B9.02 New Mission Concepts

An overview of the future observation requirements for strategic developments in Numerical Weather Prediction

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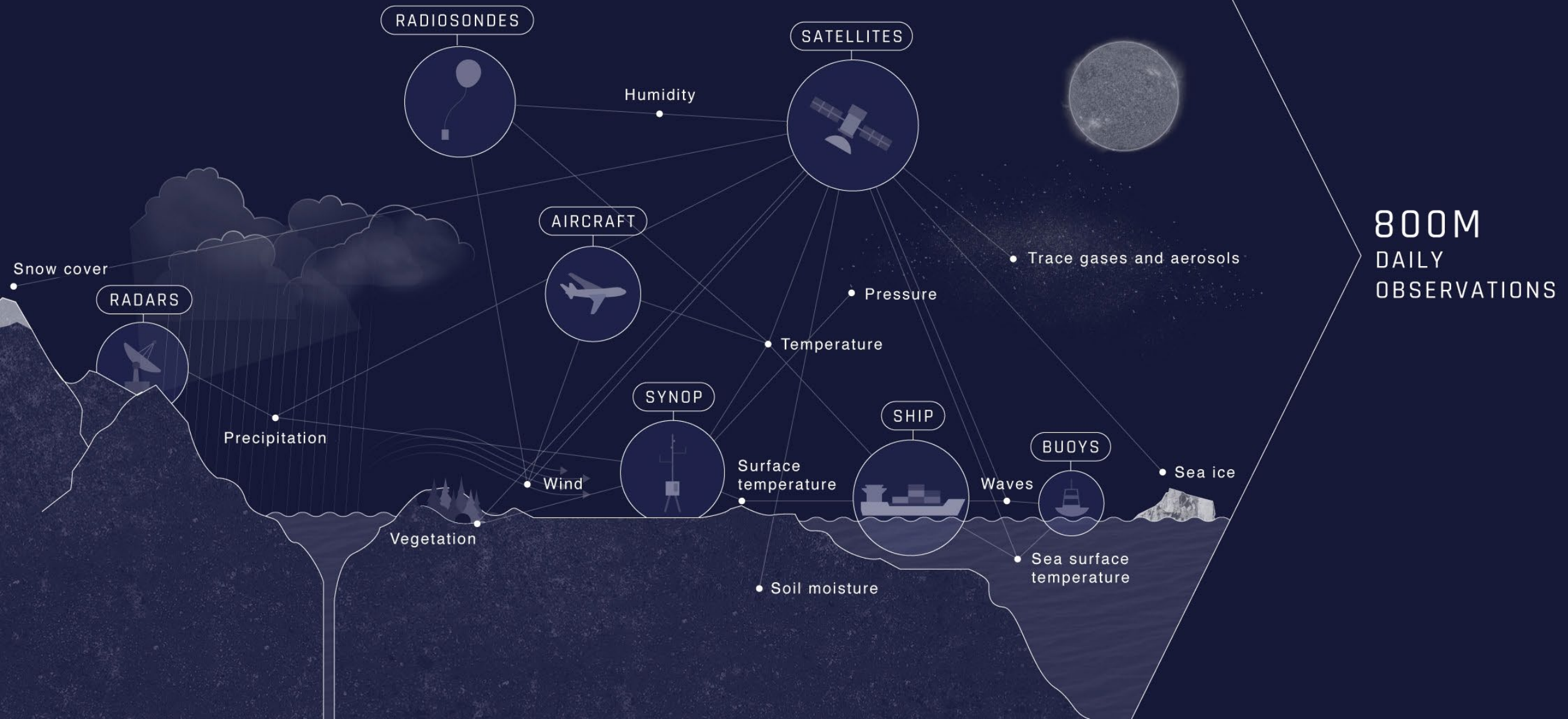
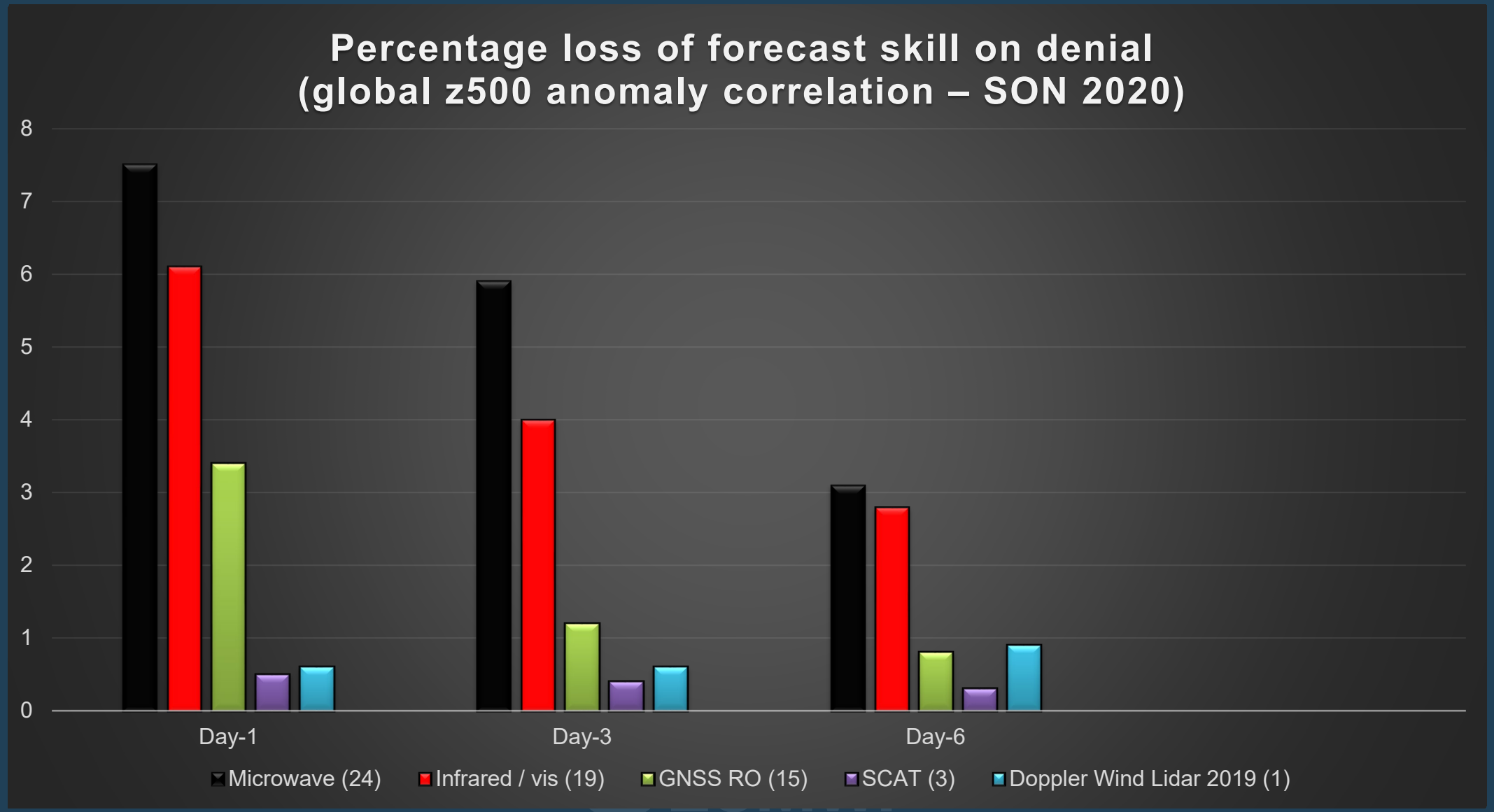
CAPTURING THE WEATHER

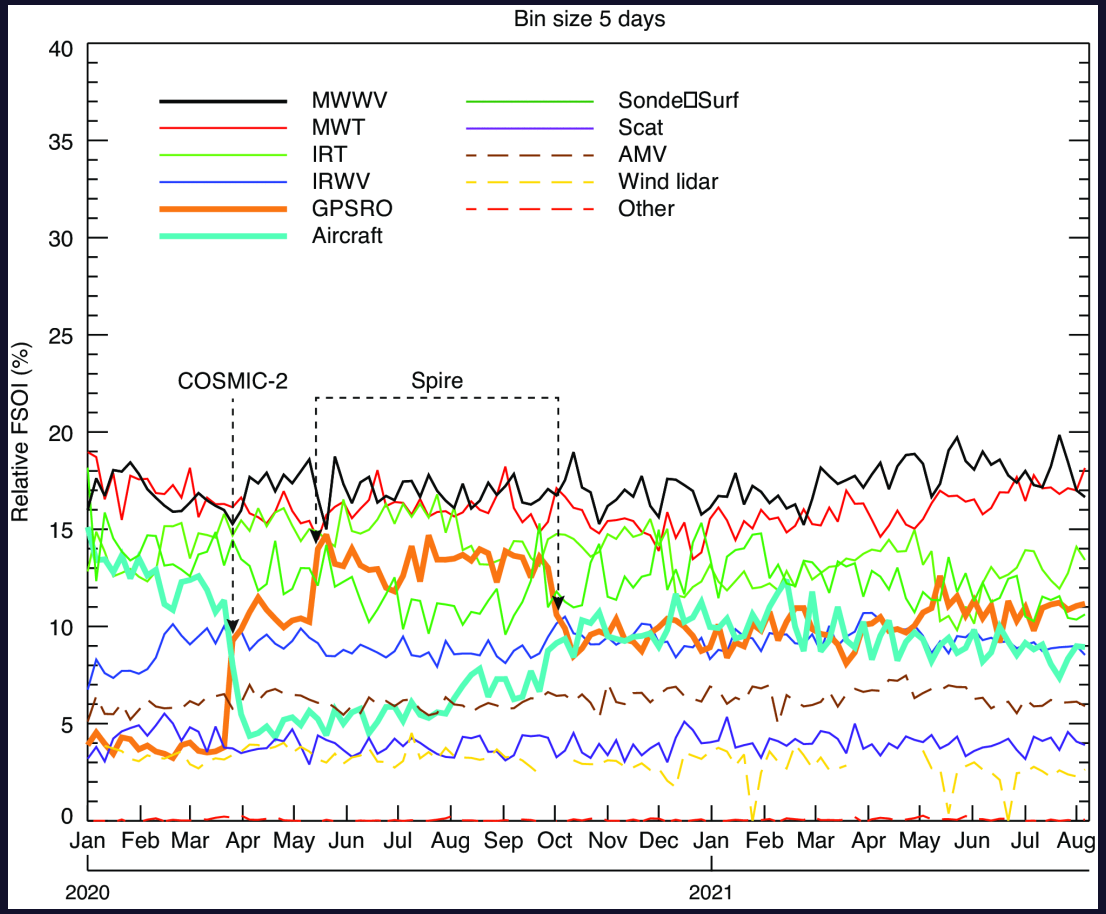
To predict the future, we observe the present. Every day, we absorb 800 million observations to create a detailed snapshot of Earth's weather.



Measuring observation impact: OSE



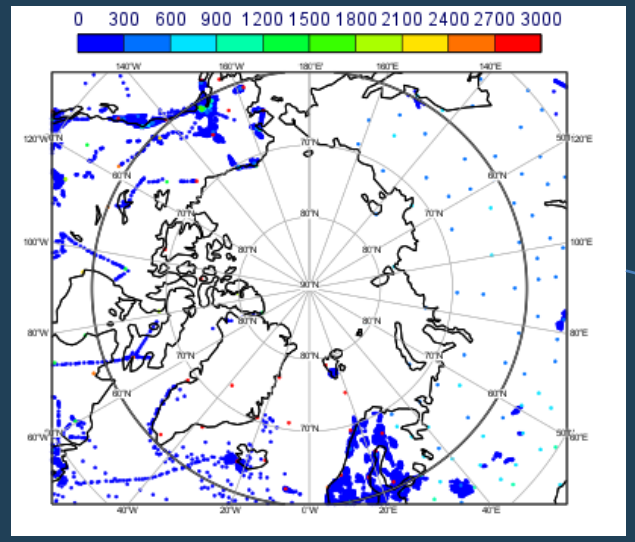
Measuring observation impact: FSOI



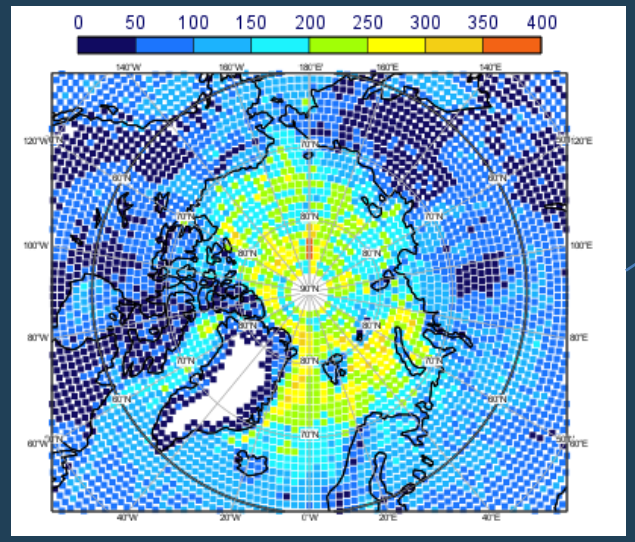
Gaps depend on science maturity not just hardware

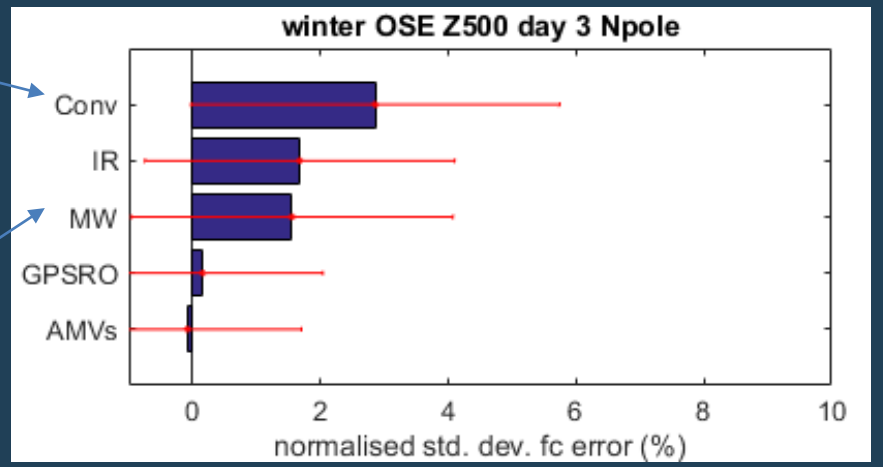
APPLICATE.eu
Advanced prediction in polar regions and beyond

Number of temperature obs 400-600 hPa



Number of satellite obs (AMSU-A)





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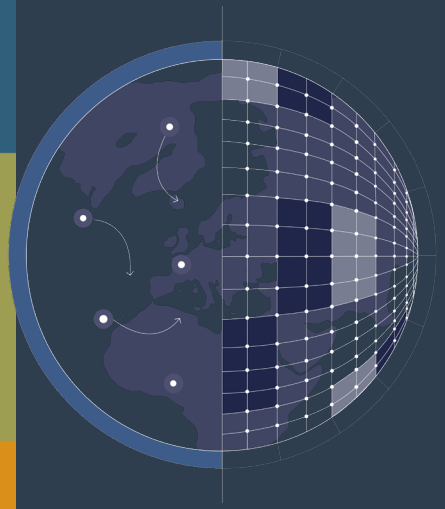
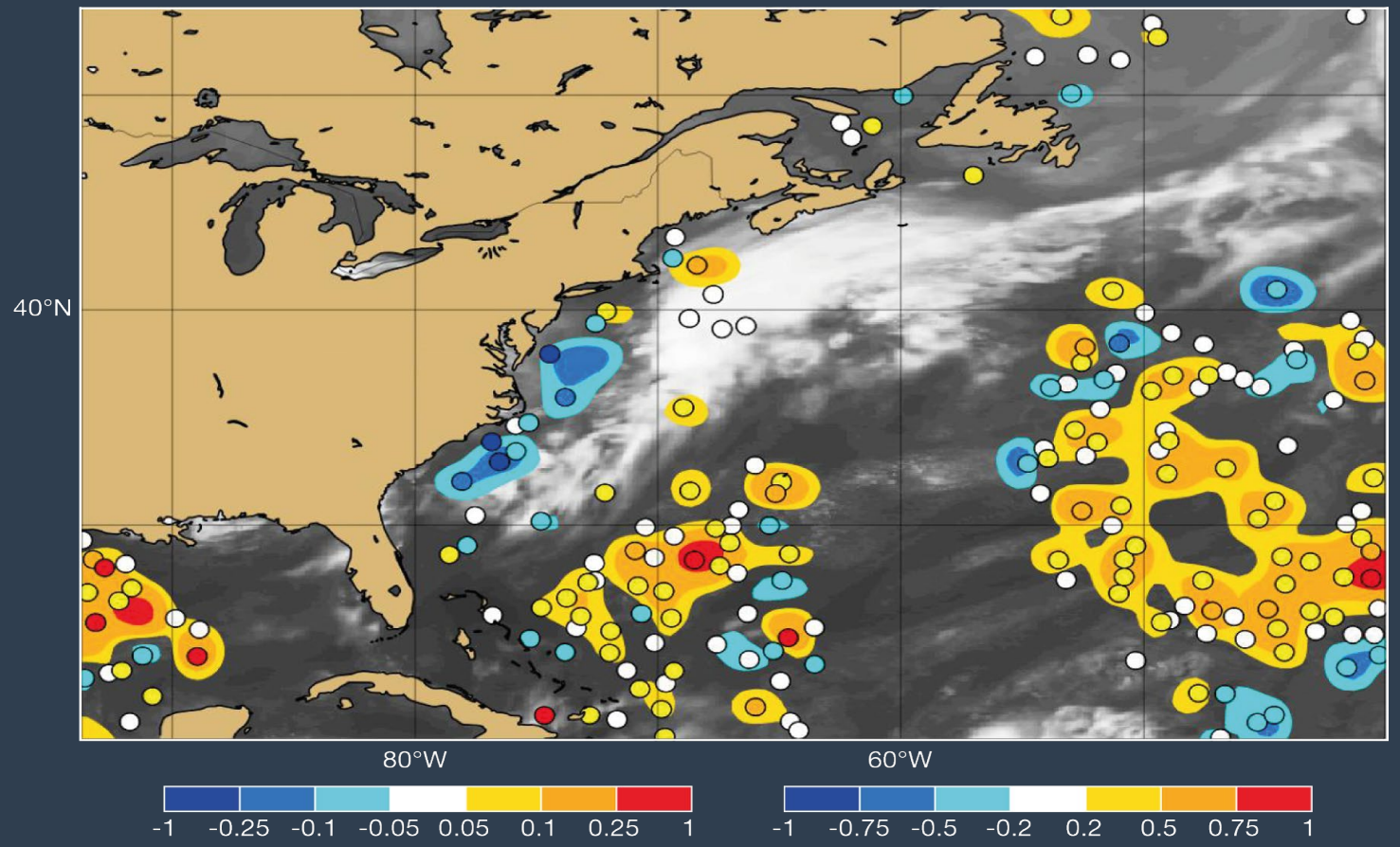
H. Lawrence

Note earlier talk by **Patricia de Rosnay** in CM22 plenary session



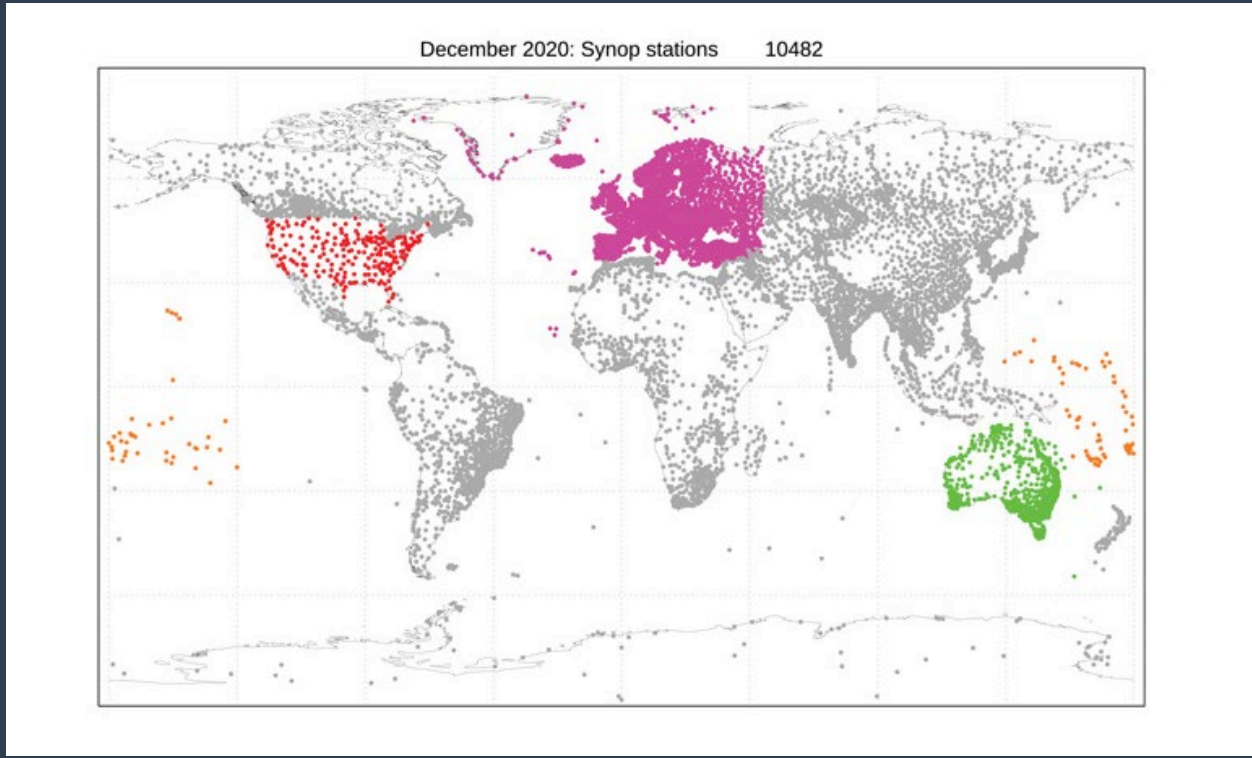
Developments in coupled Earth system data assimilation

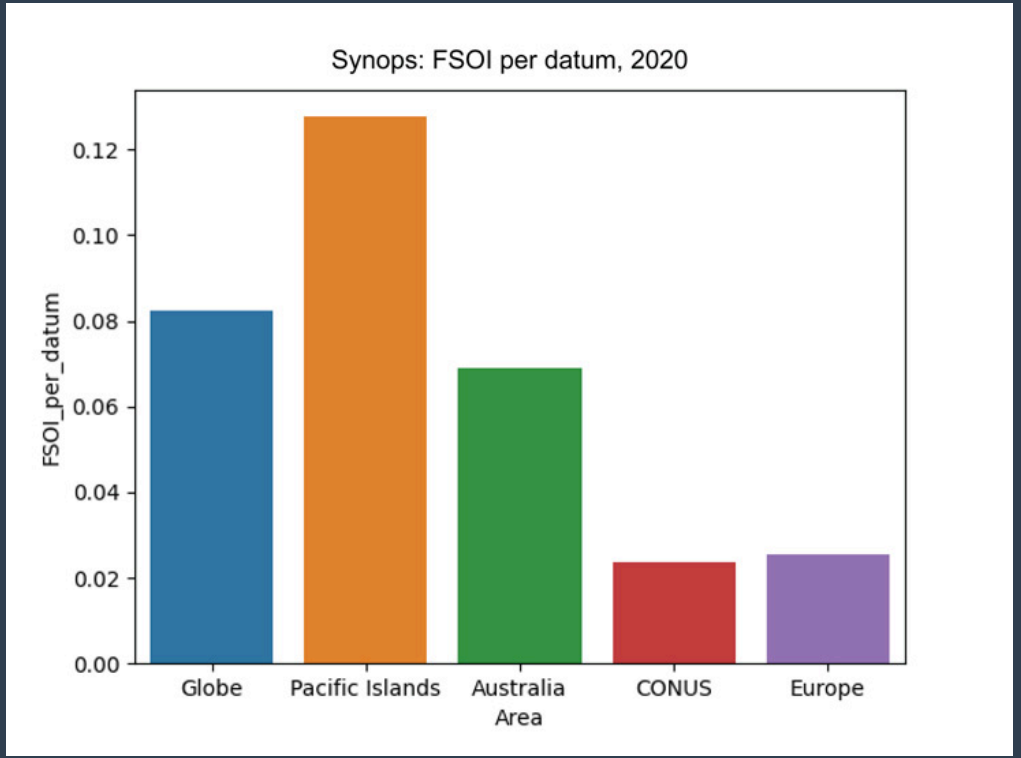


Ocean skin temperature increments (contoured colours) resulting from skin temperature departures (circles) analysed in 4D-Var from Metop-C IASI, overlaid on top of model estimated cloud cover

SOFF : Systematic Observation Financing Facility

FSOI can guide investments in observations such as SOFF





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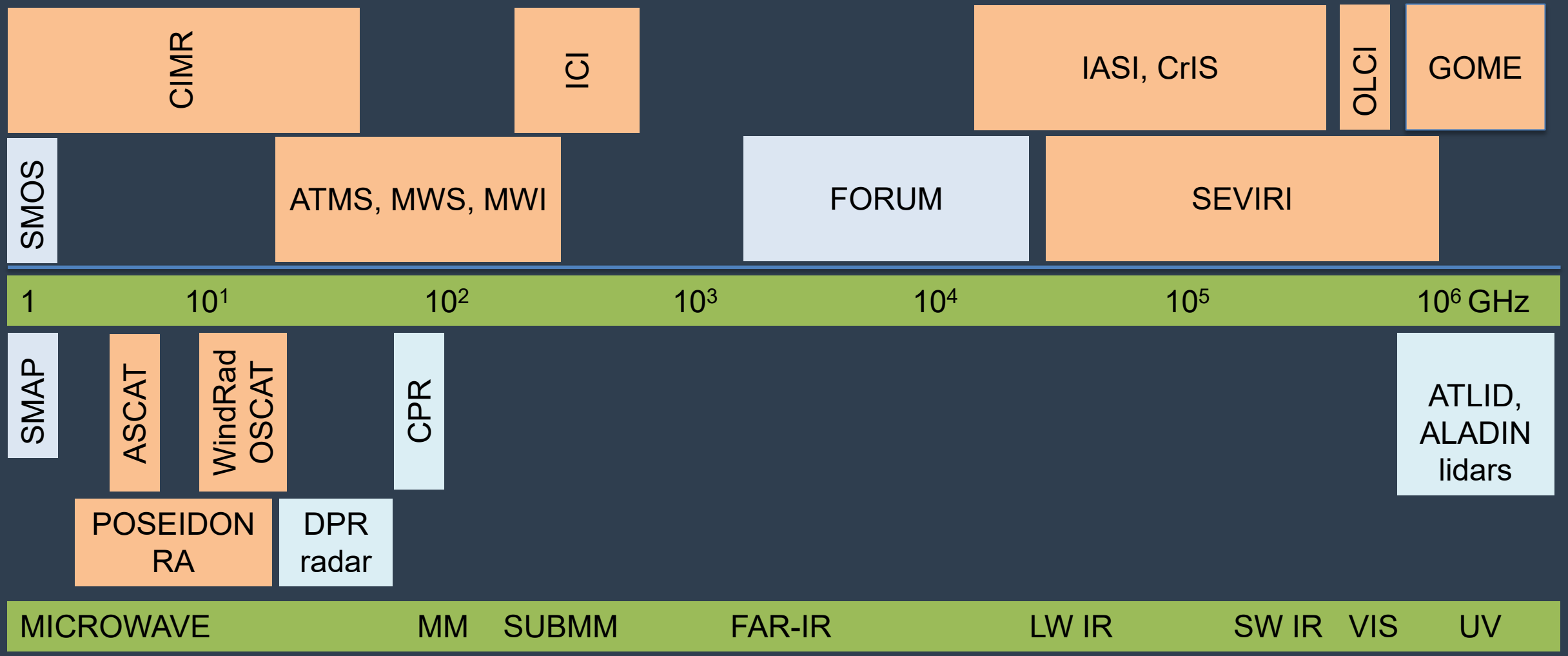
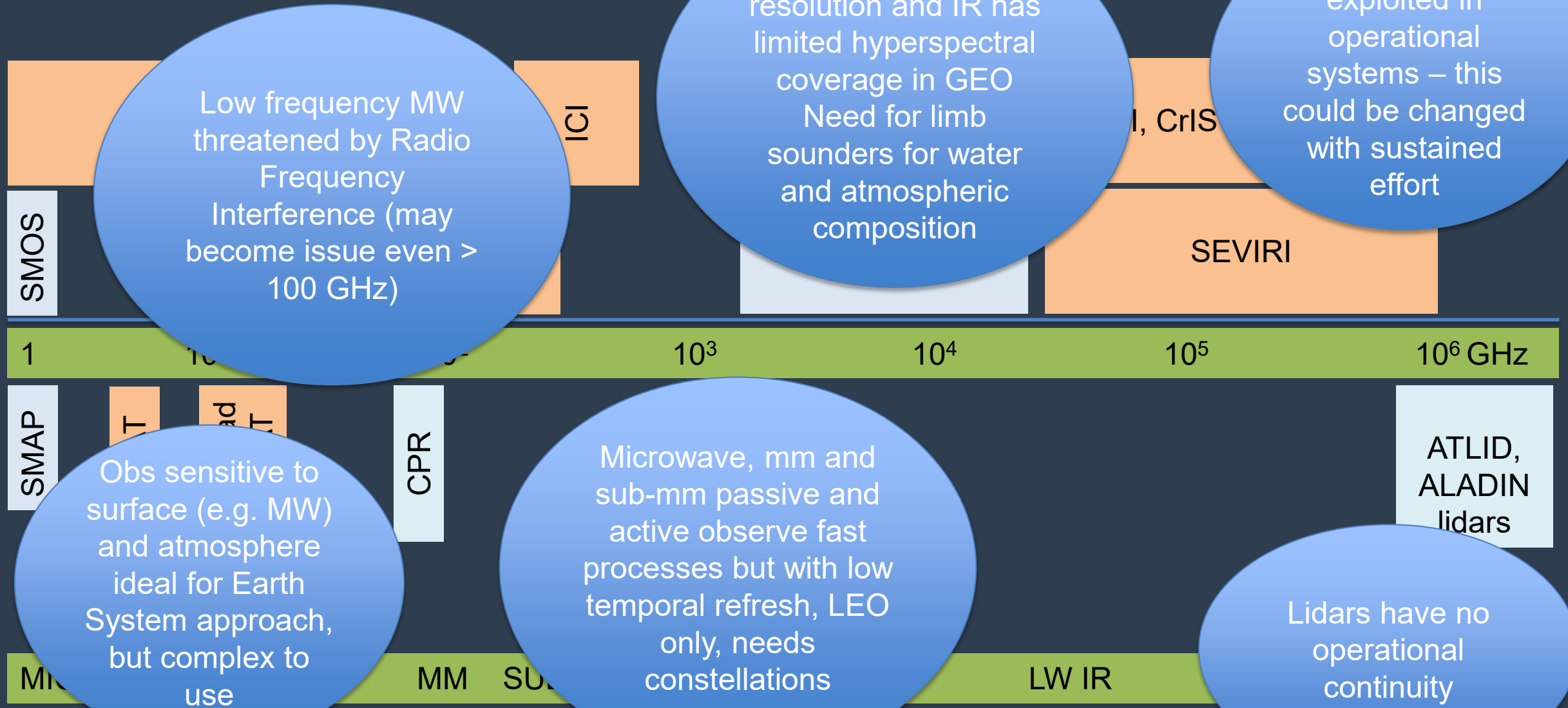
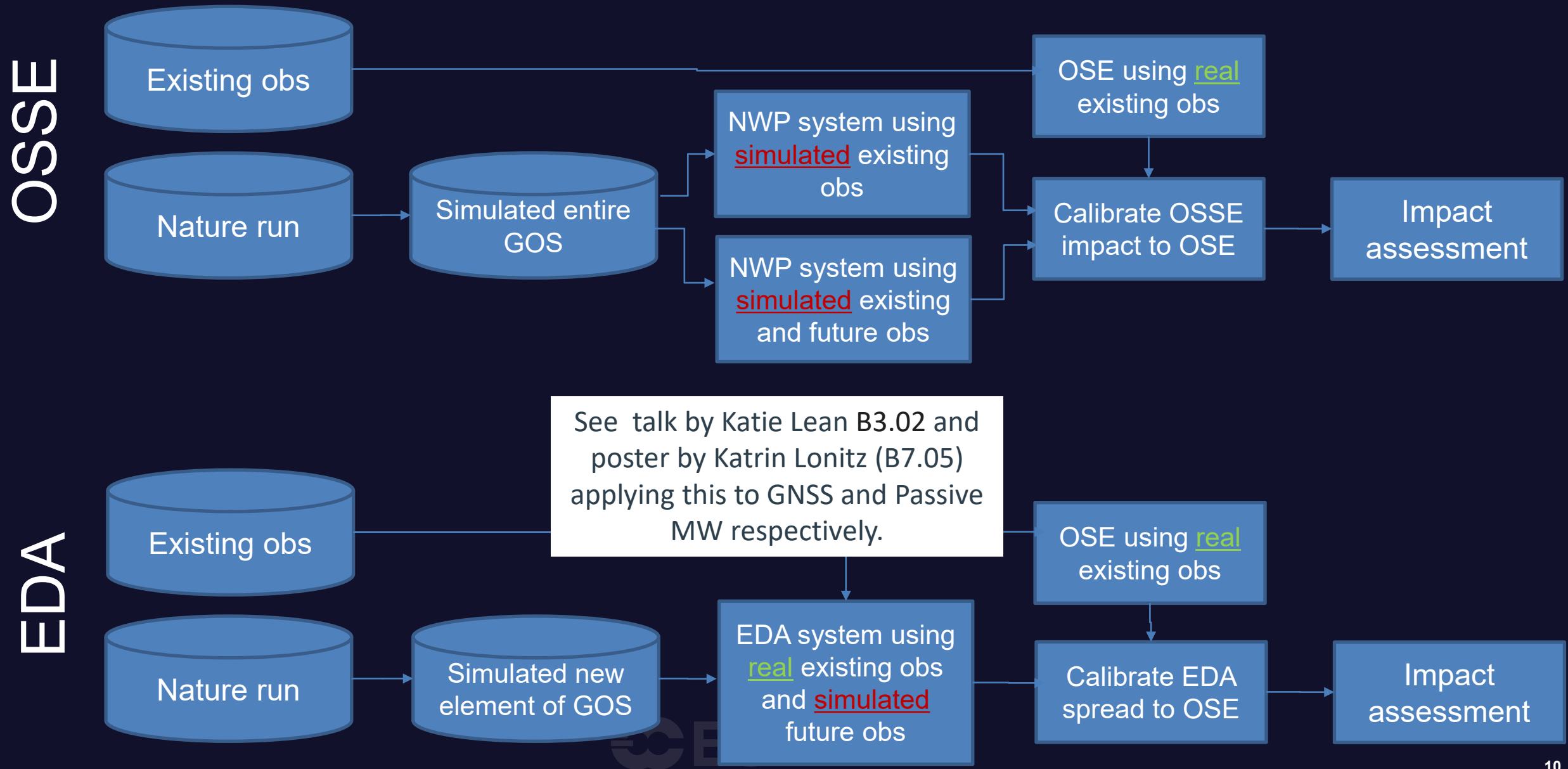
So what do we have?



So what do we need?



Future system assessment



What is needed?

- Interface observations (interface between Earth System domains)
  - Supporting Coupled DA: tools like FSOI, OSE, OSSE and EDA struggle to show benefit because science maturity is lacking
    - e.g. ASCAT underperforms in these metrics but may be a key observation in the future
    - CIMR is important in this context
    - Atmospheric composition – meteorology interactions
- Vertical resolution
  - Radiance currently dominate, with NWP models resolving scales of tens of kms.
  - What will dominate as NWP aims to resolve km scales?
  - Will we have the observations to support this?
    - Radar/lidar (EarthCARE like); Limb sounders (MLS, MIPAS, GNSS)
- Dynamics
  - Lack of wind observations is a concern: Aeolus showed the importance of wind observations to NWP
  - But all-sky radiance use and GNSS are also driving wind increments

We look forward to seeing you on our booth in the centre of the exhibition area, attached to the central ESA booth...

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12