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EOS

Significance of microwave remote sensing

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Centre for Instrumentation

Some key parameters

Atmosphere – many parameters (T; gases; clouds, rainfall)

Temperature and water vapour

Ozone and chlorine monoxide

Cirrus clouds

Land

Soil moisture

Snow

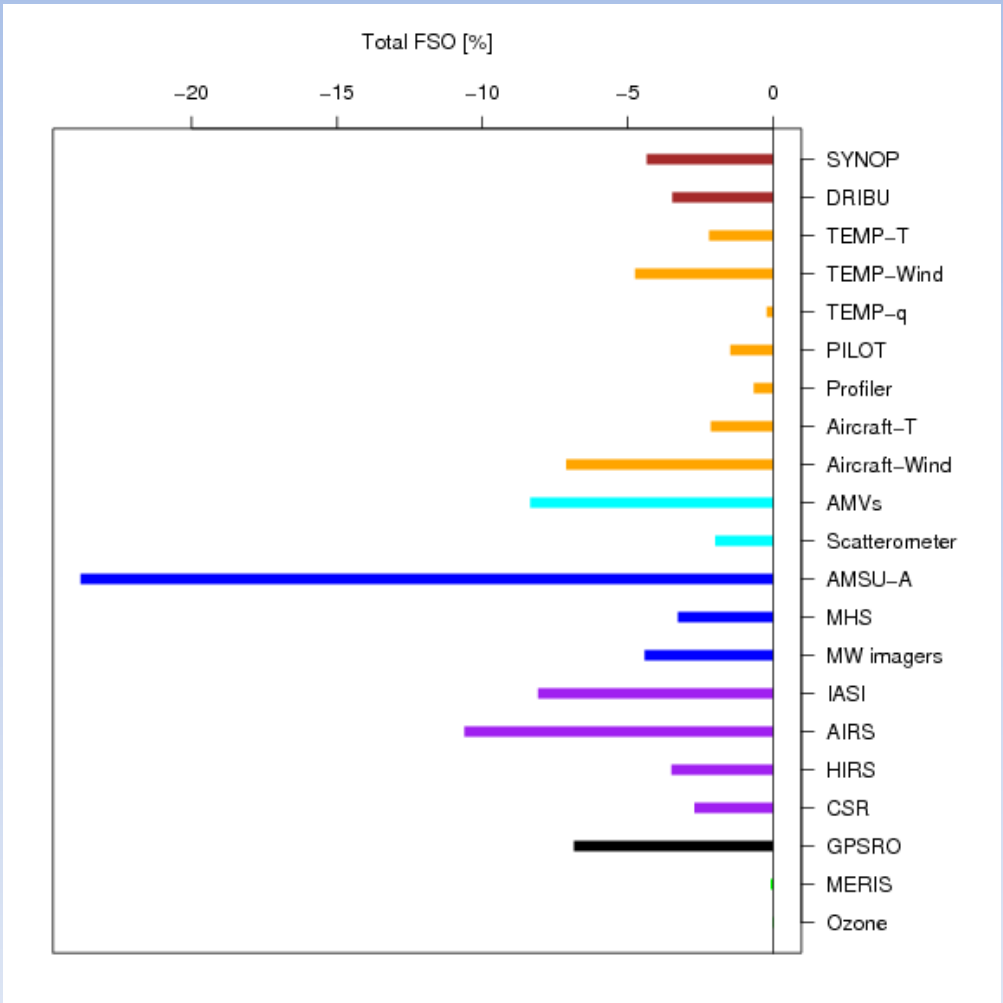
Ocean

Sea Surface Temperature

Salinity

NWP – microwave impact

Microwave temperature sounding observations in Numerical Weather Prediction

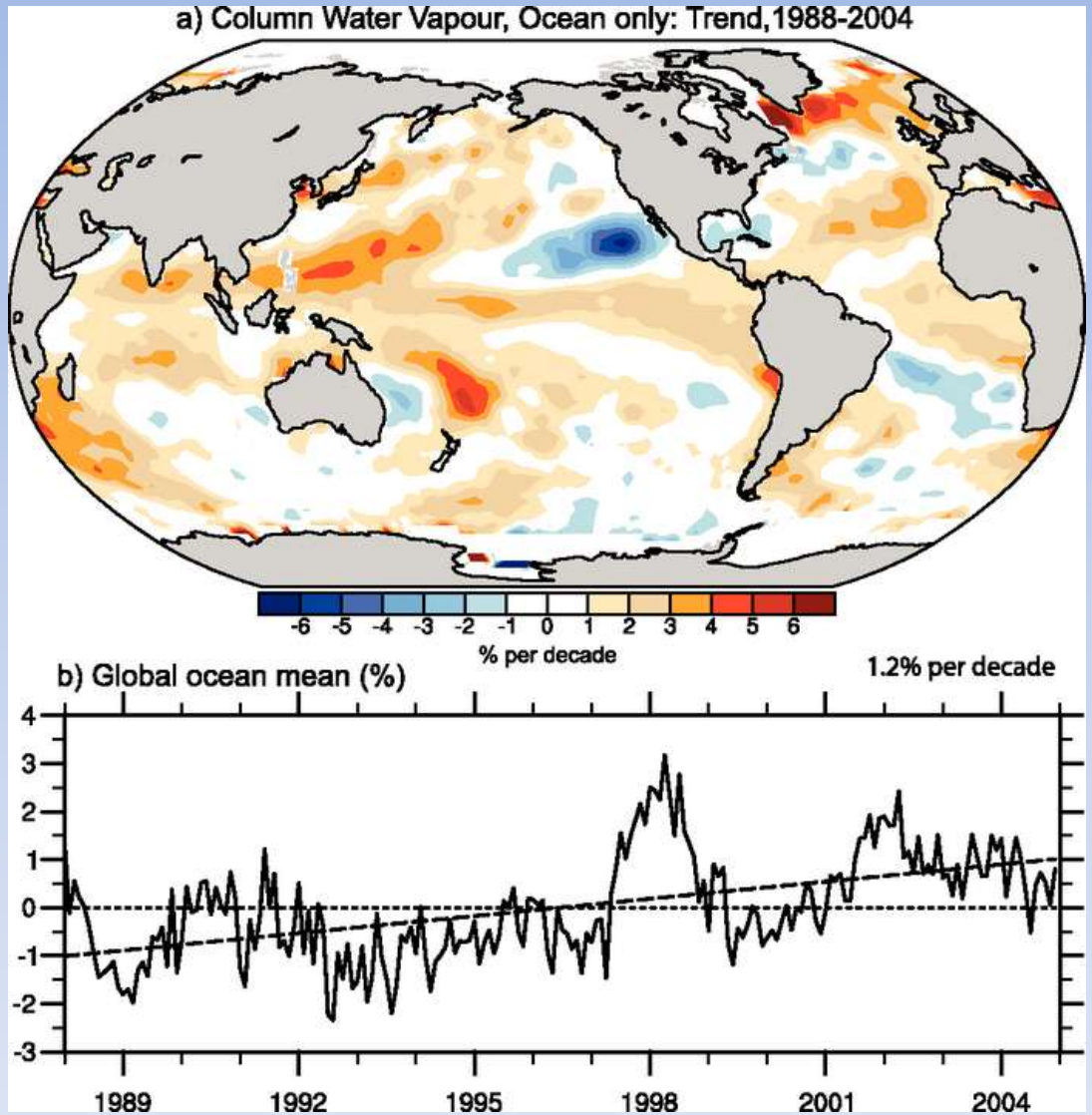


'Forecast sensitivity to Observations' (FSO) is an adjoint technique routinely used to assess the relative importance of observations in NWP data assimilation systems in reducing forecast error.

Taken as a group AMSU-A observations - from 5 satellites - continue to be the most important observation type for NWP

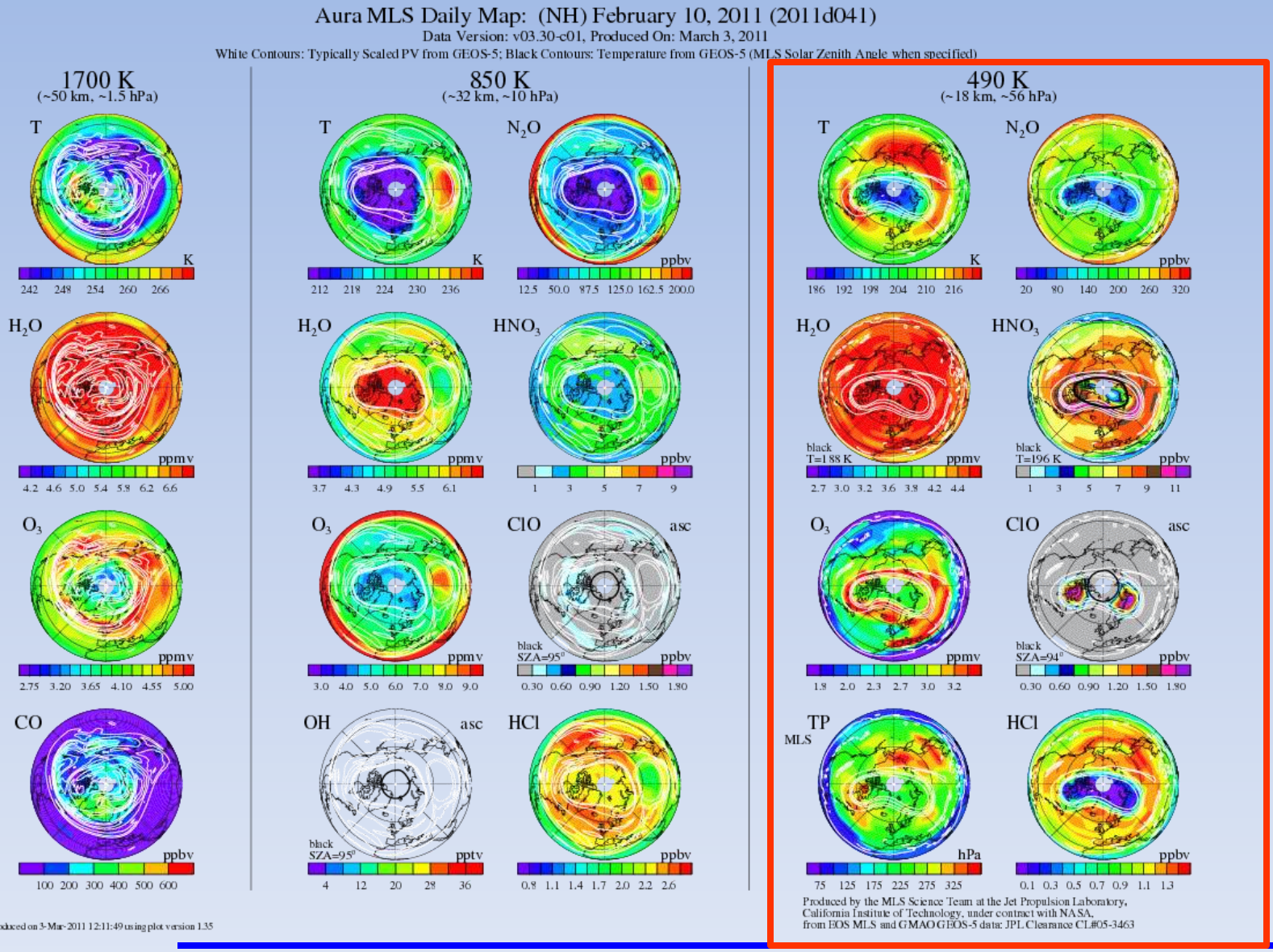
Figure from Carla Cardinali, ECMWF

Climate – water vapour trends



IPCC 2007.
Linear trends in precipitable water (total column water vapour) in % per decade (top) and monthly time series of anomalies relative to the 1988 to 2004 period in % over the global ocean plus linear trend (bottom), from RSS SSM/I (updated from Trenberth et al., 2005a).

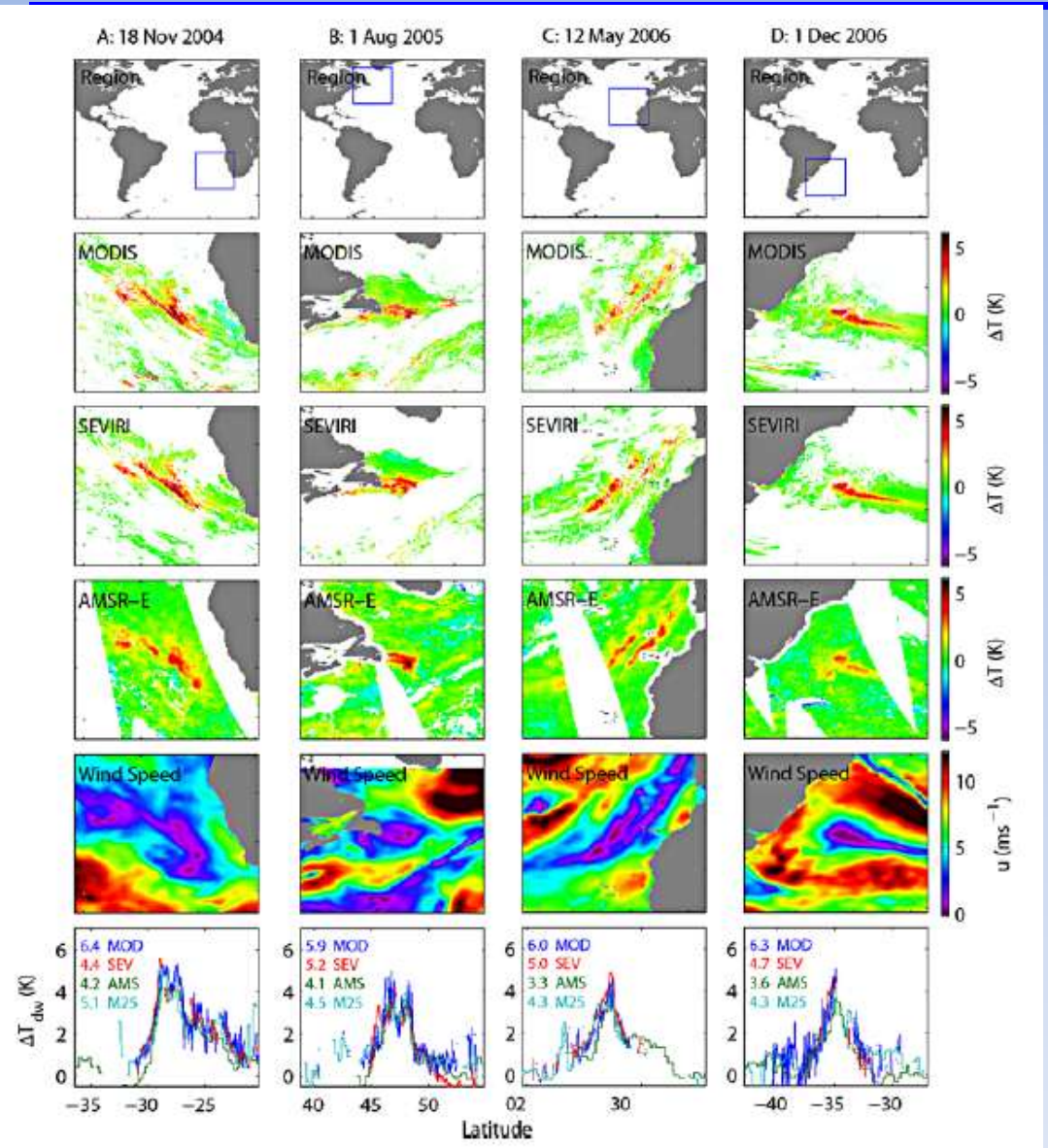
Arctic Ozone destruction – Aura MLS



2011/12 Severe Arctic ozone destruction

Manney et al, Nature, 2011

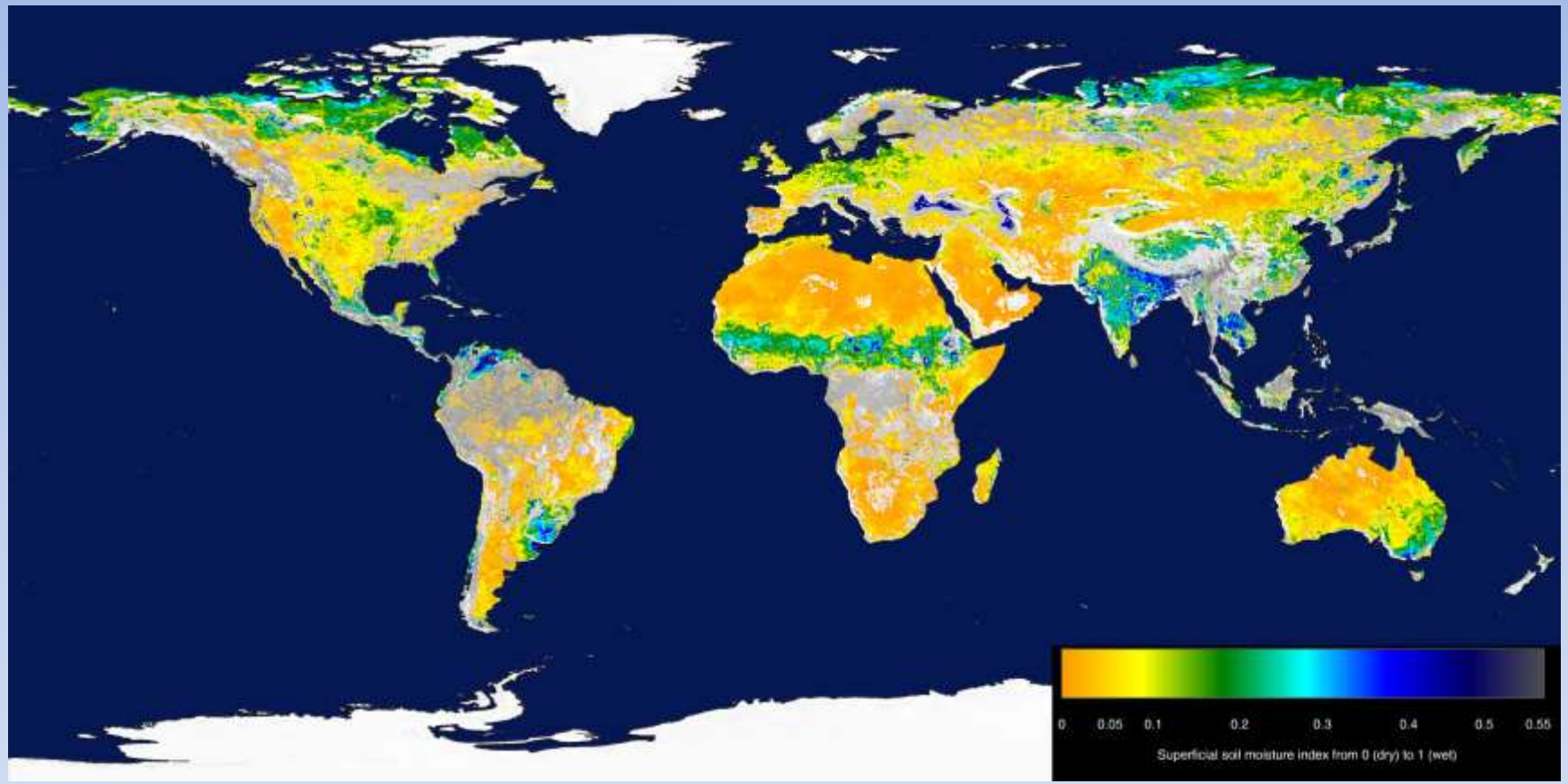
AMSR-E/TMI SST



Multi-sensor SST
(GHRSST project)

Diurnal warming amplitudes
(Gentemann et al, 2008).

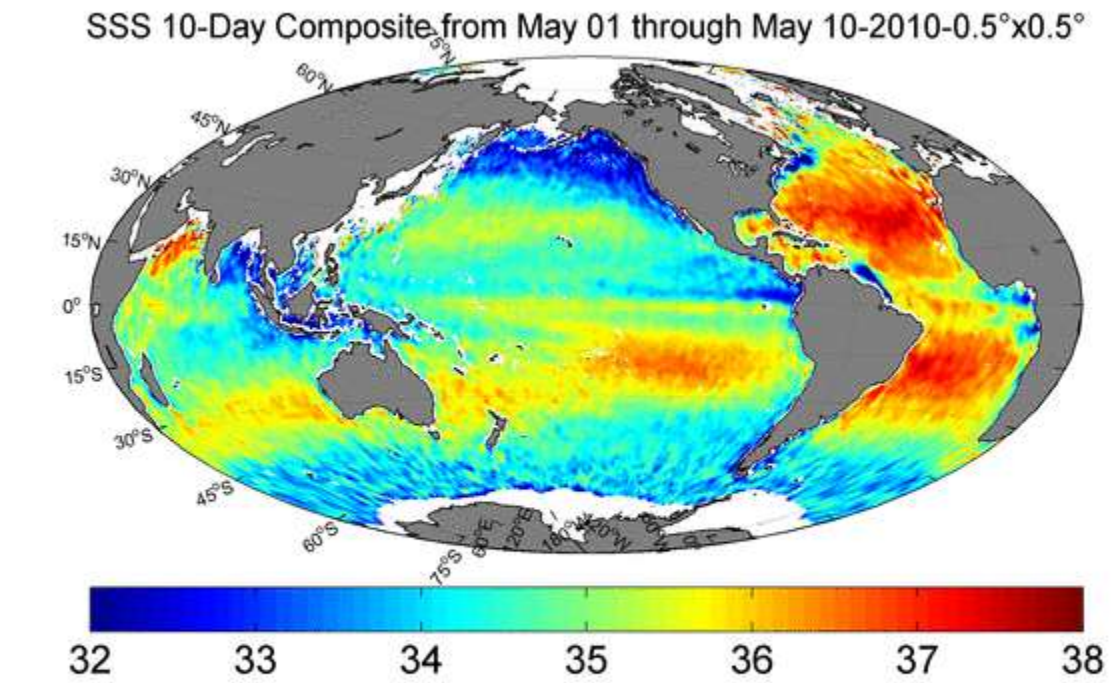
SMOS – soil moisture



Global soil moisture for August 2010 as measured by ESA's SMOS mission. Oranges and yellows represent dry soils, while blues are more moist.

Courtesy, ESA
http://www.esa.int/SPECIALS/smos/SEME9OAXH3H_1.html

SMOS – soil moisture



10-day composite SMOS Level 3 products at 0.5°x0.5° resolution from may 2010 to June 2012 generated by the CATDS/CECOS research center.

http://www.salinityremotesensing.ifremer.fr/news/newsmosl3salinityresearchproductsnowavailablefromthecatdscecexpertisecenter

Conclusions

Impacts

Numerical Weather Prediction

Climate

Ozone chemistry

Land surface and hydrology

Oceanography

Reflections

Some crucial measurements

Maturity of technique important – early days for soil moisture/salinity

Operational applications

Long-term and unpredictable phenomena – role for microwave for a long time.

Hence this workshop to build on some key capabilities in the UK.