Developments in Radiance Data Assimilation at DWD since ITSC-21

- **Introduction of humidity radiances in ICON-EnVAR:**
  - MHS, ATMS-hum., IASI-hum., SSMIS, GMI
  - CSRs: SEVIRI, GOES-imager, ABI, AHI

- **Revisions for other instruments:**
  - E.g. increased density, retuned obs-errors
  - IASI non-diagonal obs-err matrix, updated cloud detection
  - NOAA-20 and METOP-C instruments

- **Technical updates:**
  - RTTOV-12
  - Processing of MW-imagers
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- Main ongoing work:
  - Adding more humidity radiances
  - Hyperspectral sounders, Use of reconstructed radiances
  - MW and IR data over land
  - All-sky & use of VIS channels
  - Seamless forecasts from nowcasting to very short range (at convective scale, SINFONY)
  - Development of 4D-EnVAR