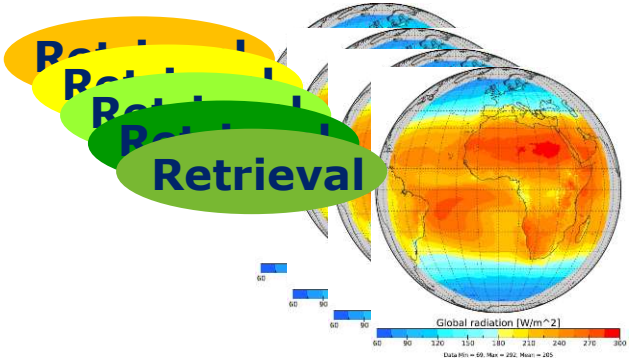


Observing system performance monitoring & automated corrections

Archived Satellite Data Records



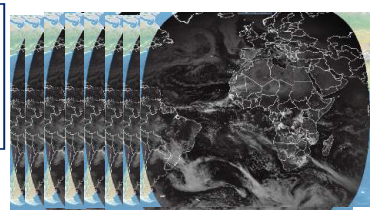
Retrieval



Longterm

Re-calibration & Inter-calibration

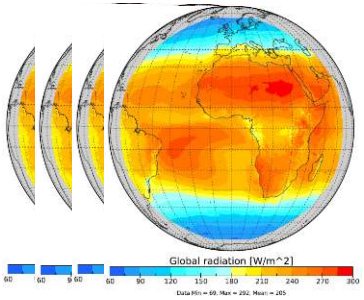
Fundamental Climate Data Records



Retrieval

Reprocessing

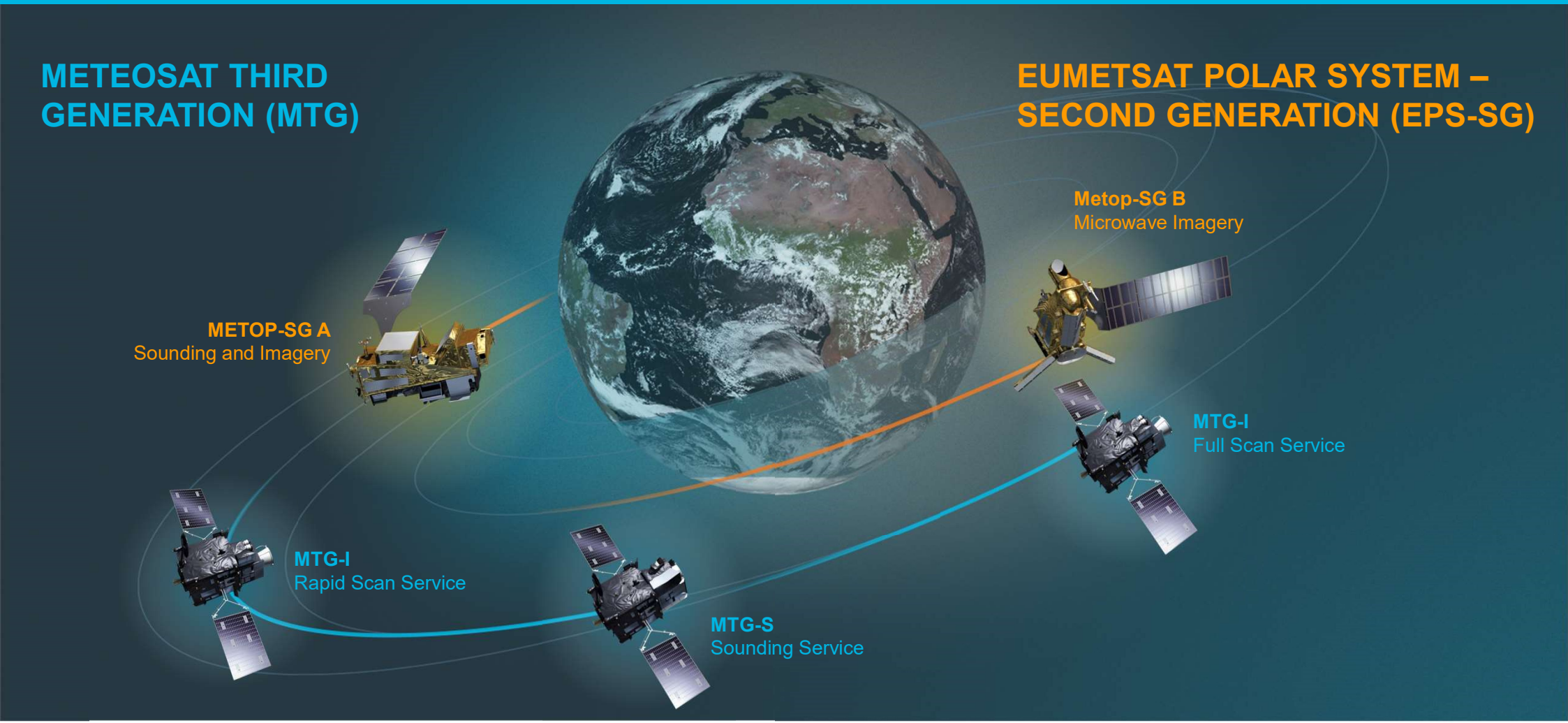
(Thematic) Climate Data Record
- Generated on an irregular basis, i.e. every few years
- Calibrated and homogenized satellite data
- Algorithm and auxiliary input data homogeneous over time
- Resulting time series fully applicable for climate monitoring purposes, including trend estimation



Suited for longer term climate variability & climate change analysis as other applications.

Schulz (2009), adapted & updated

THE FUTURE


METEOSAT THIRD GENERATION (MTG)
EUMETSAT POLAR SYSTEM – SECOND GENERATION (EPS-SG)
Metop-SG B
Microwave Imagery
METOP-SG A
Sounding and Imagery
MTG-I
Full Scan Service
MTG-I
Rapid Scan Service
MTG-S
Sounding Service

The Future

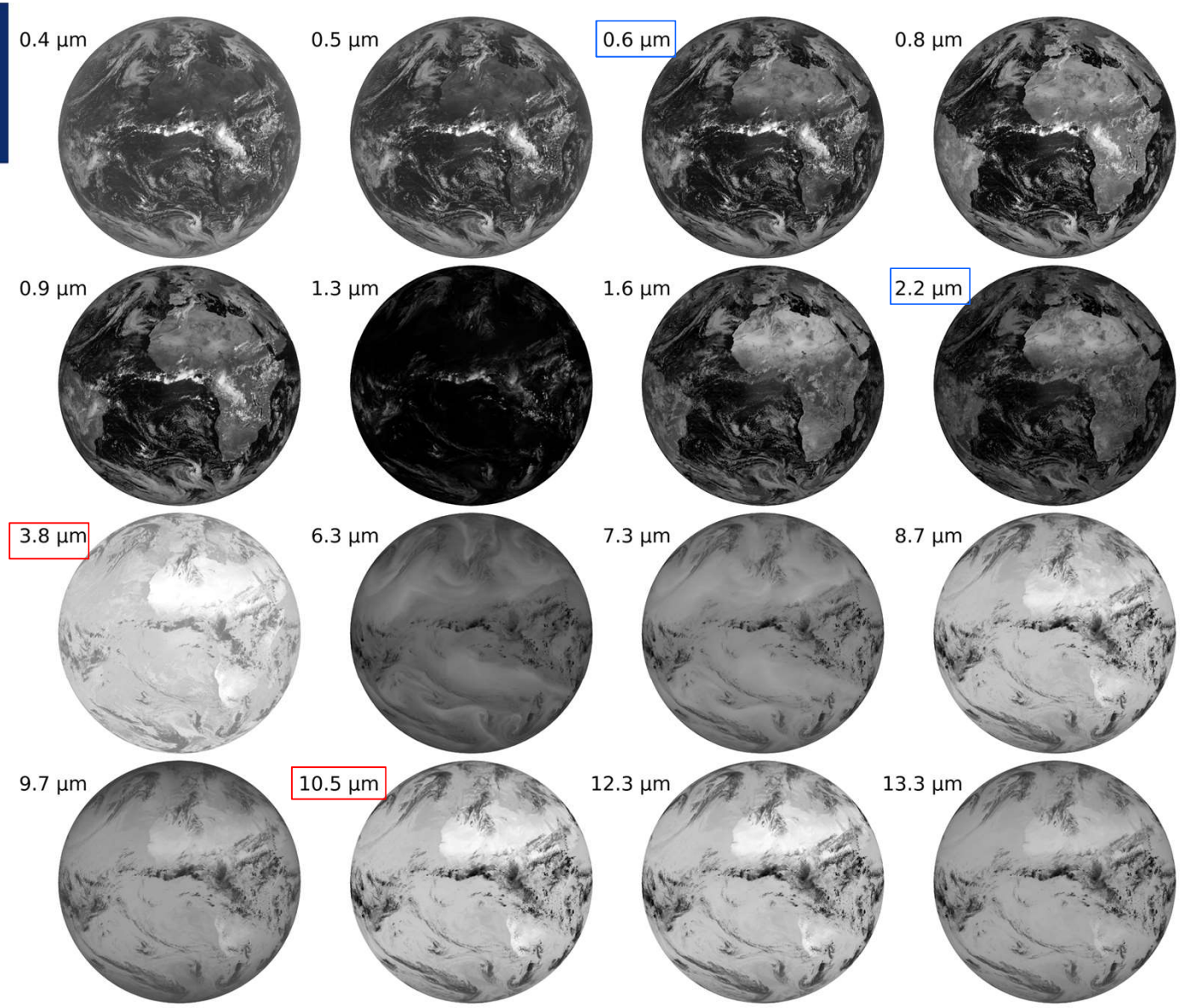
Continuity of the service provided & **Product/ Portfolio Evolution** according with user requirements and considering new data and instruments:

1) Ensure the continuity of a reliable near real time services

2) Provide homogeneous datasets for products – CDR's

MTG-I
Flexible Combined Imager –FCI

MTG-I1, from 11:50 UTC 18 March to 11:50 UTC 19 March 2023, every 10 min



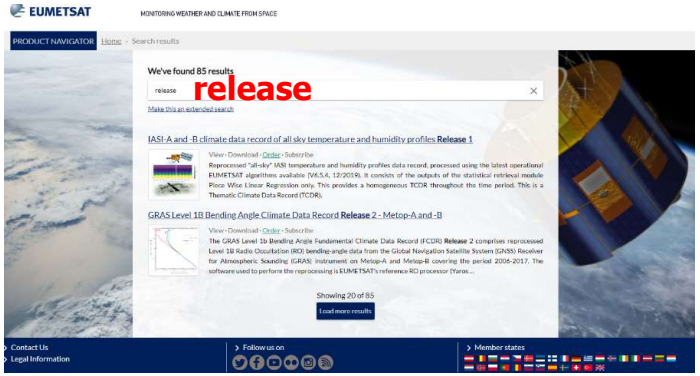
Solar channels available with 1.0 km (& 0.5 km) resolution

Thermal channels available with 2 km (& 1 km) resolution

Where to access EUMETSAT data

- EUMETSAT product navigator

https://navigator.eumetsat.int/start



- Check also on each SAF webpage

http://lsa-saf.eumetsat.int; http://h-saf.eumetsat.int;
http://osi-saf.eumetsat.int ; http://nwc-saf.eumetsat.int;
etc….

EUMETSAT NWC SAF — SUPPORT TO NOWCASTING AND VERY SHORT RANGE FORECASTING
EUMETSAT ROM SAF — RADIO OCCULTATION METEOROLOGY
EUMETSAT NWP SAF — NUMERICAL WEATHER PREDICTION
EUMETSAT CM SAF — CLIMATE MONITORING
EUMETSAT LSA SAF — LAND SURFACE ANALYSIS
EUMETSAT H SAF — SUPPORT TO OPERATIONAL HYDROLOGY AND WATER MANAGEMENT
EUMETSAT OSI SAF — OCEAN AND SEA ICE
EUMETSAT AC SAF — ATMOSPHERIC COMPOSITION MONITORING

Contact helpdesk: ops@eumetsat.int

Thank you!

Questions are welcome.