Changes in the operational use of passive sounding data in the ECMWF NWP system since ITSC-23

Niels Bormann, Bill Bell, Angela Benedetti, Chris Burrows, Mohamed Dahoui, David Duncan, Stephen English, Reima Eresmaa, Alan Geer, Katie Lean, Katrin Lonitz, Cristina Lupu, Marco Matricardi, Tony McNally, Samuel Quesada-Ruiz, Kirsti Salonen, Tracy Scanlon, Josef Schröttle, Liam Steele

- System configuration (high-res $T_{CO}1279 \approx 9$ km)
- Radiative transfer (RTTOV 12.2)
- Instruments used

  New: Himawari-9, GOES-18, Met-9; FY-3E MWHS-2

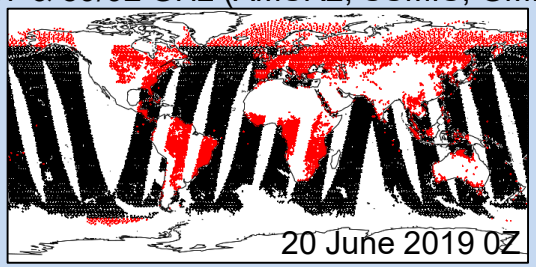
Cycle 47r3 – implemented 12 Oct 2021

- Move AMSU-A assimilation from clear-sky to all-sky
- New RTTOV coefficients for all hyperspectral sounders (100 layers, updated CO_2 and spectroscopy)
- Updated observation error covariance for AIRS (with inter-channel error correlations)

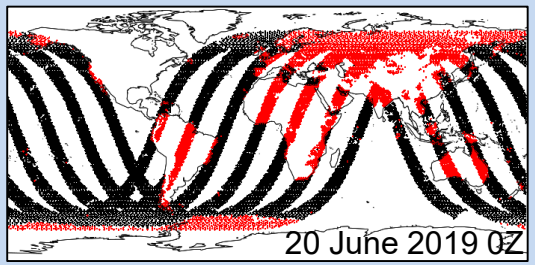
Cycle 48r1 - to be implemented in June 2023

- Extended assimilation of MW radiances over “difficult” surfaces, for imager and humidity-sounding channels

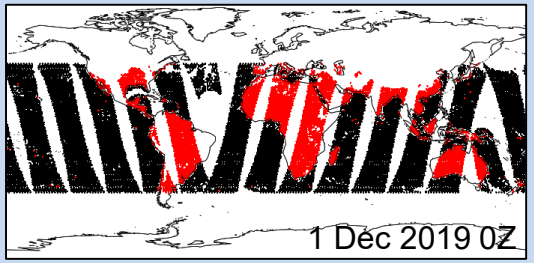
37 & 89/92 GHz (AMSR2, SSMIS, GMI)



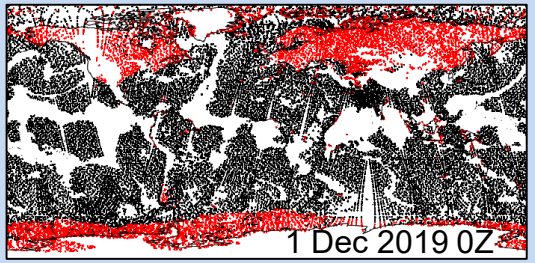
GMI 183 GHz



150/167 GHz (SSMIS, GMI)



ATMS 183 GHz



- RTTOV-v13: Major upgrade of cloud and precipitation microphysics in RTTOV-SCATT, esp for ice-clouds
- New aerosol-type classification and updated trace-gas detection for all hyperspectral sounders
- Allow usage of all IASI pixels (subject to thinning)
- Unified VarBC setup for all hyperspectral IR sounders