

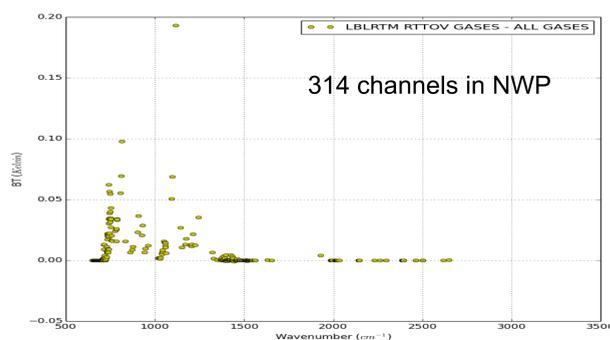
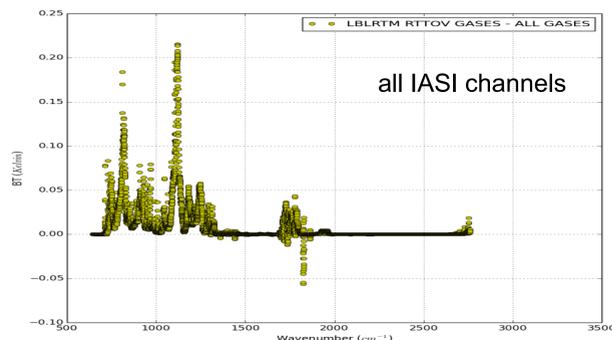
Met Office

Improvements to fast radiative transfer modelling of hyperspectral infrared sensors

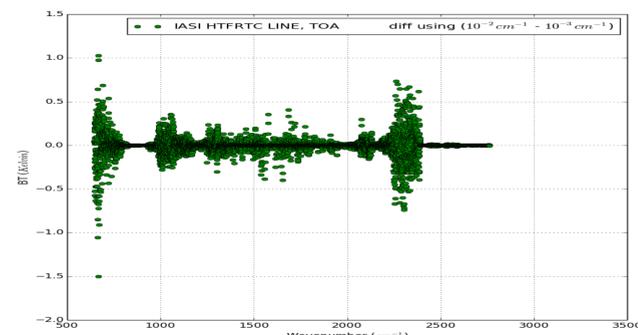
Stephan Havemann

1. Potential sources of differences between models (for the comparisons the assumptions are identical across models, i.e. 17 RTTOV gases, 0.001 cm⁻¹, 91 levels)

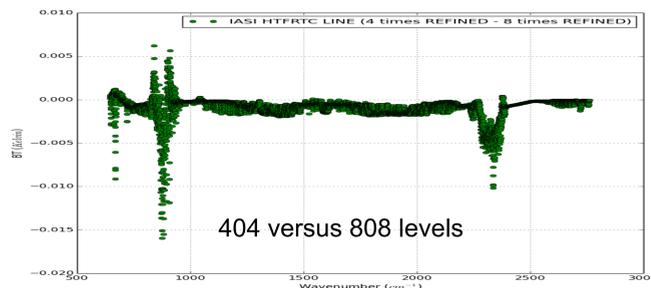
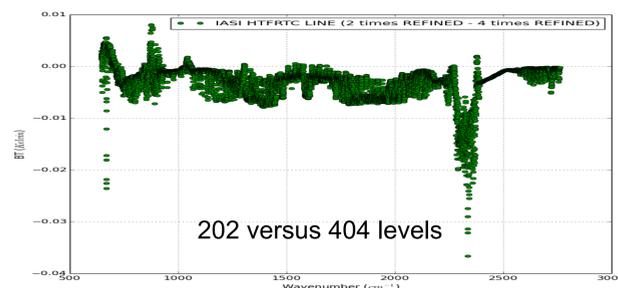
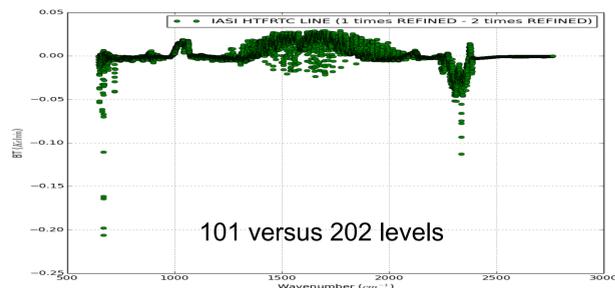
a. All HITRAN gases (48) versus RTTOV selection (17)



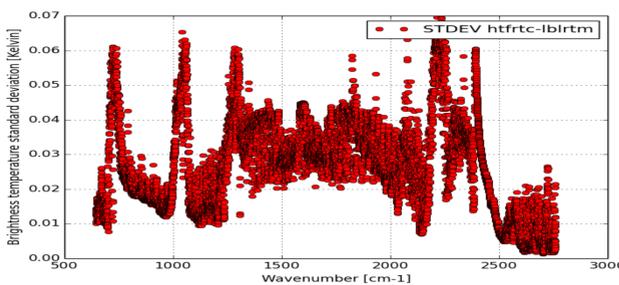
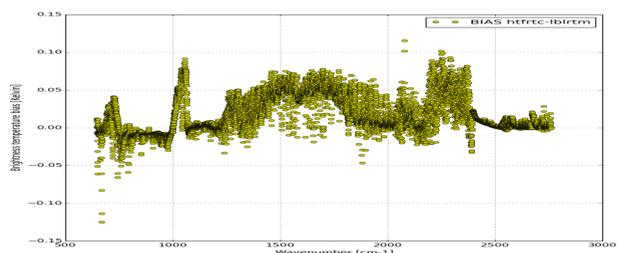
b. Spectral resolution of 0.01 cm⁻¹ versus 0.001 cm⁻¹



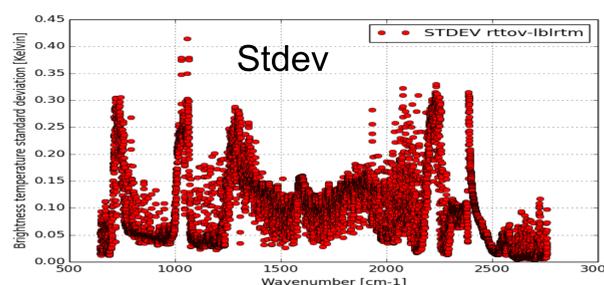
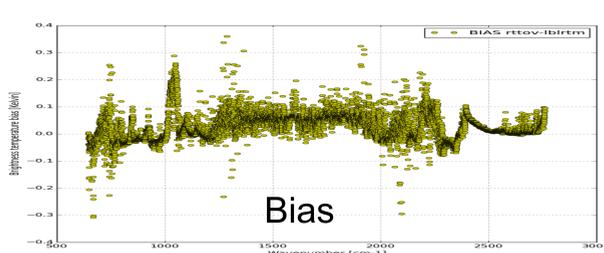
c. Vertical resolution of the atmospheric profiles



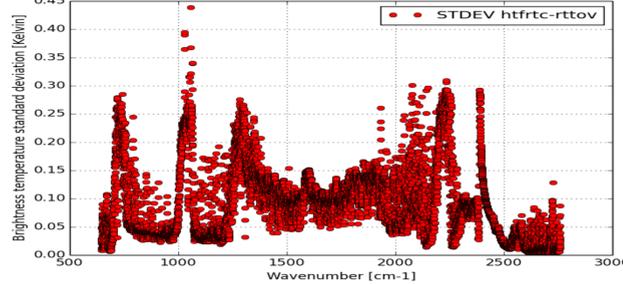
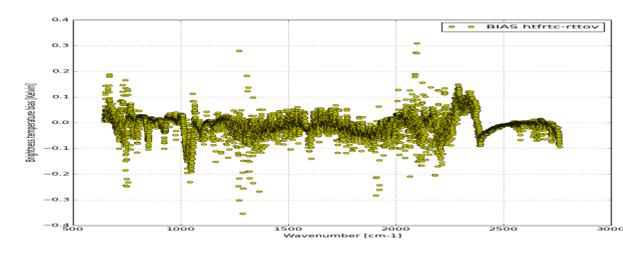
2. HT-FRTC - LBLRTM (100 random independent profiles)



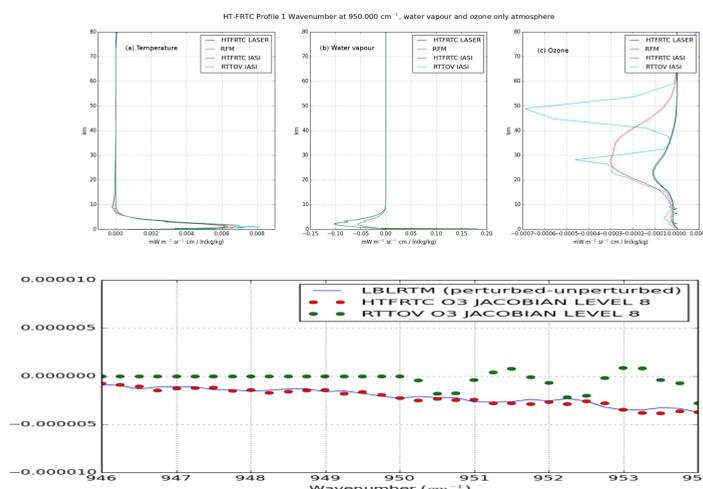
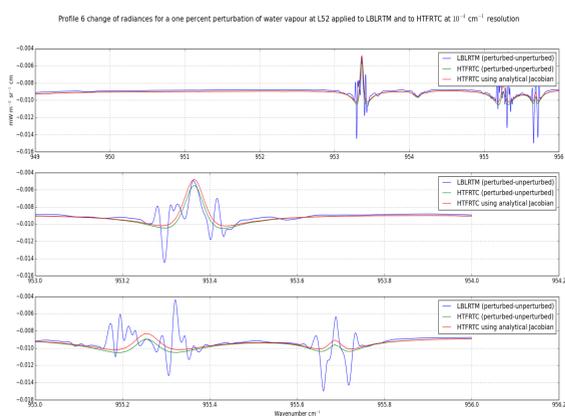
3. RTTOV - LBLRTM (same 100 profiles)



4. HT-FRTC - RTTOV (24000 random independent profiles)



5. Jacobians around 950 cm⁻¹



- ✓ HT-FRTC uses very high resolution, line-by-line, sensor-independent principal components (PC)
- ✓ covers spectrum from microwave to UV
- ✓ 50 trace gases, 20 aerosols, clouds and precip
- ✓ spectrally resolved surface emissivity / reflectivity
- ✓ airborne, spaceborne and groundbased sensors
- ✓ solar and lunar contribution, spherical Earth
- ✓ part of 1D-Var retrieval in PC space

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