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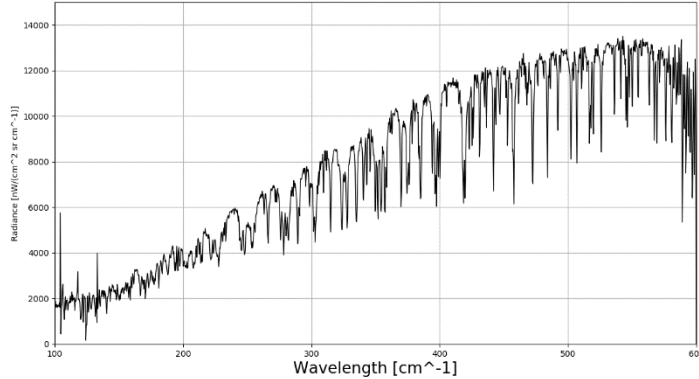
GOAL: analyse the consistency between current FIR spectroscopic data and airborne measurements, study EE9-FORUM role in the FIR spectroscopy improvement

OBSERVATIONS: REFIR-PAD and TAFTS airborne spectra between 100 and 600 cm^{-1}

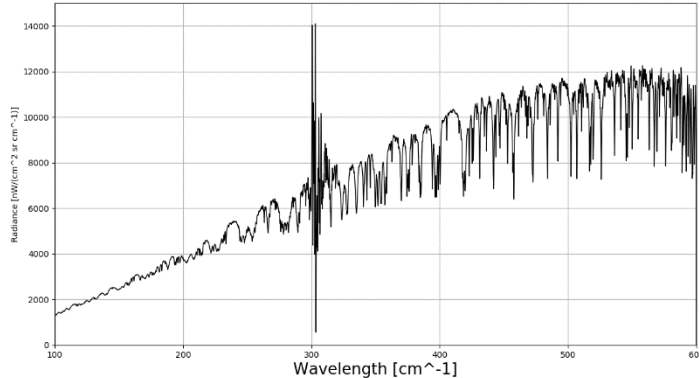
SIMULATIONS: Spectra simulated with line-by-line RTM using spectroscopic data from different databases. The differences among simulations in the FIR are of the order of the instrumental noise of REFIR-PAD and TAFTS and higher than FORUM GOAL noise

ANALYSIS: calculation of the reduced χ^2 between observations and simulations

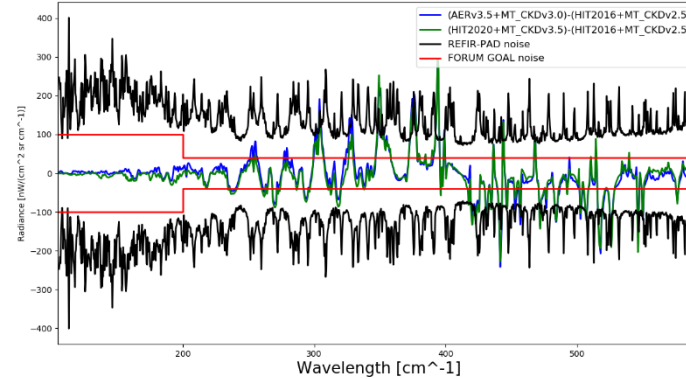
REFIR-PAD SPECTRUM



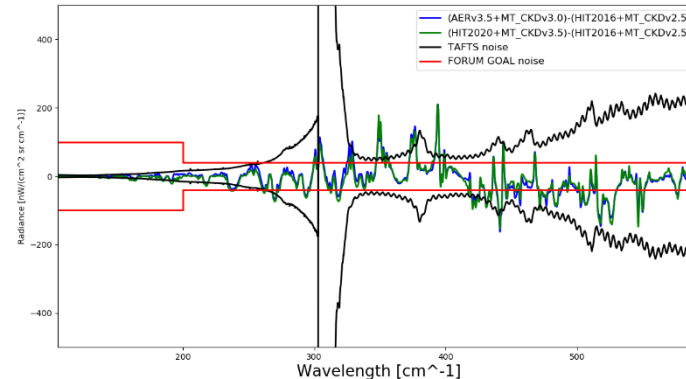
TAFTS SPECTRUM



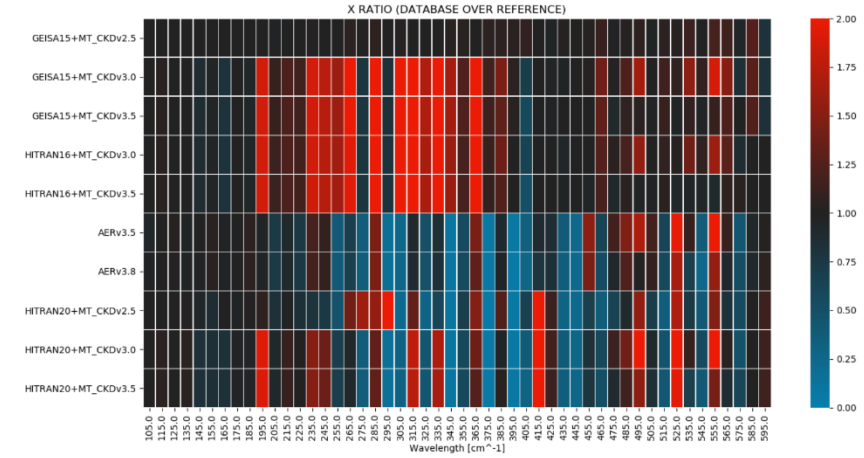
RADIANCE DIFFERENCE vs. REFIR-PAD NOISE



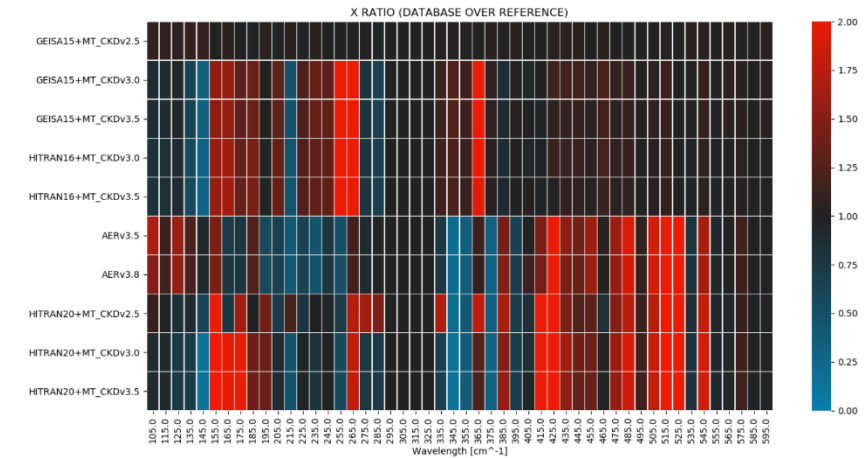
RADIANCE DIFFERENCE vs. TAFTS NOISE



REFIR-PAD



TAFTS



Ratio between reduced χ^2 values calculated using each database + continuum parametrisation and the reference **HITRAN2016 + MT_CKDv2.5**. Values are calculated in spectral microwindows 10 cm^{-1} wide

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Conclusions drawn from the analysis are listed below

For both the instruments:

- The older databases (GEISA15 and HITRAN16) should be coupled with MT_CKDv2.5 continuum
- The AER database has introduced a consistent improvement in the FIR range with respect to HITRAN2016 database
- The HITRAN2020 database reproduces the improvements introduced by the AER database, except for some isolated spectral intervals from 200 to 350 cm^{-1}

From REFIR-PAD → The AERv3.8 coupled to the updated continuum version MT_CKDv3.5 slightly improved the consistency between simulations and observations for wavenumbers $> 450 \text{ cm}^{-1}$

The analysis confirms the capability of the EE9-FORUM mission to verify the quality of the water vapour spectroscopy and trigger further improvements in the databases