RTTOV for airborne sensors

Presented for James Hocking

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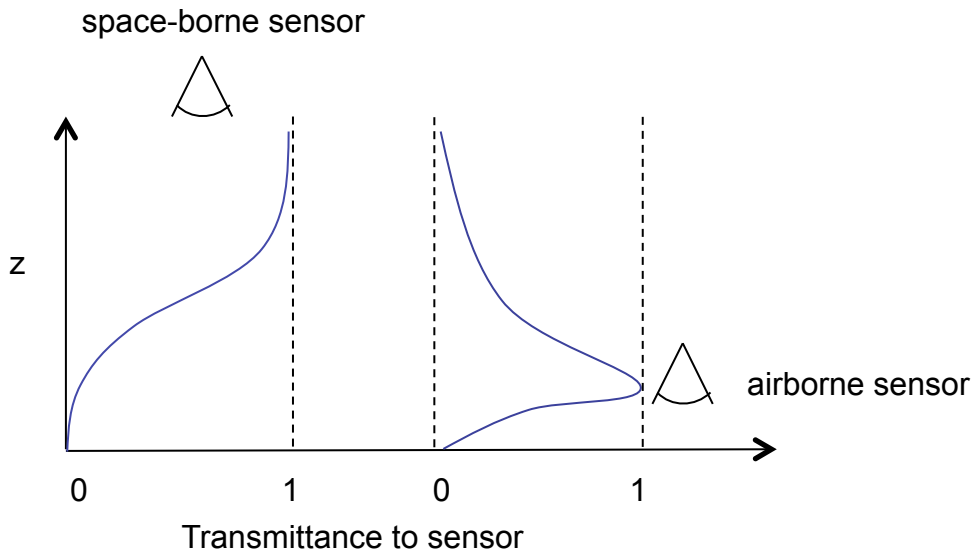
RTTOV for airborne sensors

- RTTOV is a fast RT model for simulation of space-borne passive visible, IR and MW sensors. http://nwpsaf.eu/deliverables/rtm/index.html
- Development funded by EUMETSAT through the Satellite Applications Facility for Numerical Weather Prediction (NWP SAF).
- RTTOV uses an optical depth prediction scheme based on methods developed by McMillin and Fleming in the 1970s.
- An experimental version was recently developed to enable clear-sky simulations of airborne sensors (in particular ISMAR).
- This has yet to be tested against real data.

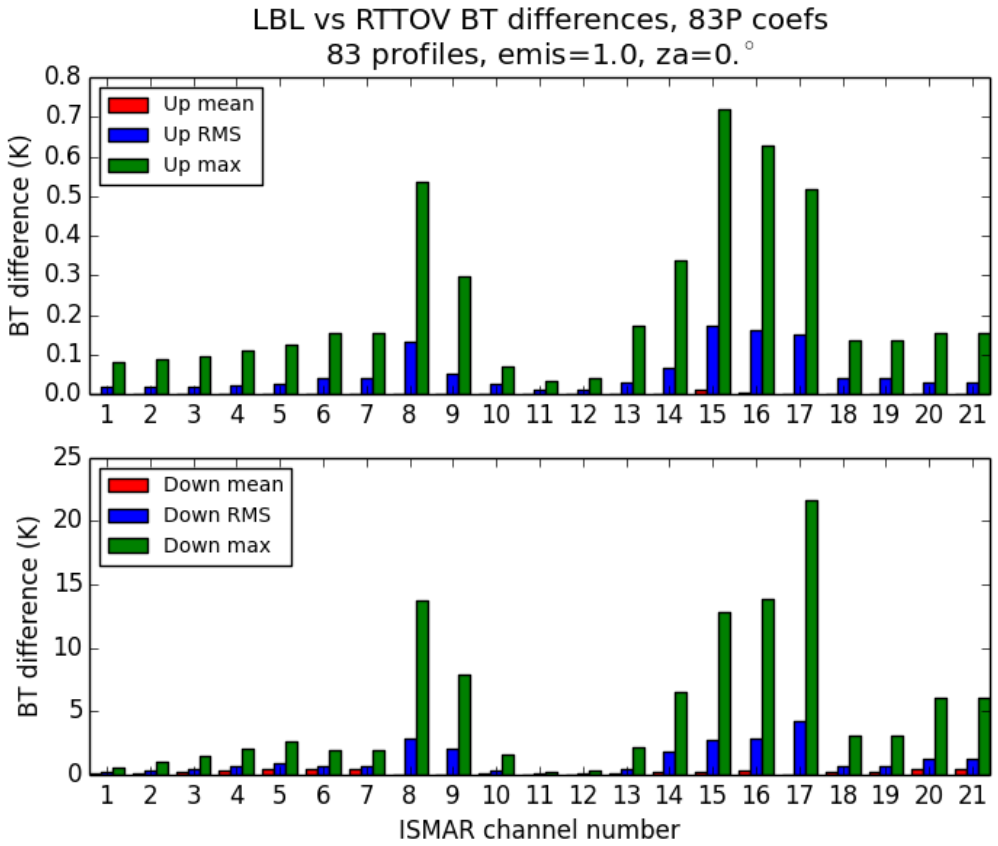
RTTOV for airborne sensors

- RTTOV is optimised for accurately predicting polychromatic transmittances for space-borne sensors which involves calculating level-to-space transmittances.
- For space-borne sensors RTTOV does not need to predict optical depths below a level where the atmosphere becomes sufficiently opaque.
- For airborne sensors it must predict optical depths everywhere in the atmosphere, even when the total atmospheric transmittance is extremely small.
- The upshot is that currently "airborne RTTOV" must be compiled with quadruple precision in order to represent all transmittances.



RTTOV for airborne sensors

- RTTOV is more accurate at simulating radiances against a warm background than a cold background
  => upwelling atmospheric emission plus surface-emitted contribution is more accurately simulated than downwelling atmospheric emission



RTTOV future plans for ICI and ISMAR

- Preliminary clear-sky RTTOV coefficients are available for ICI.
- Work is planned to validate and if necessary improve the MW spectroscopic database above 200GHz.
- The MW scattering model RTTOV-SCATT will also be updated for ICI: this includes extending the database of optical properties to higher frequencies.
- There are no firm plans to develop the airborne capability further, but potentially it could be if it proves useful for ISMAR.