

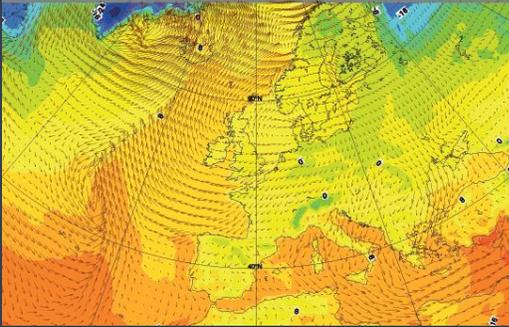
GLOBAL FORECASTS

NWP SCIENCE

ENVIRONMENTAL SERVICES

SERVING METEOROLOGY

SUPERCOMPUTING



Advancing the science to improve global forecasts:

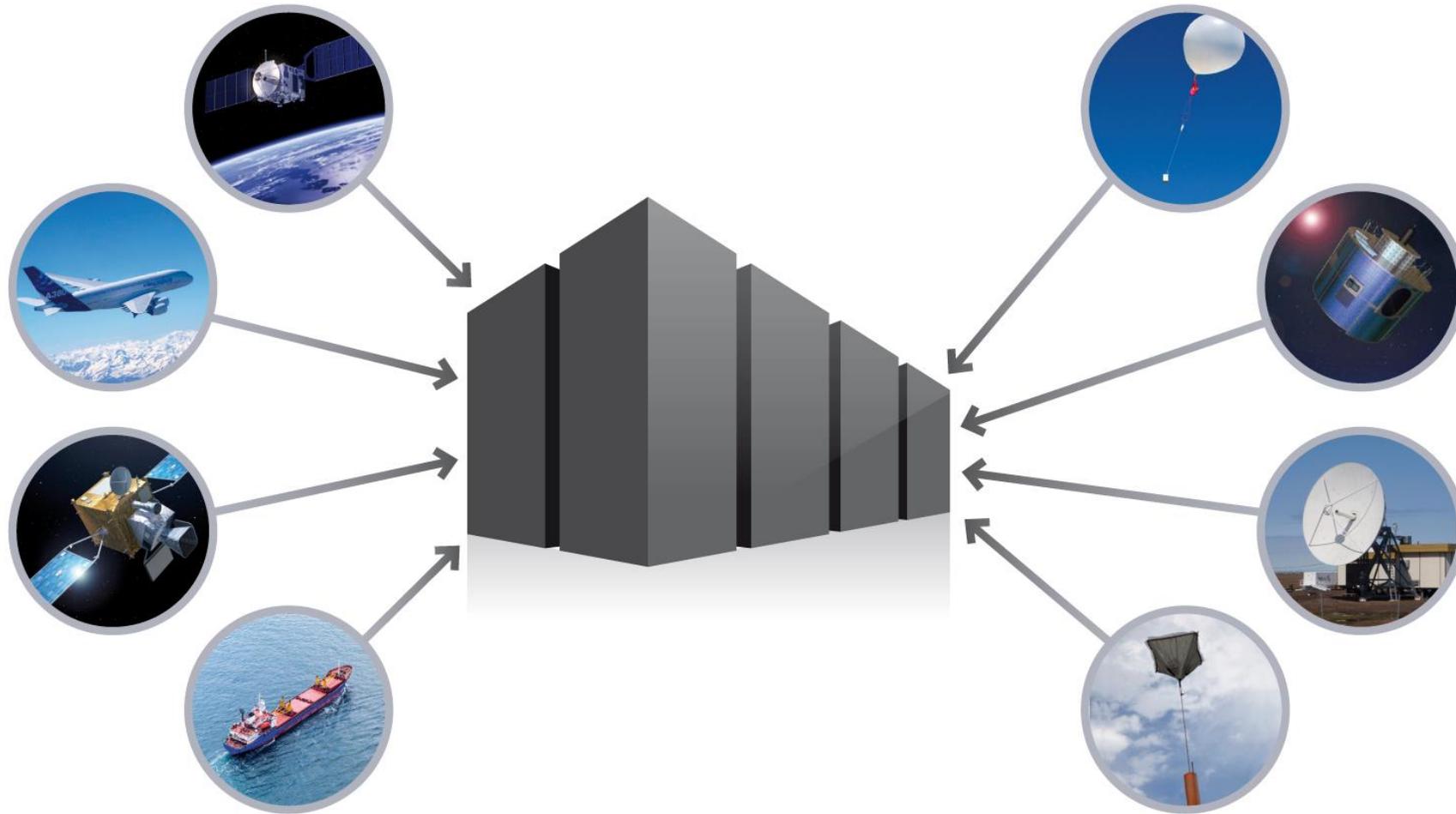
ECMWF 2009-2017

Erland Källén



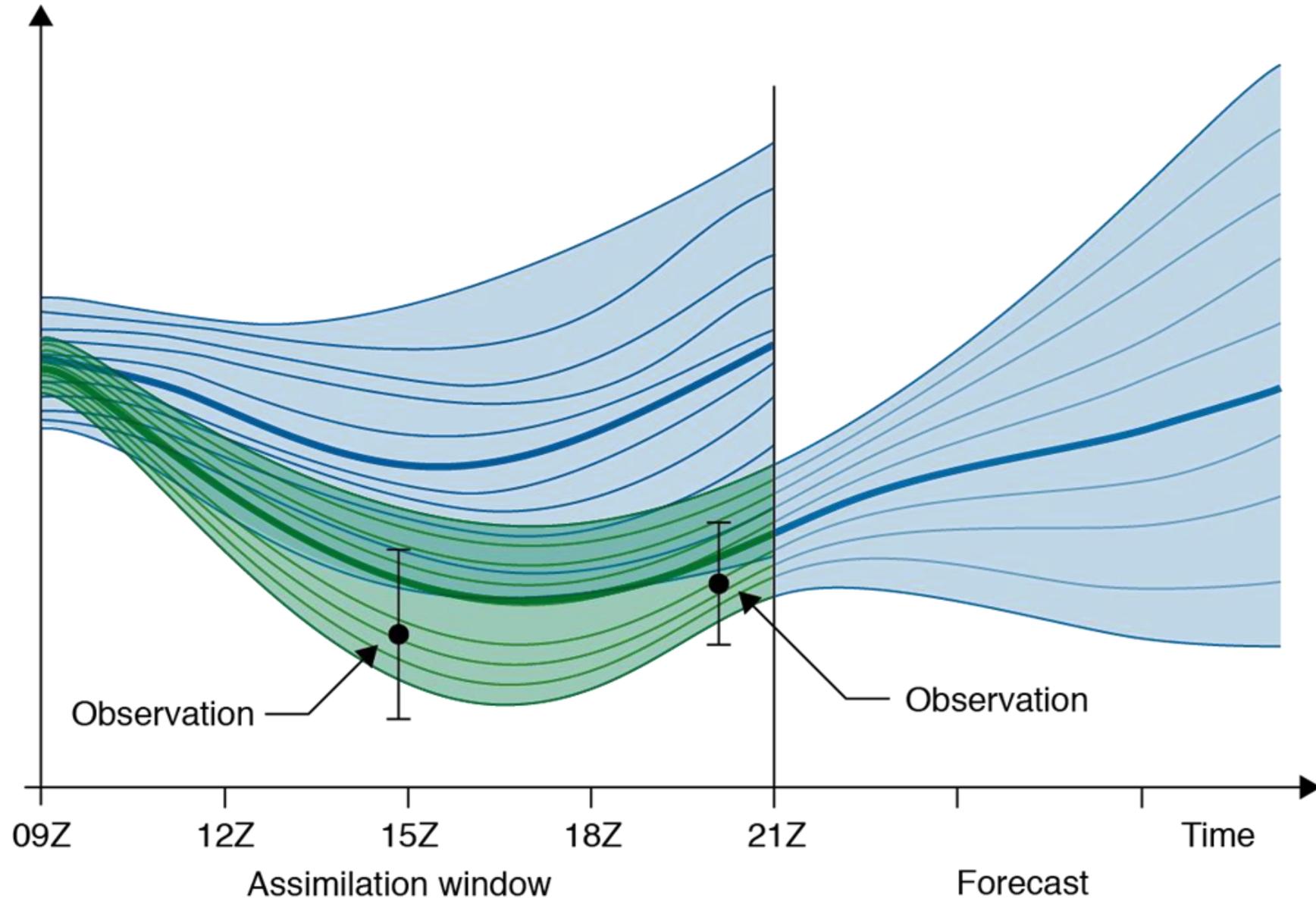
June 9, 2017

Observation platforms

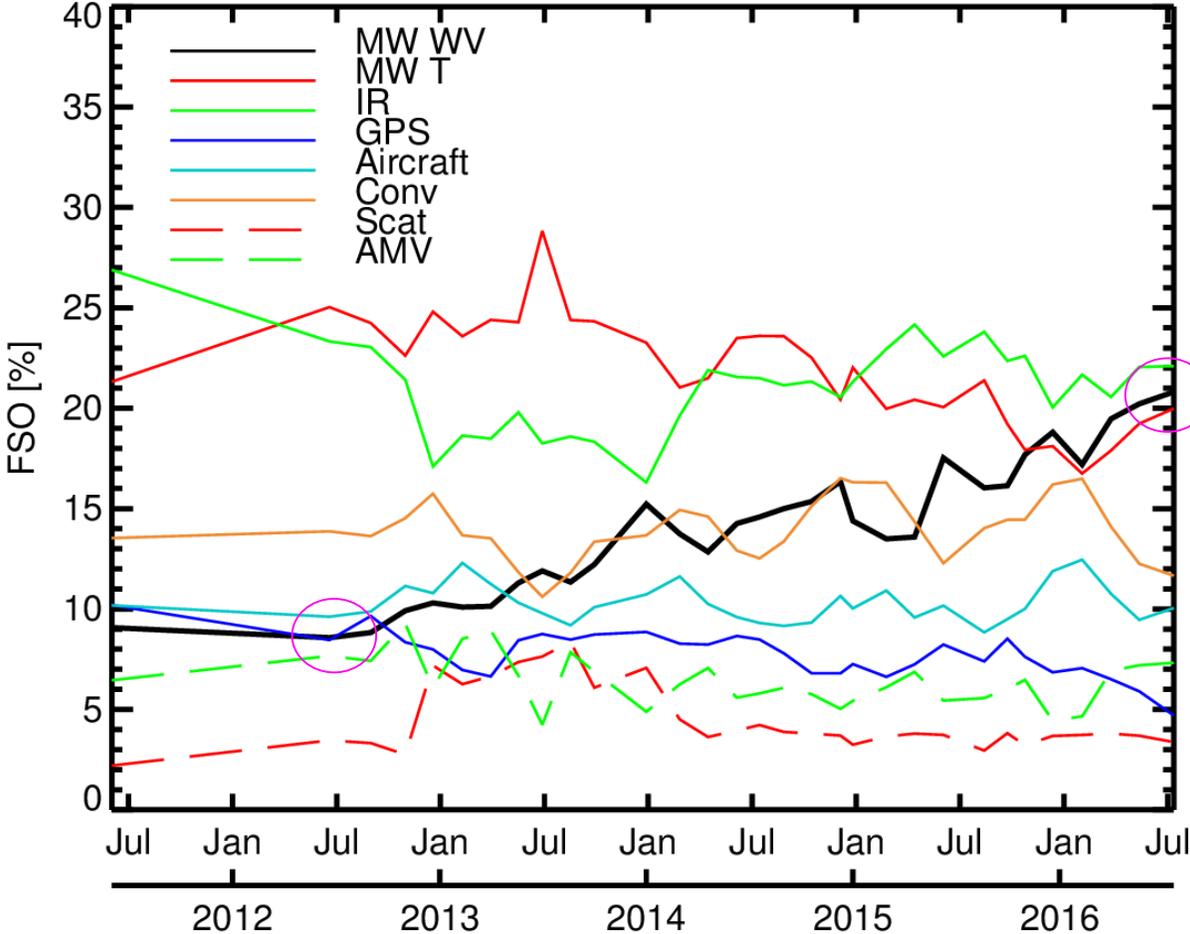


Ensemble Data Assimilation

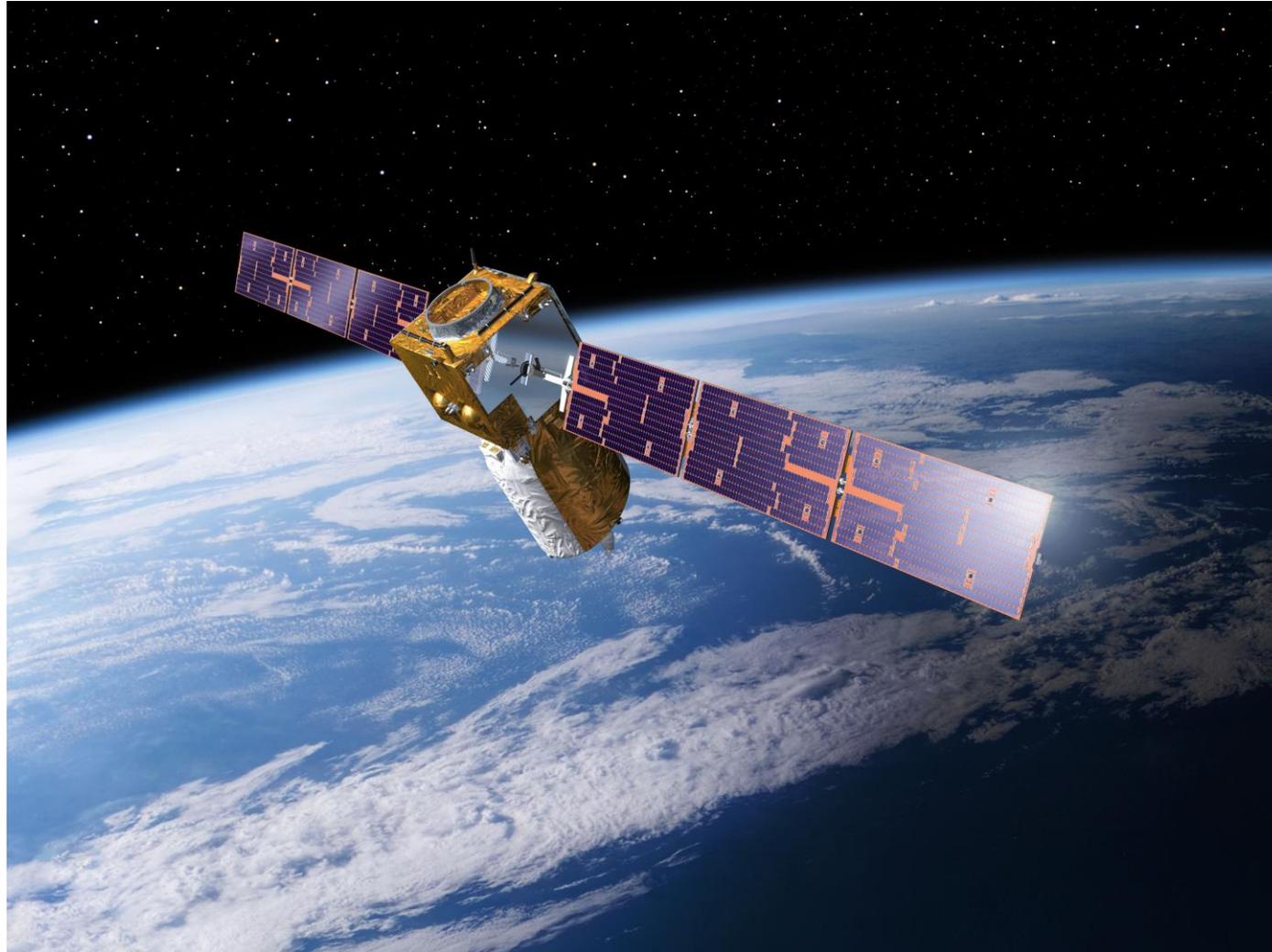
Ensemble Forecast



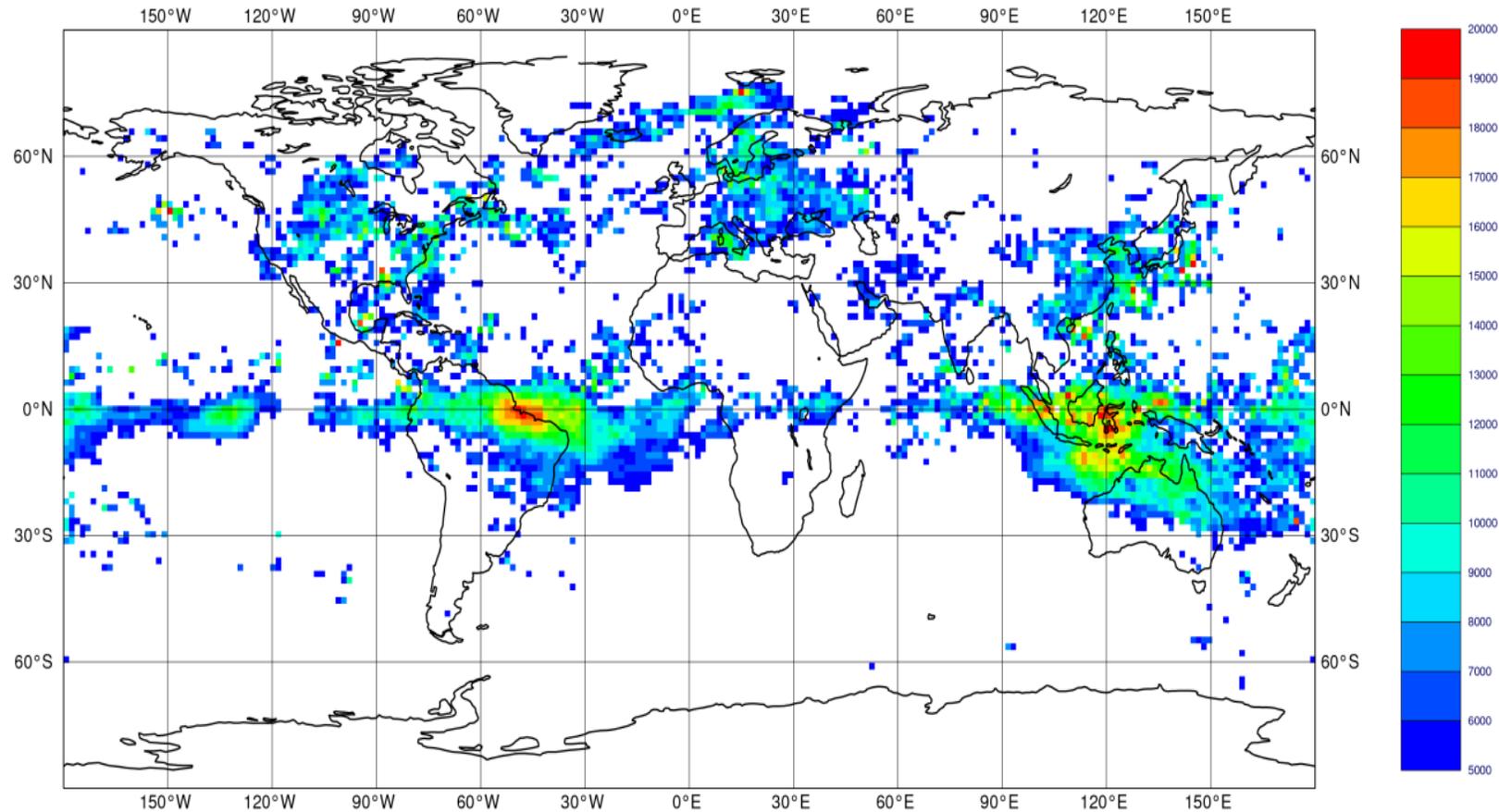
Forecast sensitivity (FSO) of major observing systems in ECMWF operations



Aeolus Doppler wind Lidar
launch December 2017
ESA Earth Explorer Mission

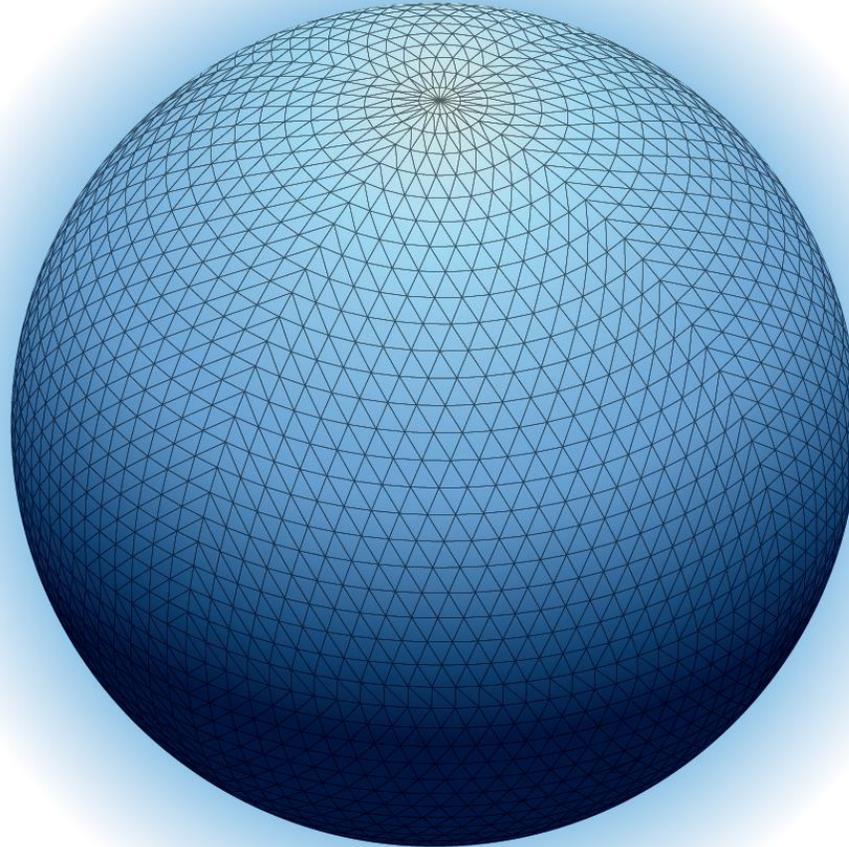


Aeolus NWP impact experiment



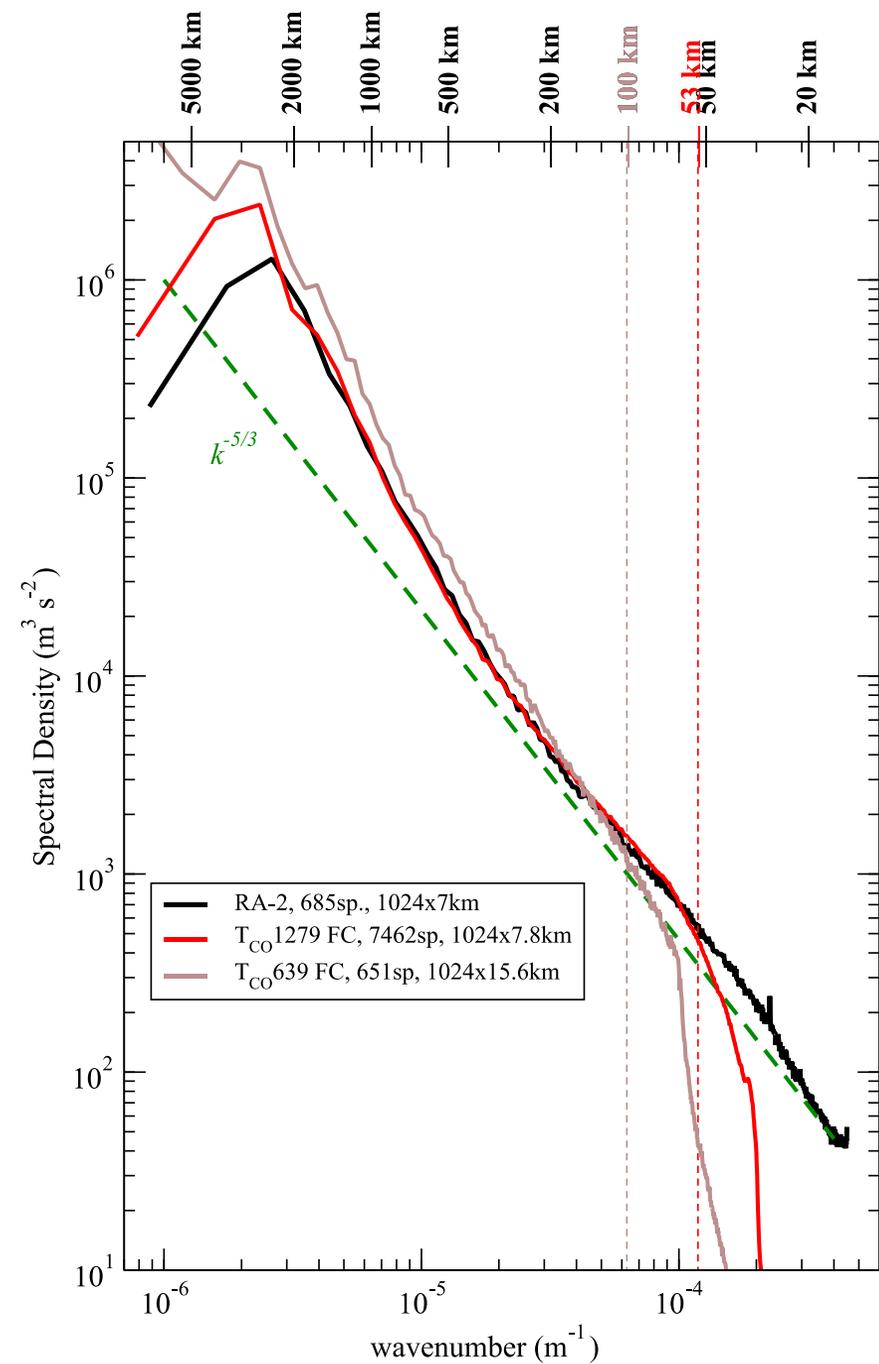
Forecast model – Cubic octahedral 9 km grid, 137 levels

- Wind
- Temperature
- Pressure
- Humidity
- Clouds
- Precipitation

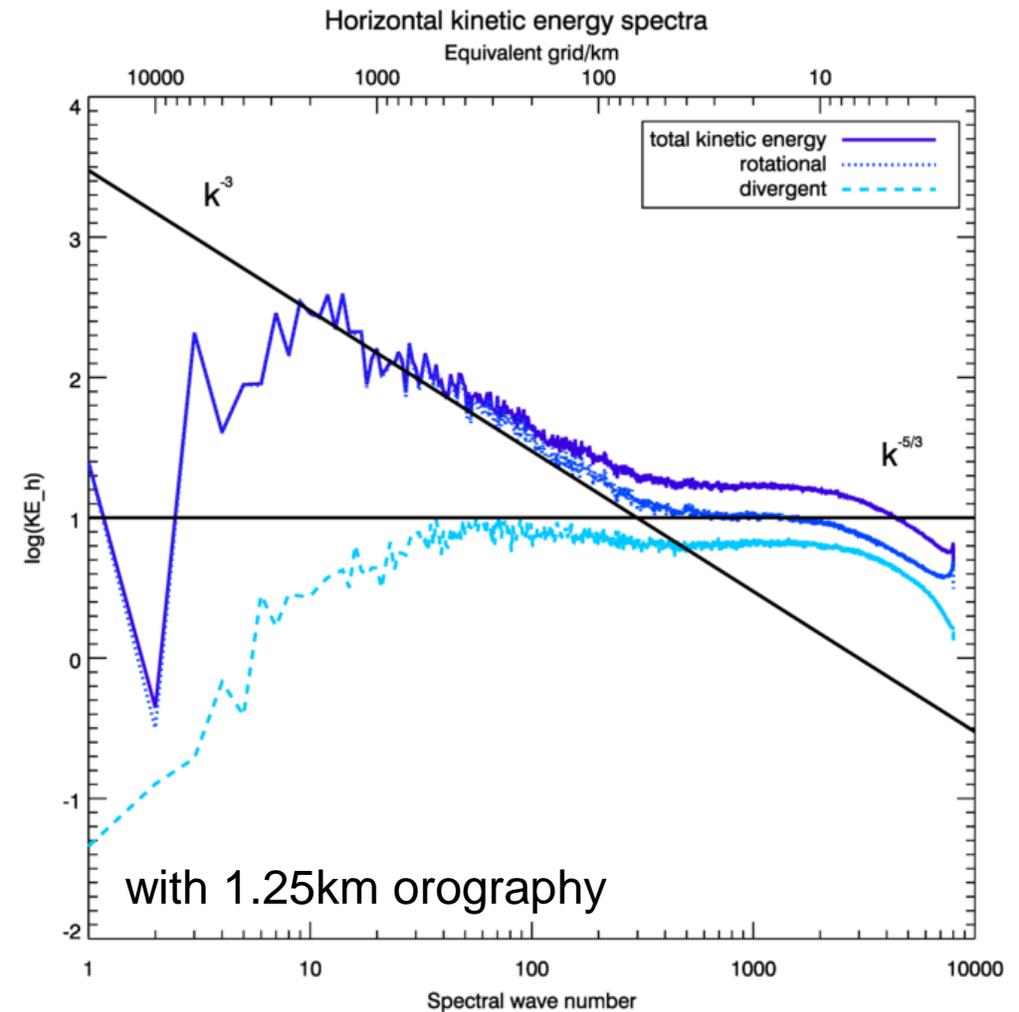
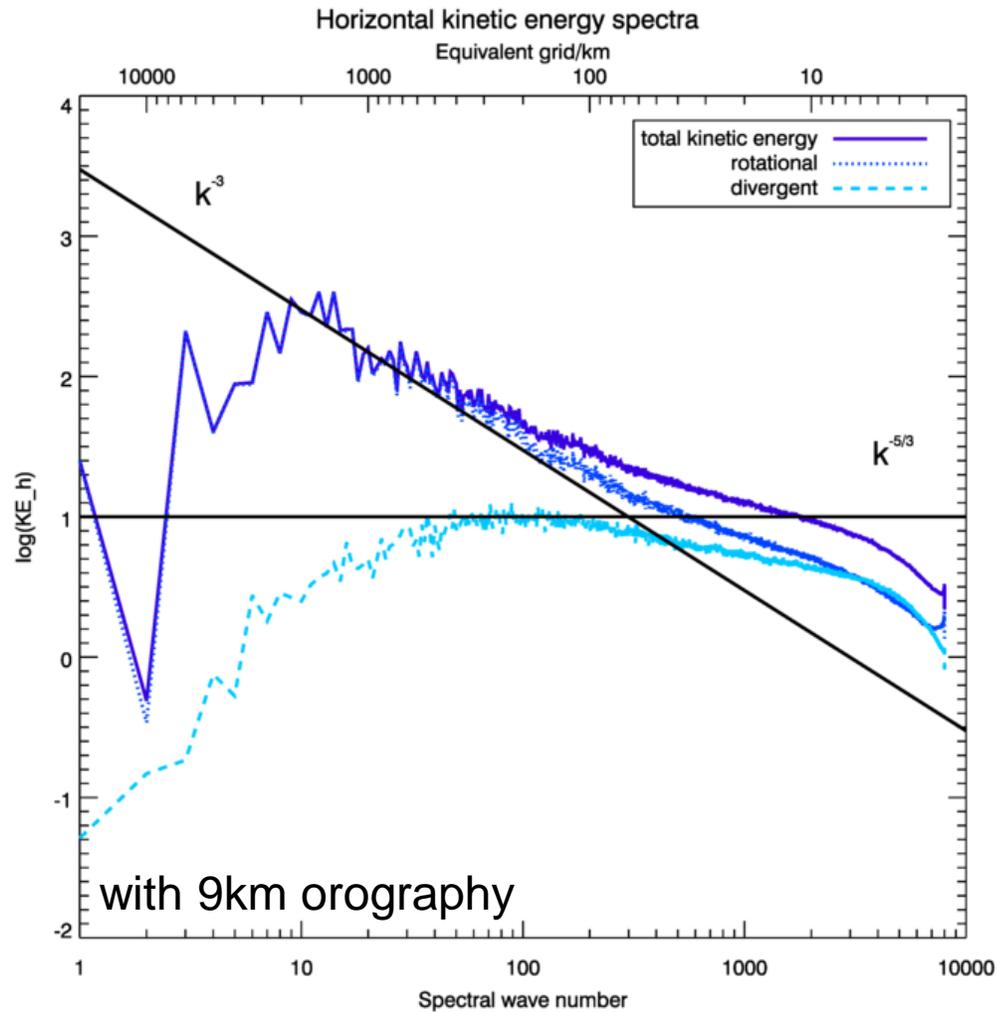


Wind Speed Spectrum of operational T_{CO} resolutions

(Saleh Abdalla)



Global 1.25km spectra: Mid-Troposphere 500hPa

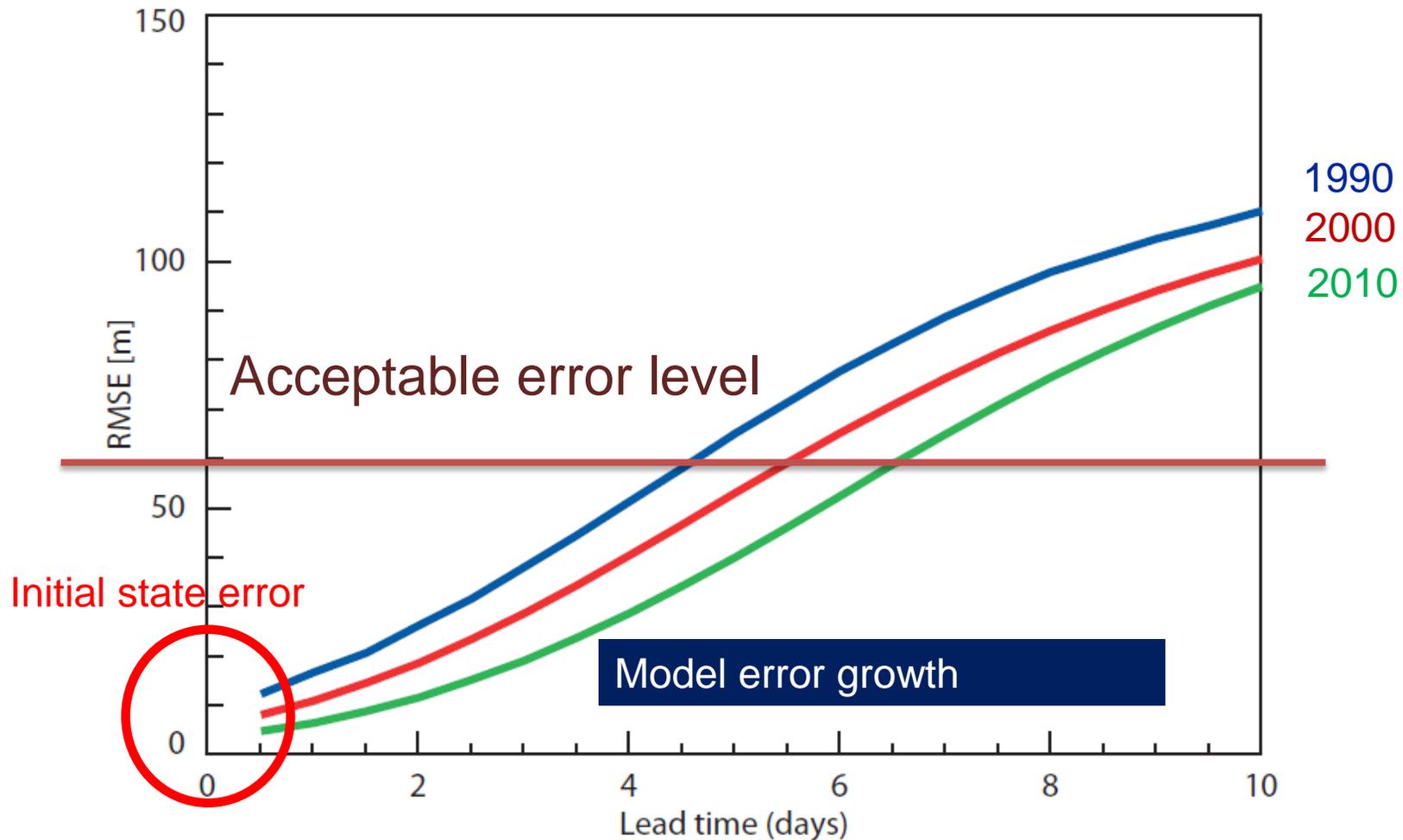


Impact of parametrizations + orography, (*Malardel + Wedi, JGR 2016*)

Open IFS

- Provide IFS for research and education
- Make scientists familiar with IFS code
- Provide feedback to ECMWF developments
 - Single precision coding
 - Super parameterisation of convection
 - PBL research
- NWP training at universities and met services

RMS error of 500 hPa height field Northern Hemisphere



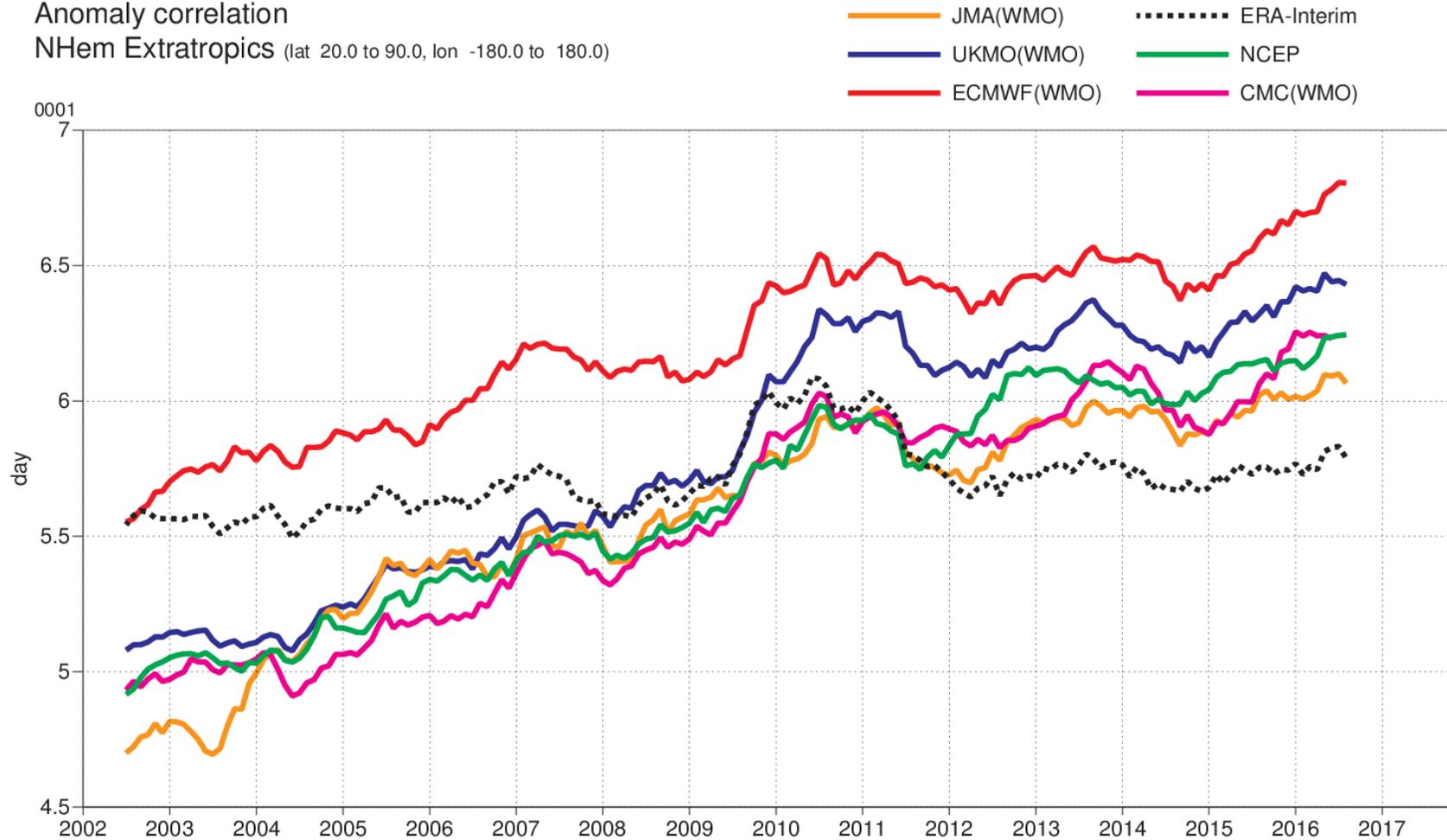
Comparison to other centres

Lead time of ACC=80%

500hPa geopotential

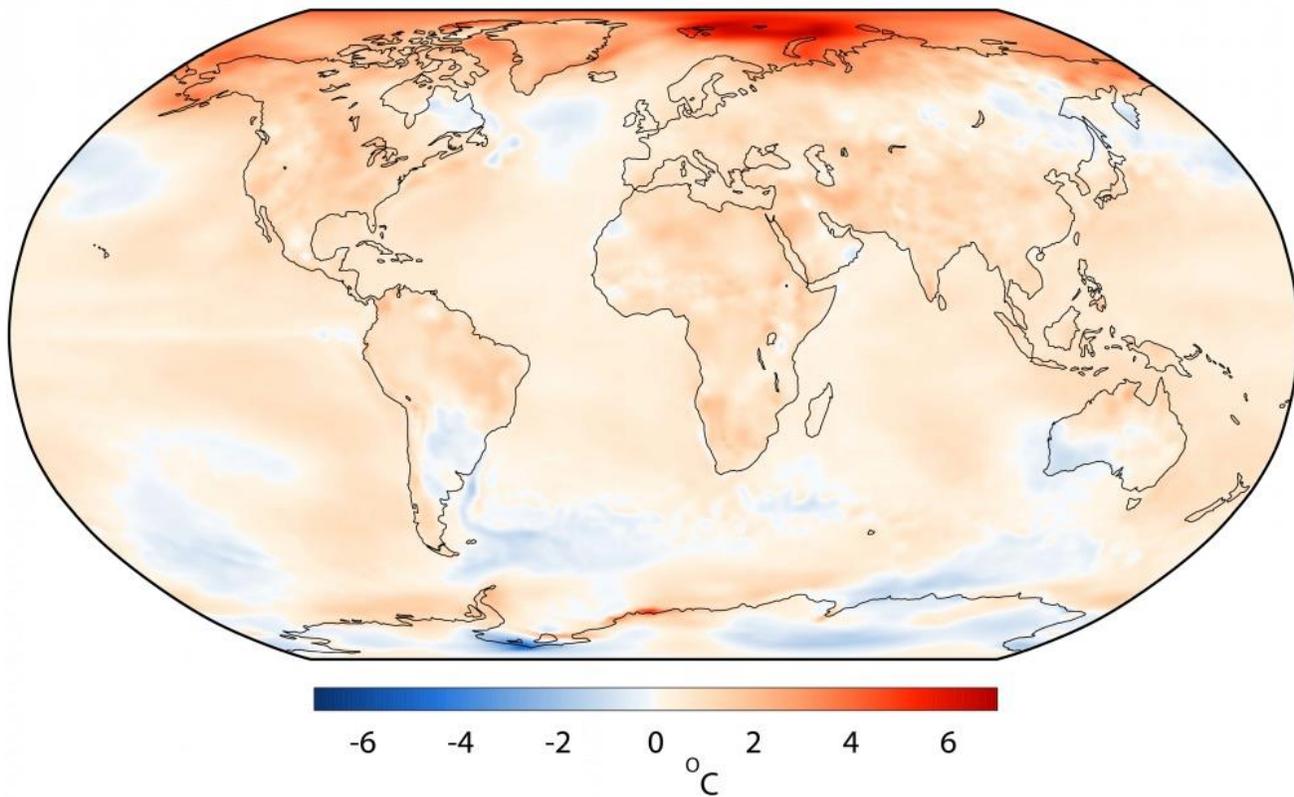
Anomaly correlation

NHem Extratropics (lat 20.0 to 90.0, lon -180.0 to 180.0)

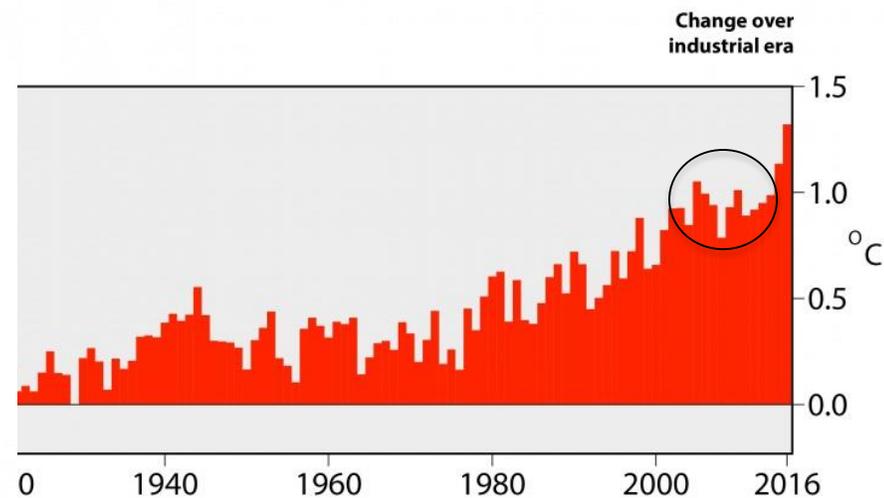


Reanalysis results for climate change

AVERAGE SURFACE AIR TEMPERATURE FOR 2016



GLOBAL SURFACE AIR TEMPERATURES FROM 1880 TO 2016



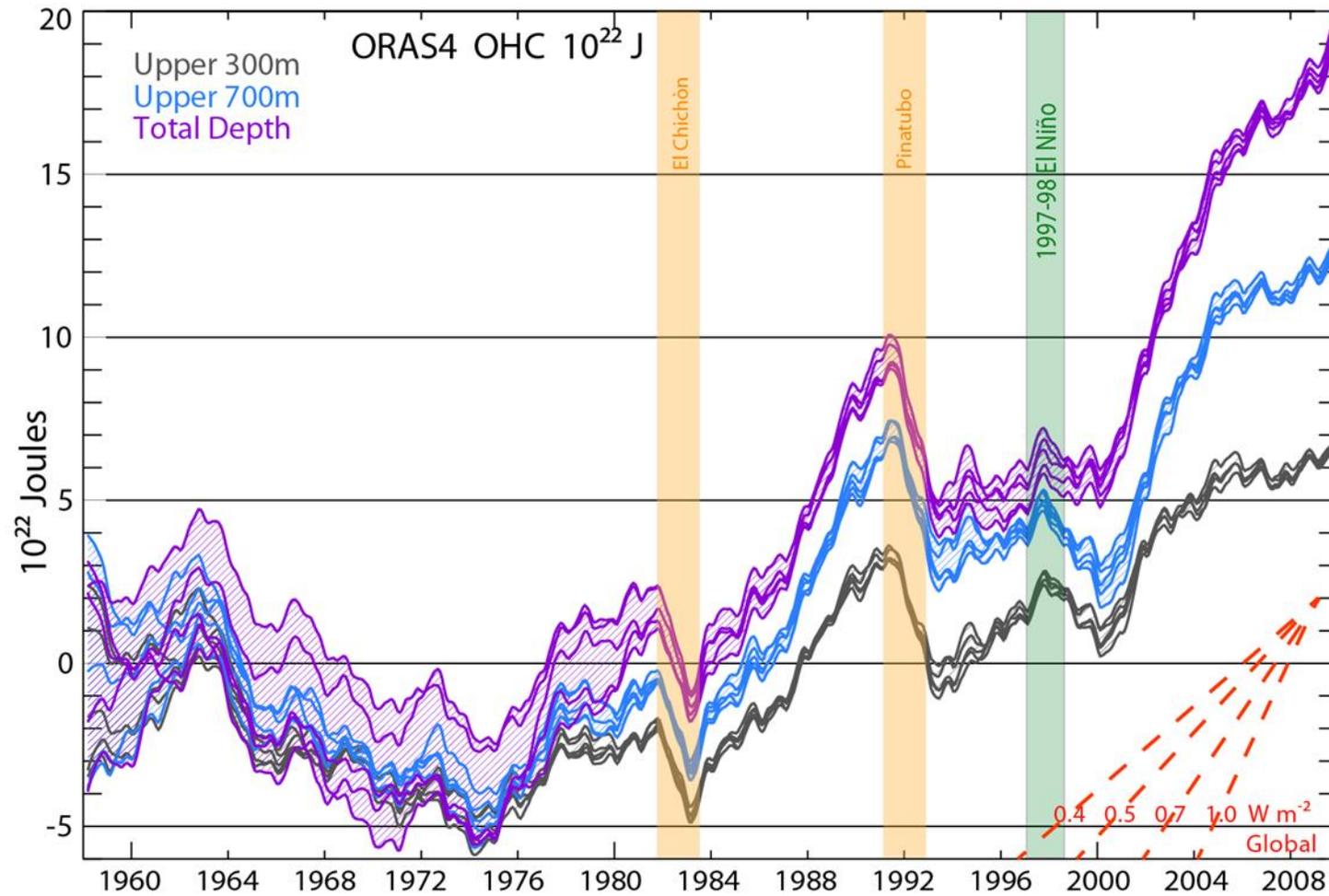
Source: Copernicus Climate Change Service, ECMWF.



from 1979;
to 1979.



Ocean heat storage

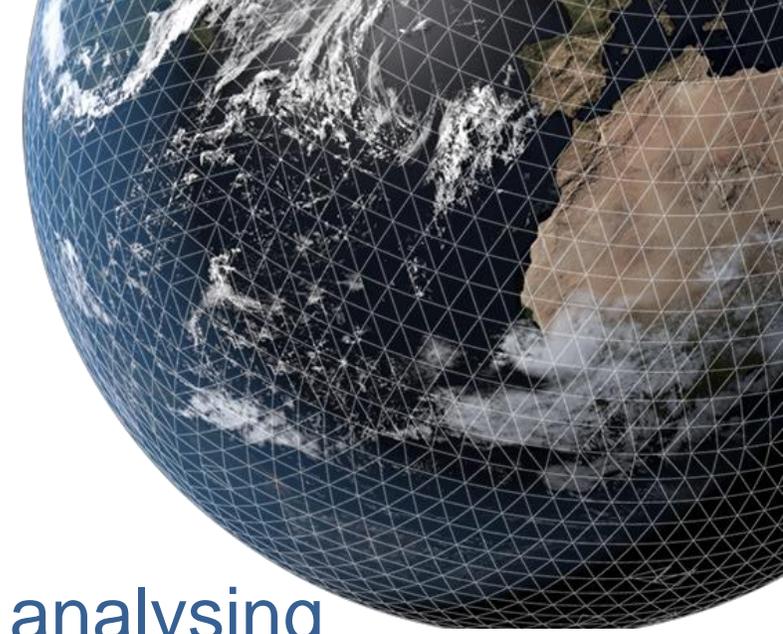


Balmaseda, Trenberth,
Källén, 2013

The strength of a common goal

The Strategic Goals 2016-2025

- Earth system approach to modelling and analysing
- Ensemble prediction at 5km
- Scalability across the NWP chain



A large conference room with many small flags on stands arranged in a circle. The flags represent various countries, including Turkey, the United Kingdom, and Switzerland. The room has a blue carpet and wooden walls.

The strength of a common goal