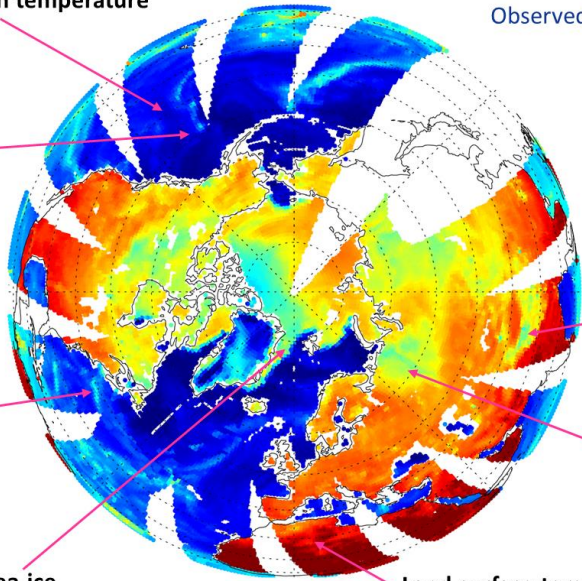


Ocean waves, wind, skin temperature

SSMIS F-17 channel 13 (19 GHz, v)
Observed TB, 3rd December 2014

New age of satellite data assimilation

Atmospheric water vapour



High altitude

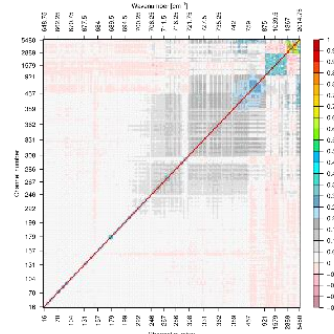
Snow cover

Land surface temperature, biomass, soil/rock, soil moisture

Sea-ice

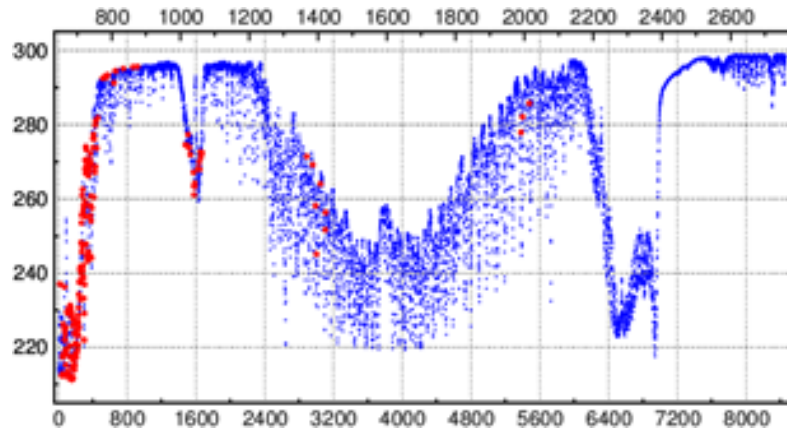
Cloud and precipitation

Microwave sounder & imager data can be assimilated in all-sky conditions over all surfaces

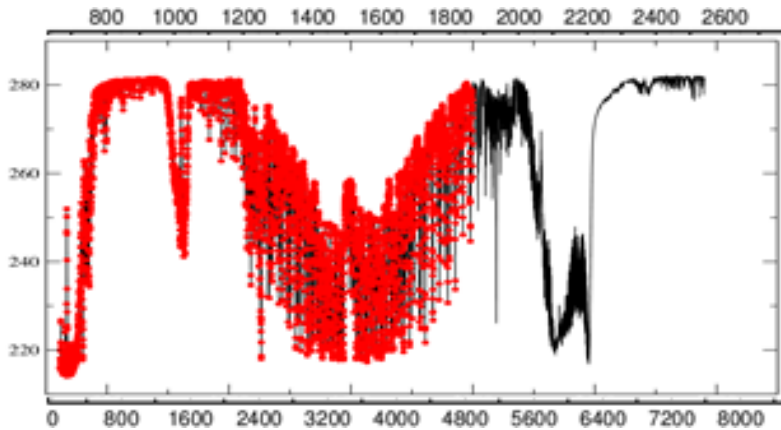


Observation error formulations can include state dependence and error covariances

~200 channels



~5500 channels



Infrared sounder data can be assimilated using the full spectrum via principal components

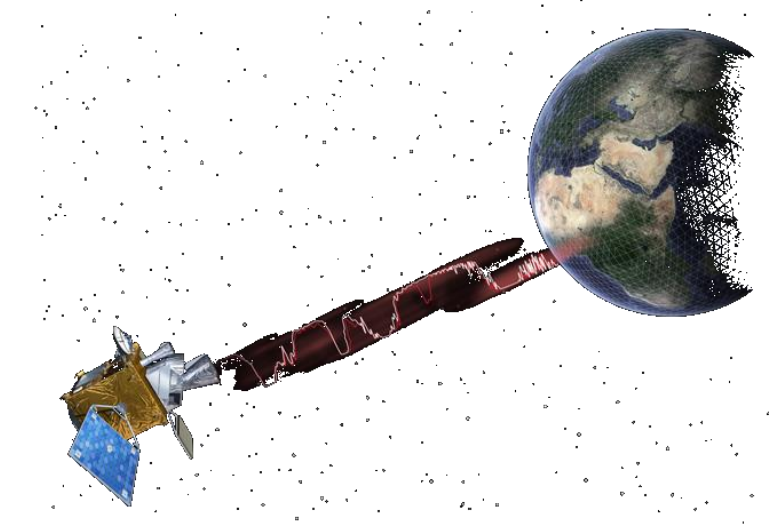
Hyperspectral sounders

Are now:

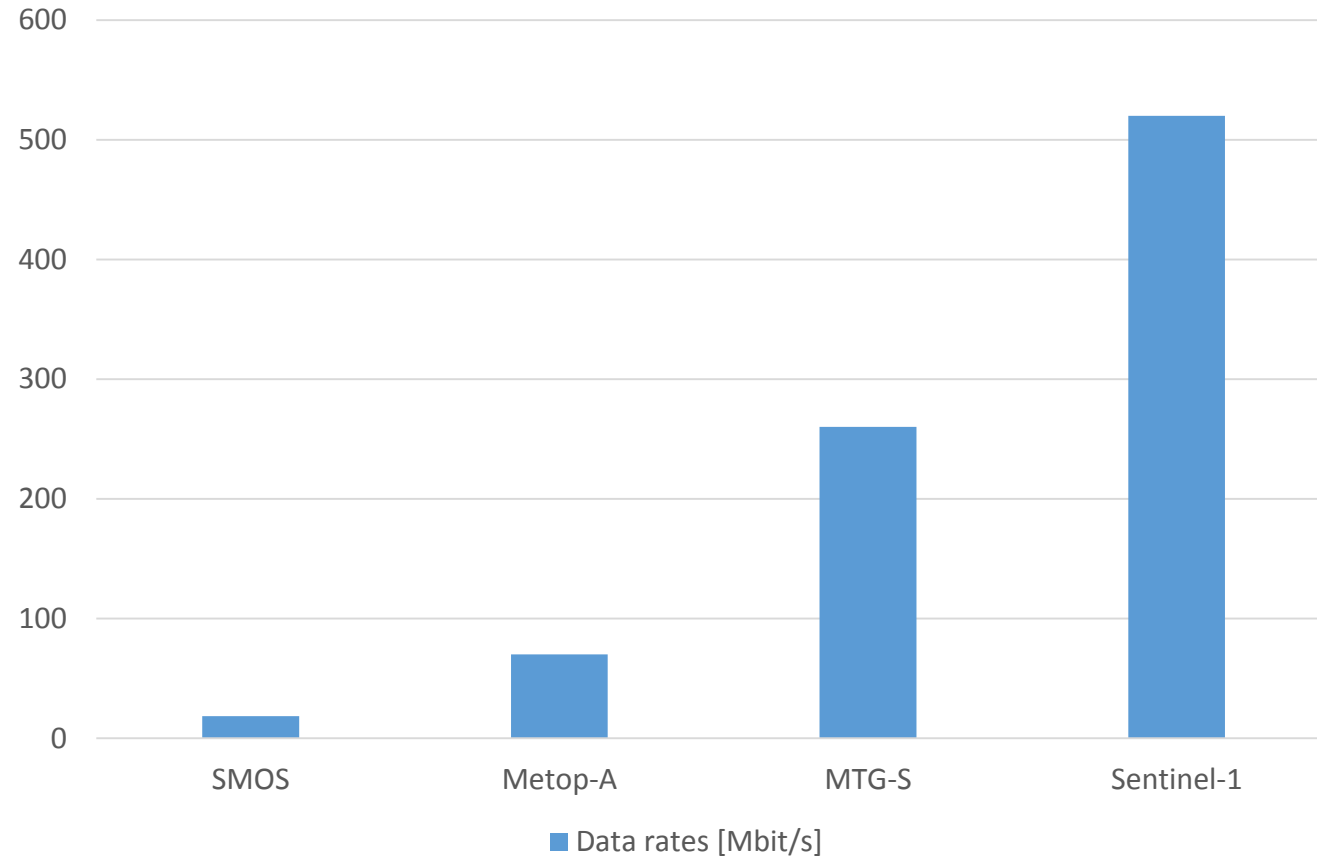
- Backbone of weather and climate observing system
- Atmospheric dynamics, physics and composition observing system
- ‘All-sky’ observing system

- Very well characterized in terms of errors
- Calibration standard between different types of observing systems
- Very accurately represented by radiative transfer modeling codes

- Internationally coordinated, sustained observing system



Great new science ...



Given significant data handling challenges [efficiency, cost]:
How much of the information contained in the data is being used?