CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

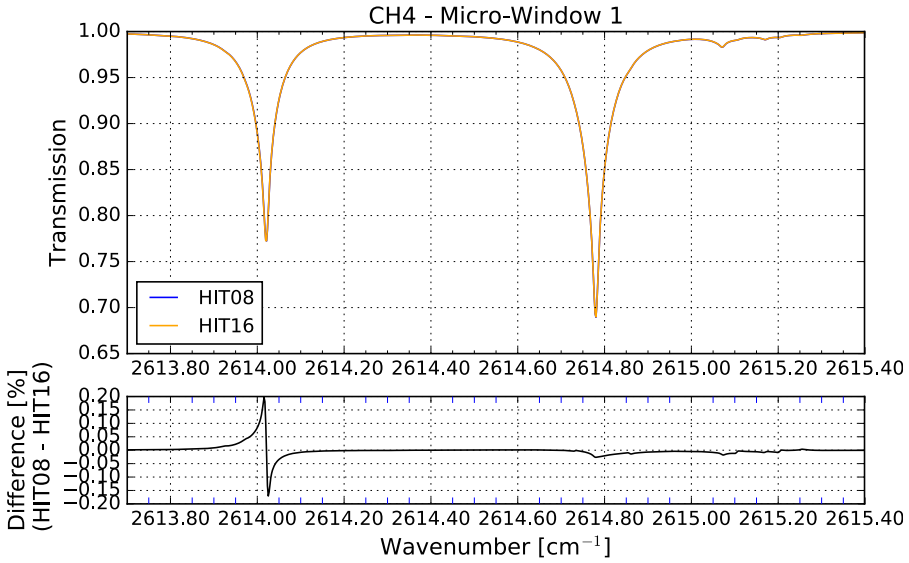
- Simulations

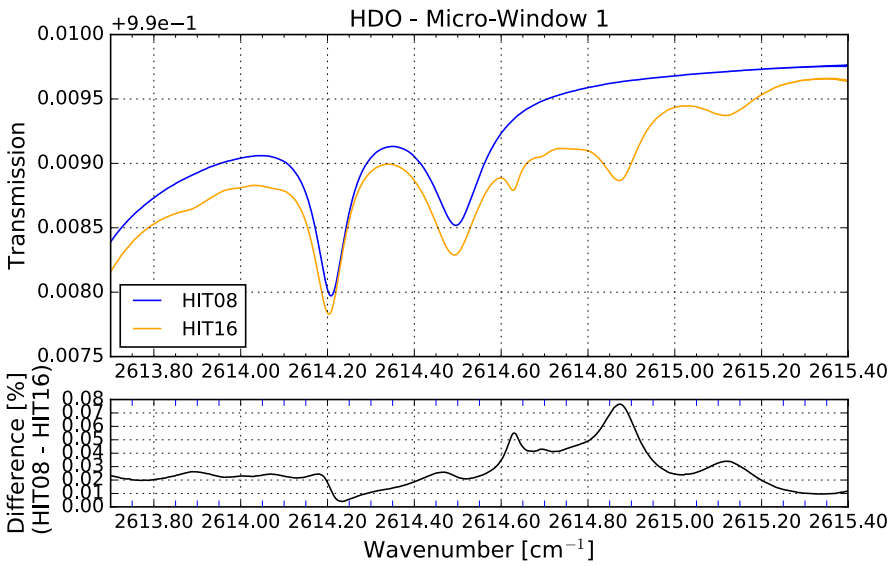
- Retrieval example & comparison
  - HITRAN 08 / HITRAN 16 / ATM 18 (interim list from Geoff ~Dec 2018)
  - Standard IRWG retrieval windows, our typical retrieval setting for archival data.
  - Each interfering species by window with difference then fit then difference in profiles
    - First H08/H16 then H16/A18

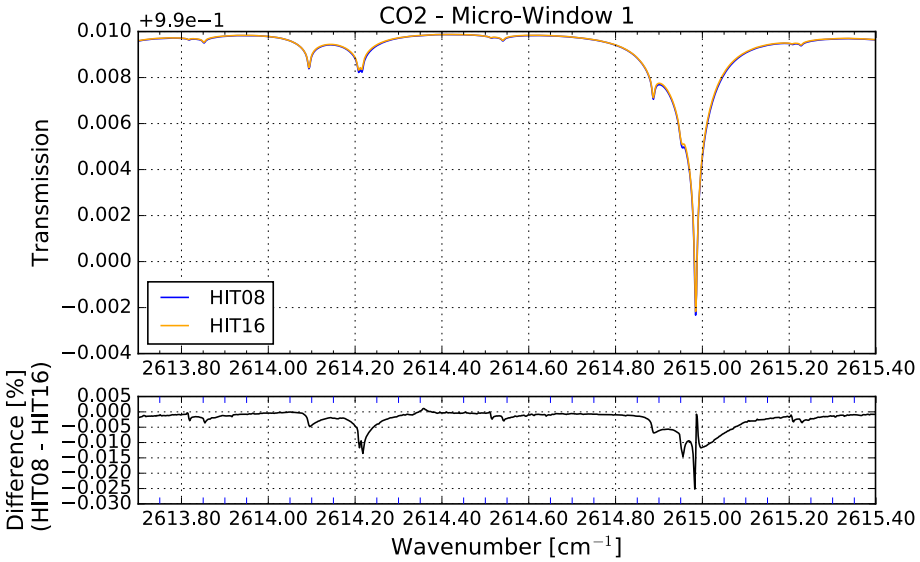
- Correlations
  - Column, fit RMS, DOF

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests



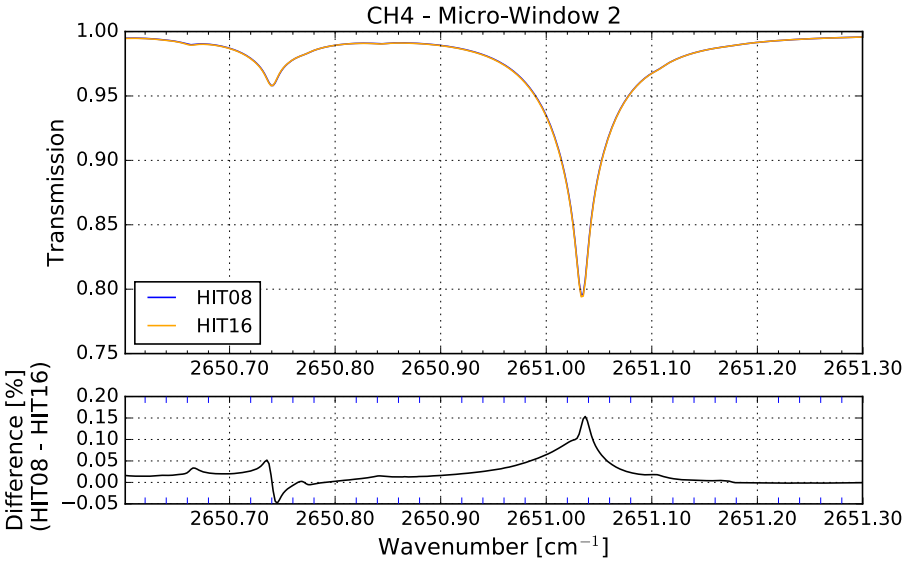


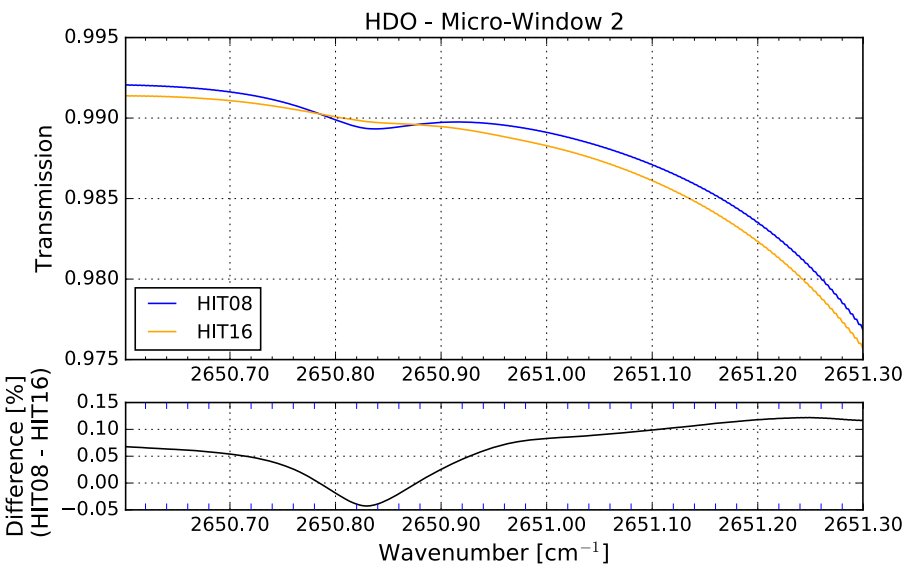


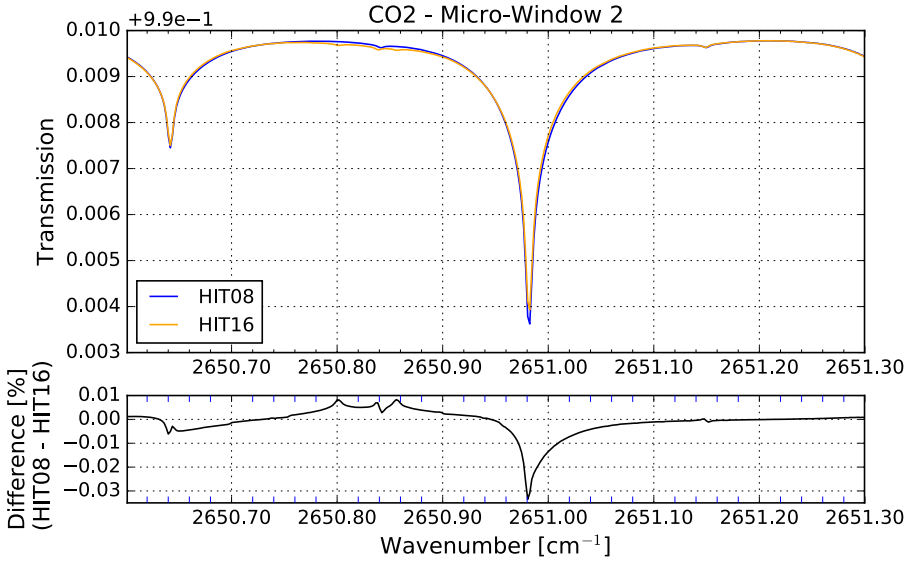
Sig difference in HDO – likely below noise

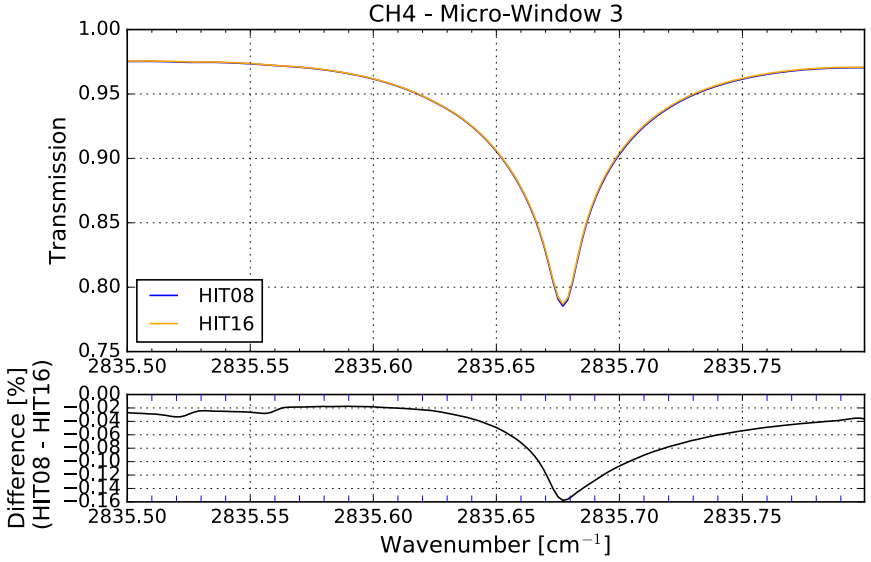
Post retrieval HIT08 / HIT16

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





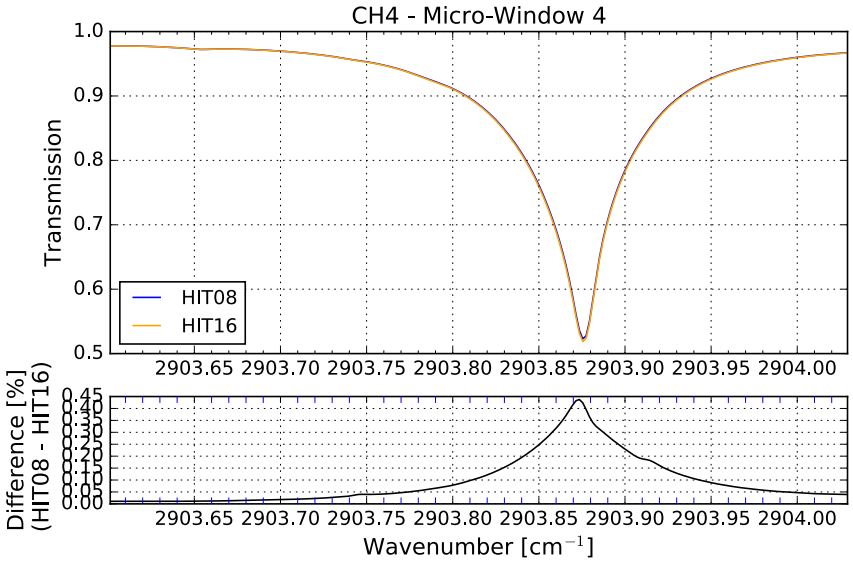


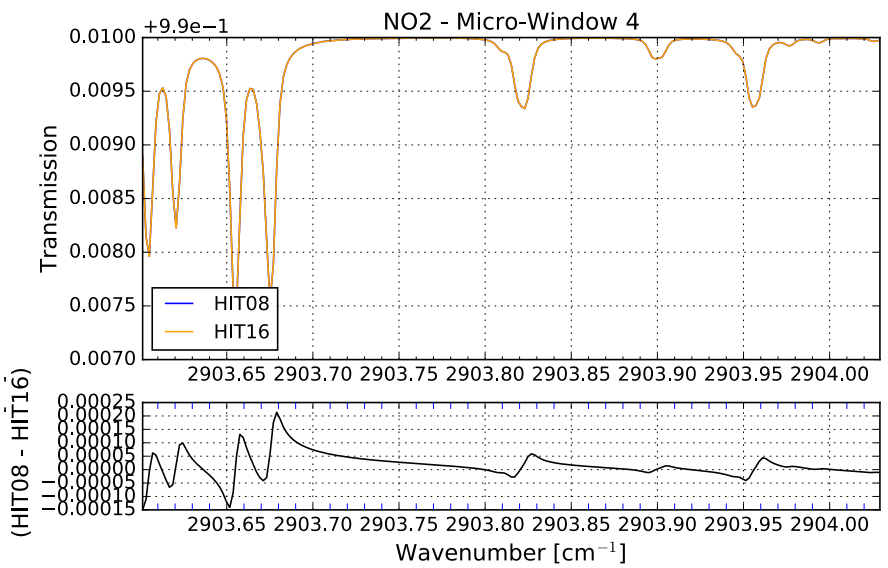


Post retrieval HIT08 / HIT16

Asymmetric CO2 & CH4 – press. shifts?

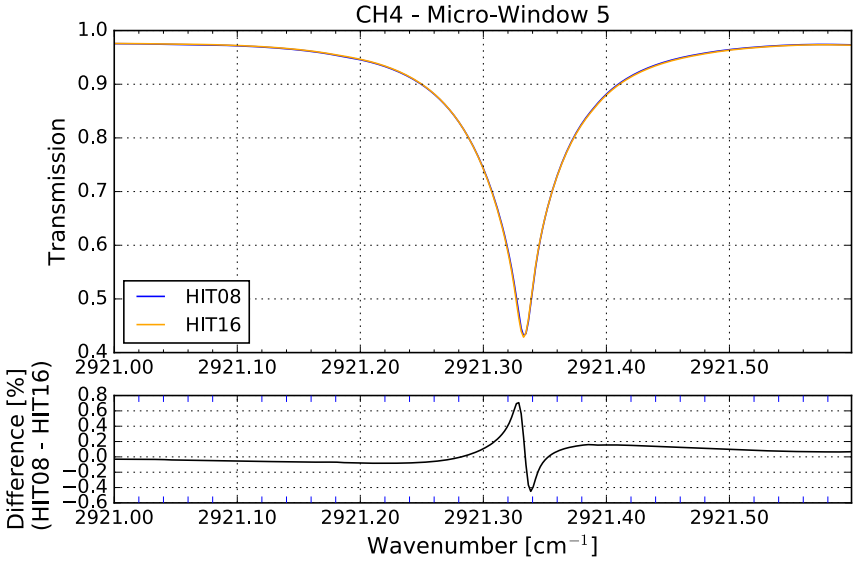
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

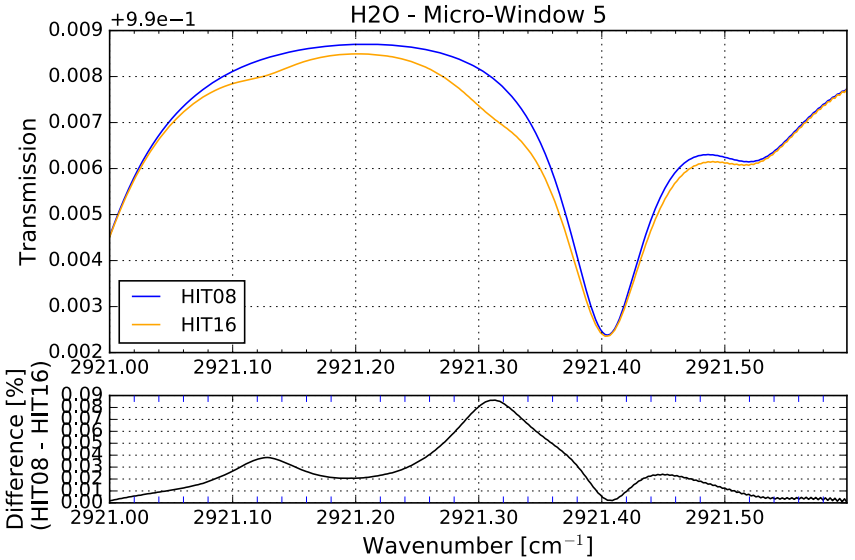


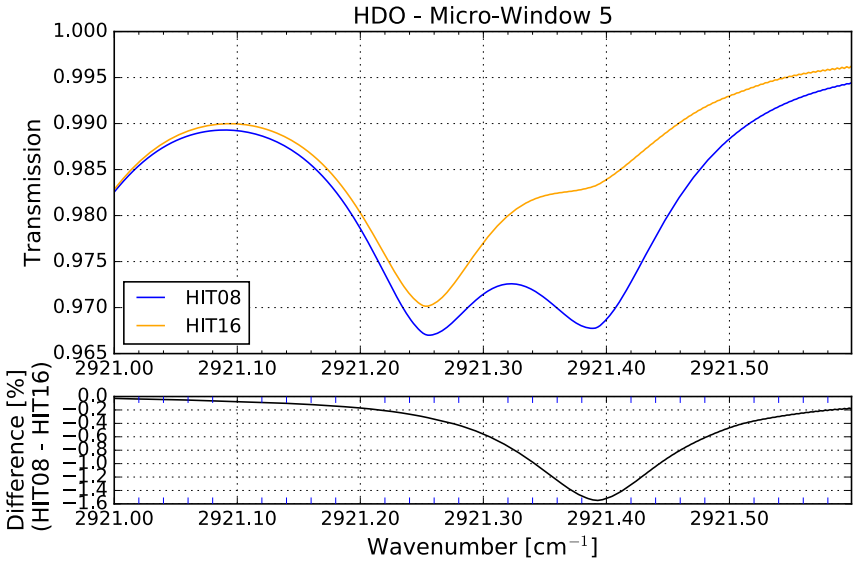


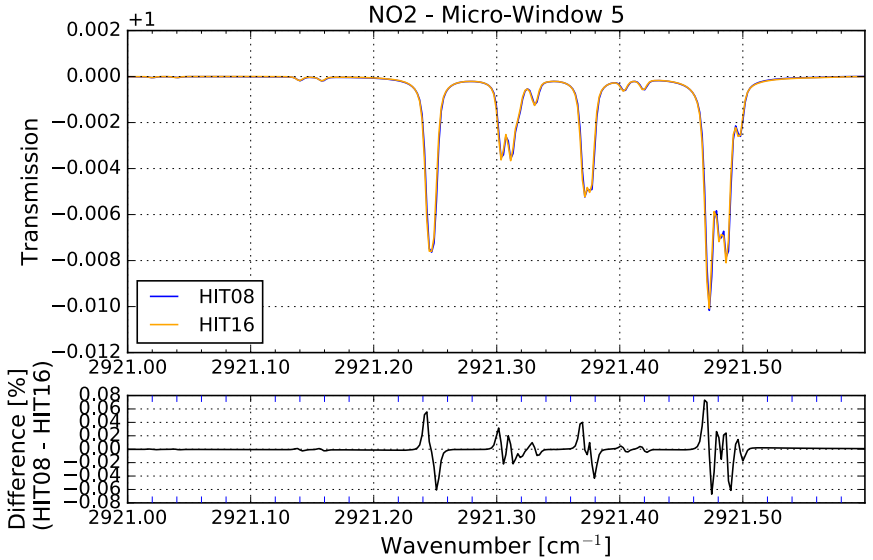
Post retrieval HIT08 / HIT16

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





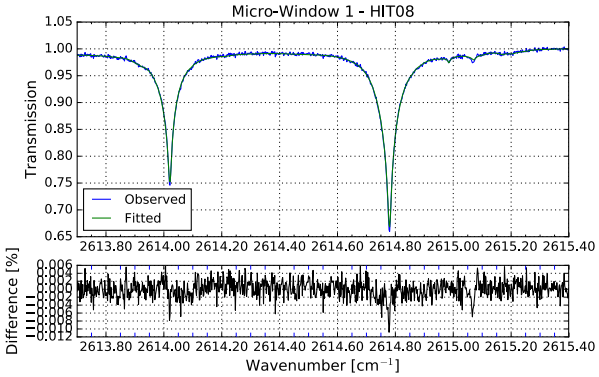


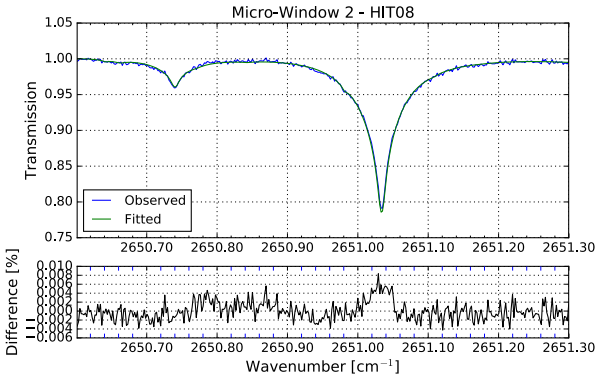


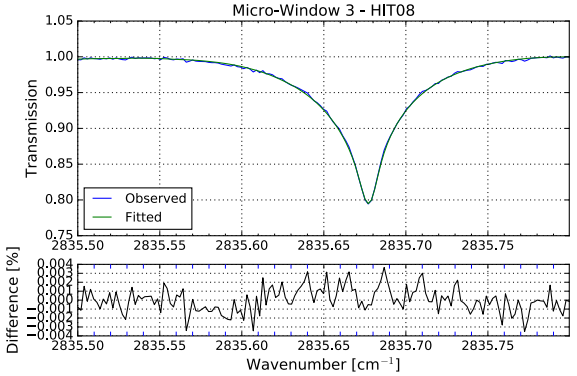
Post retrieval HIT08 / HIT16

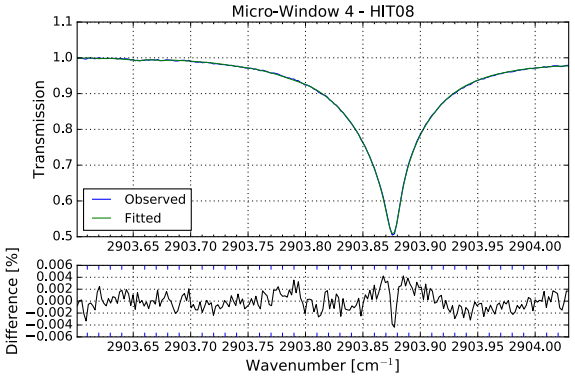
Sig difference in HDO again

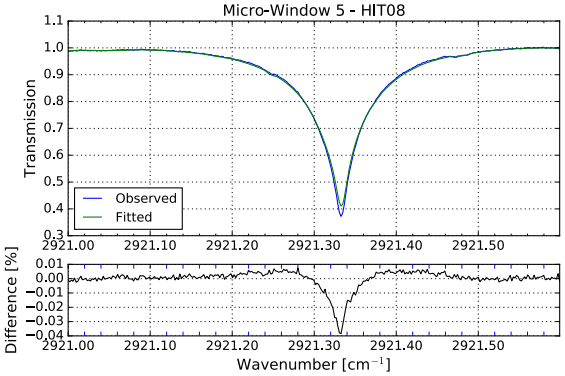
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





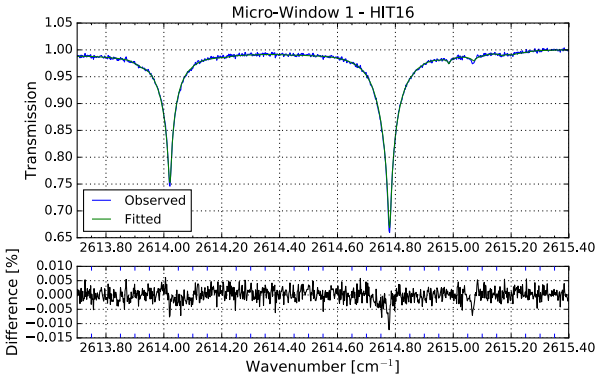


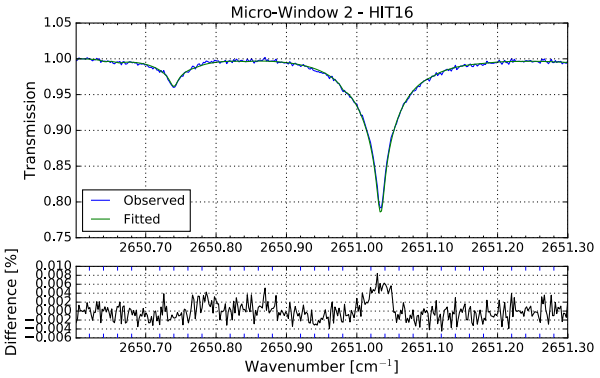


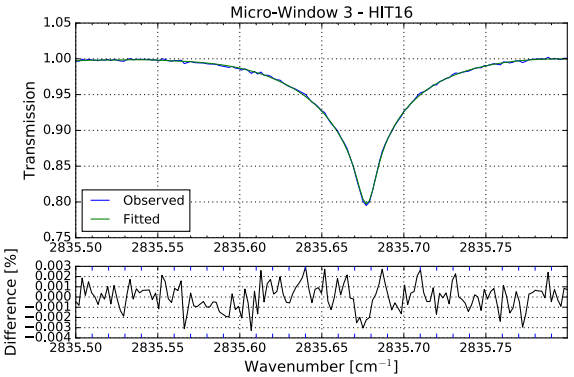


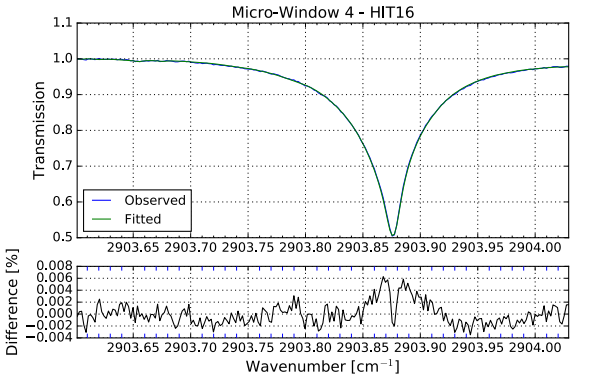
Post retrieval HIT08 / HIT16

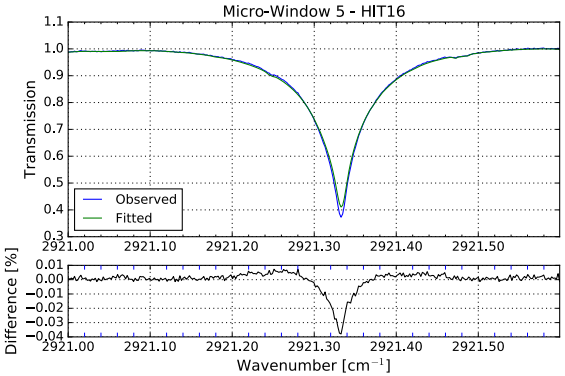
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





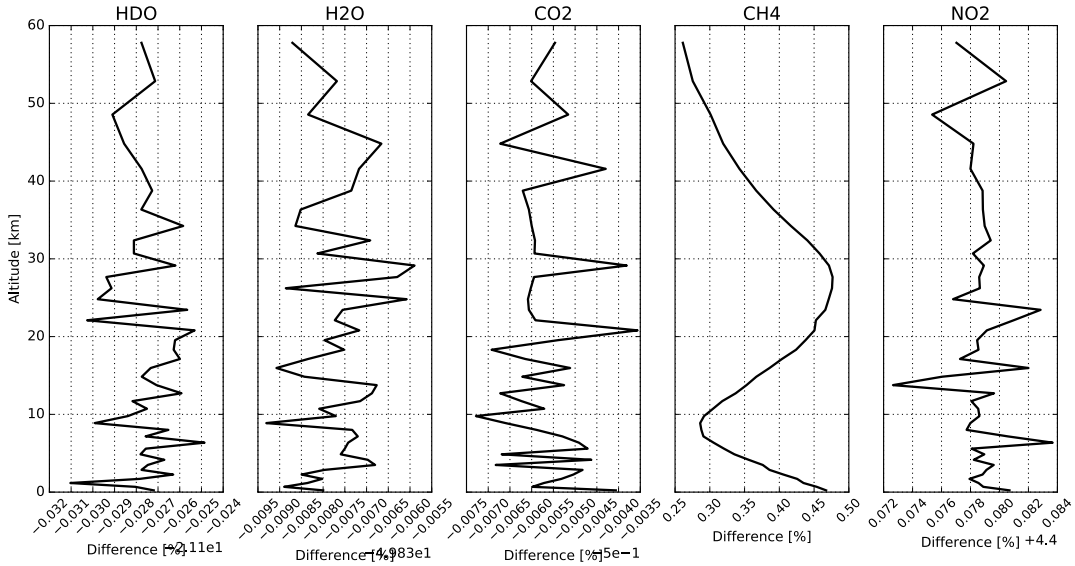






Post retrieval HIT08 / HIT16

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests



16 retrieves smaller column

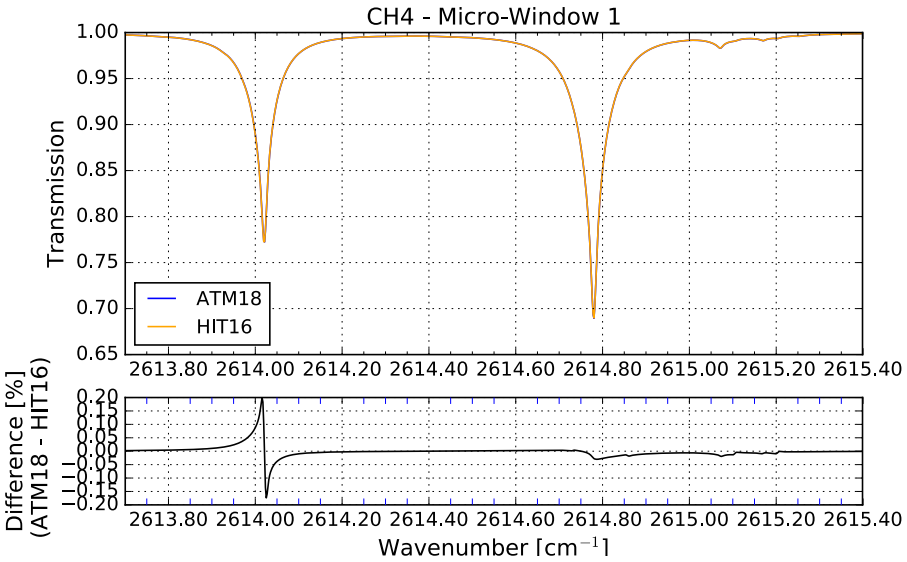
Version = ch4_HIT08-Ret
Total Column = 3.71876438197e+19
rms = 0.341278
dof = 1.84284997661
Version = ch4_HIT16-Ret
Total Column = 3.70506627462e+19
rms = 0.344832
dof = 1.8135588337

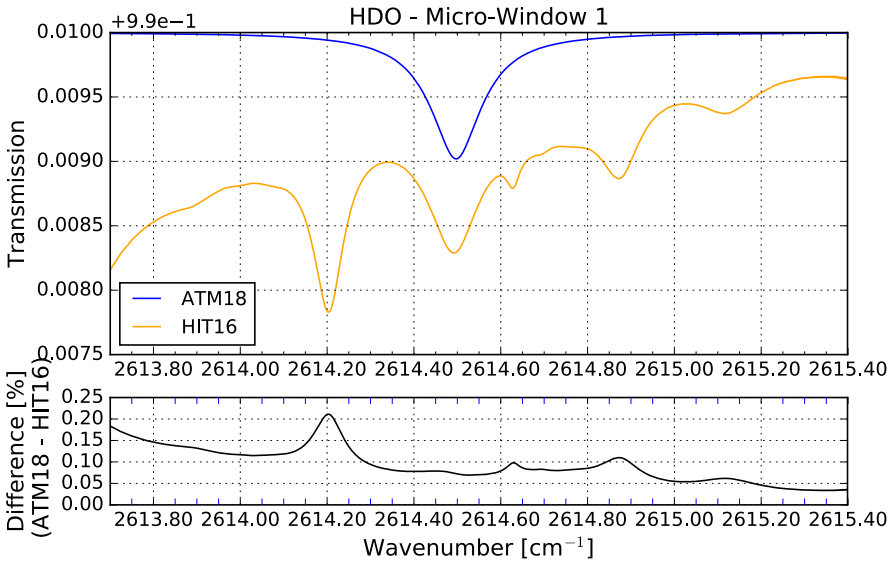
Difference of ch4_HIT08-Ret - ch4_HIT16-Ret

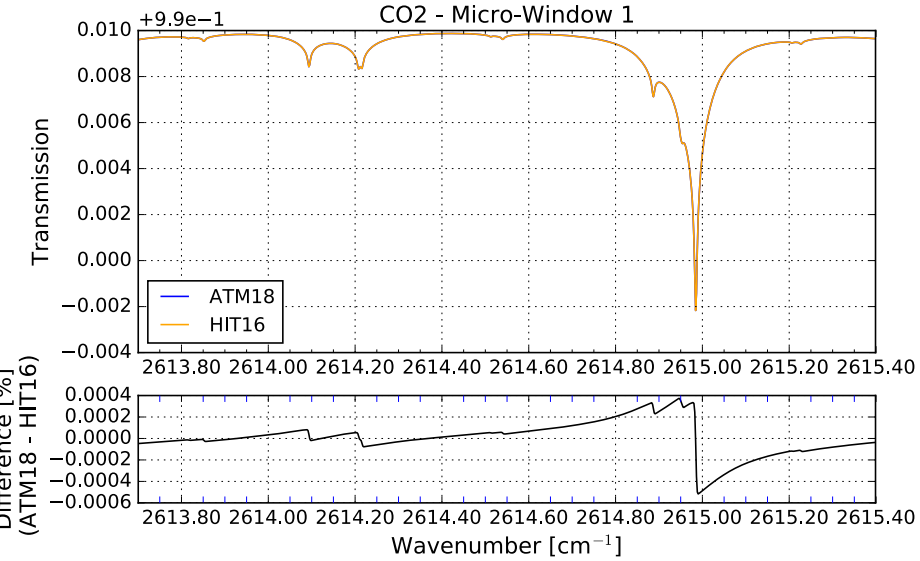
Difference [molec/cm2] = 1.36981073527e+17
Difference [%] = 0.369712883317

Post retrieval HIT08 / HIT16

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

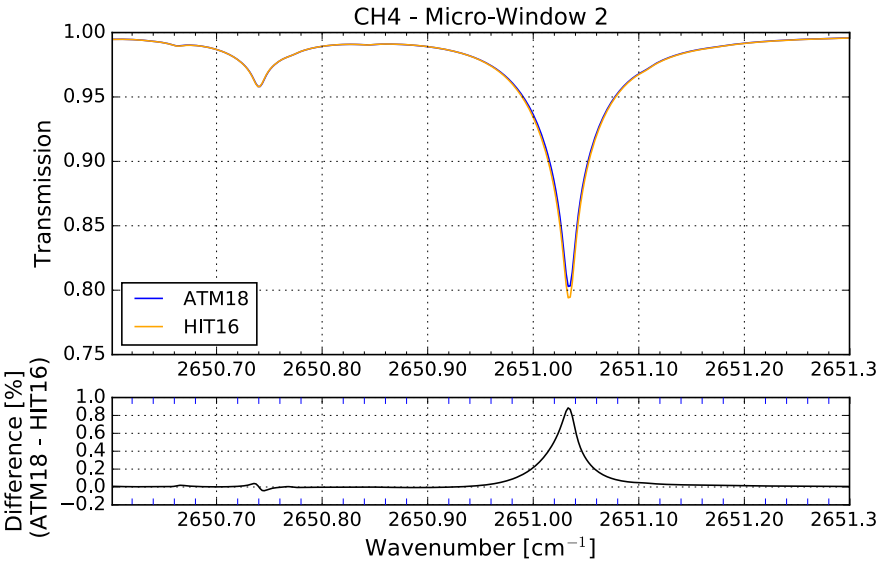


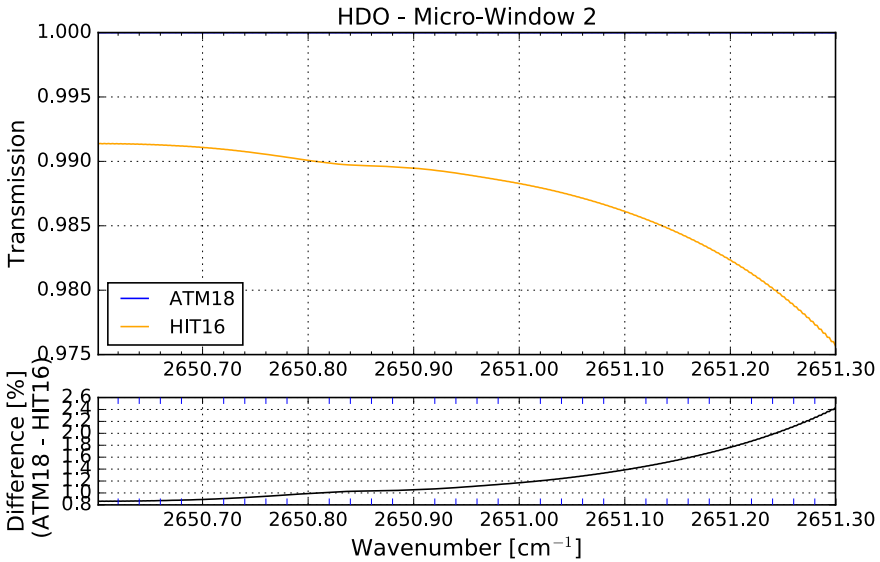


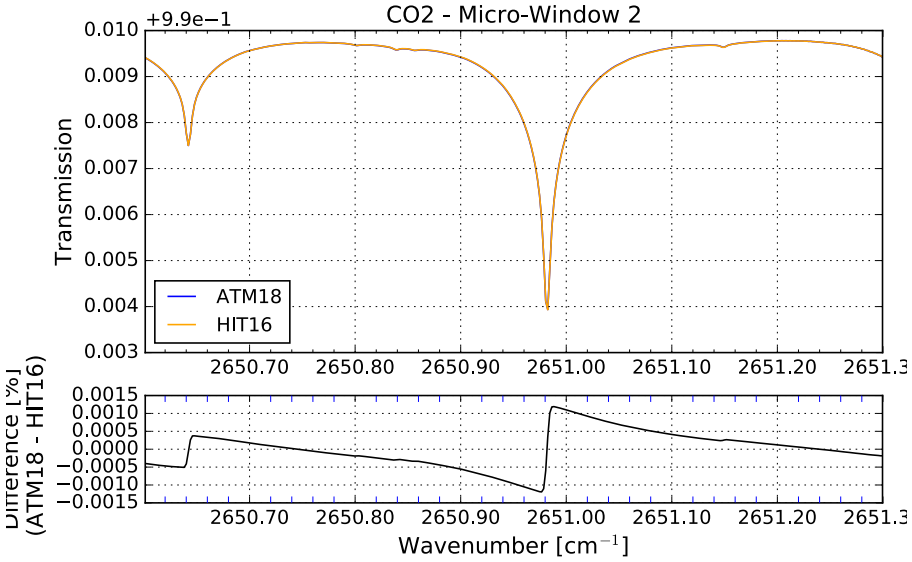


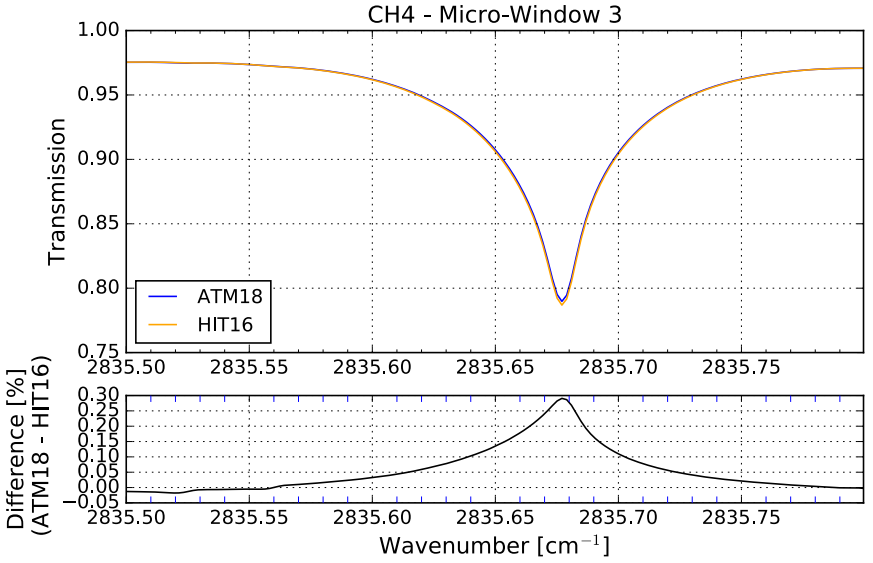
Post retrieval HIT16 / ATM18

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests



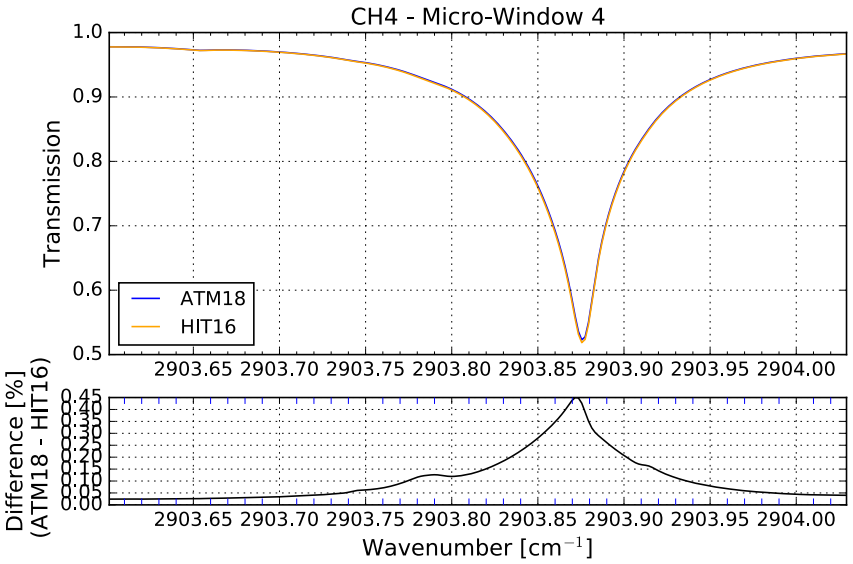


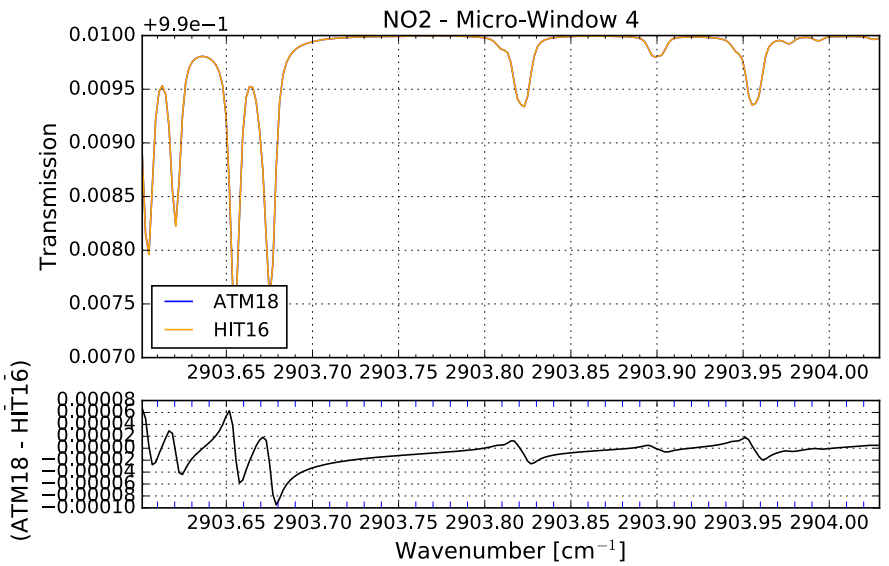




Post retrieval HIT16 / ATM18

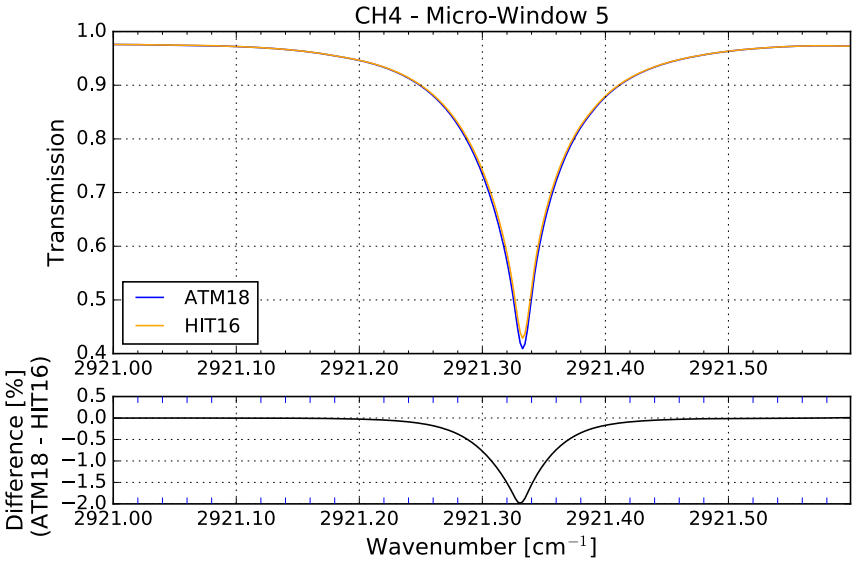
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

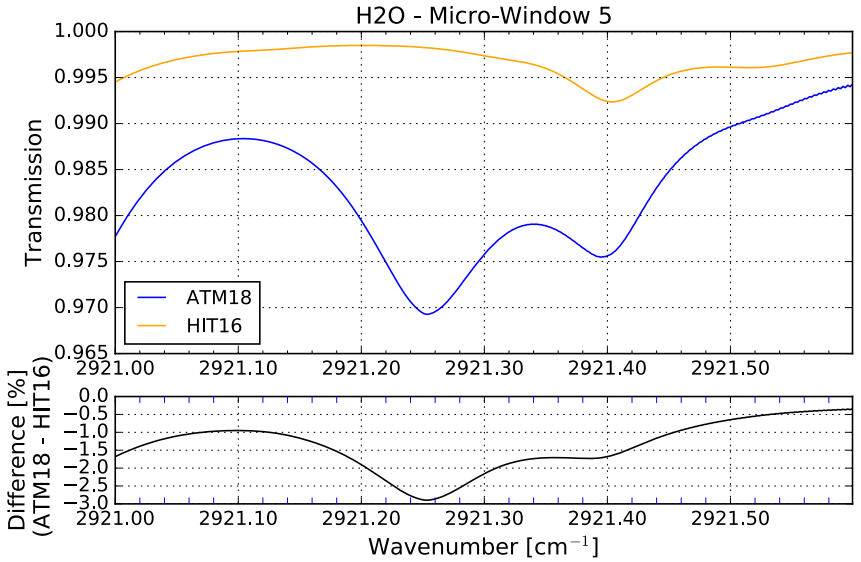


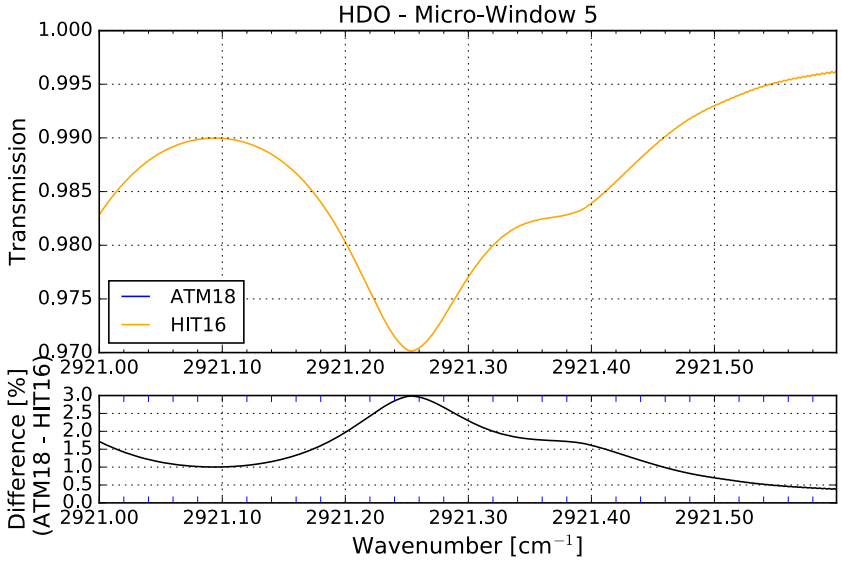


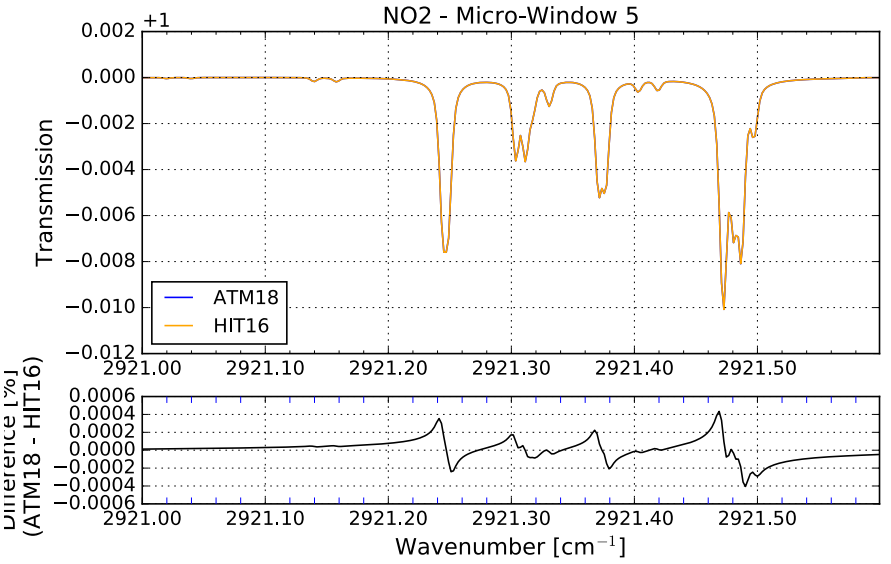
Post retrieval HIT16 / ATM18

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests



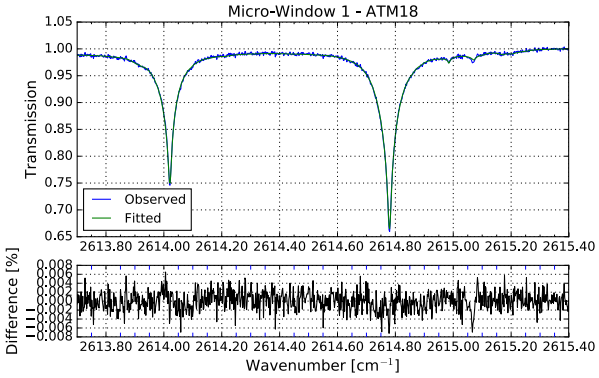


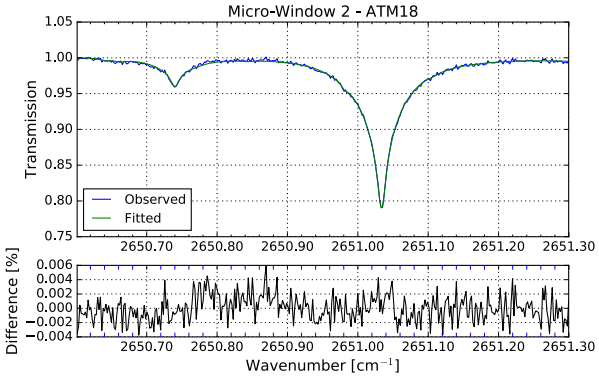


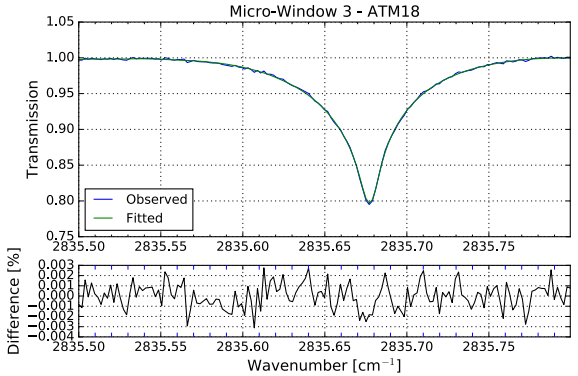


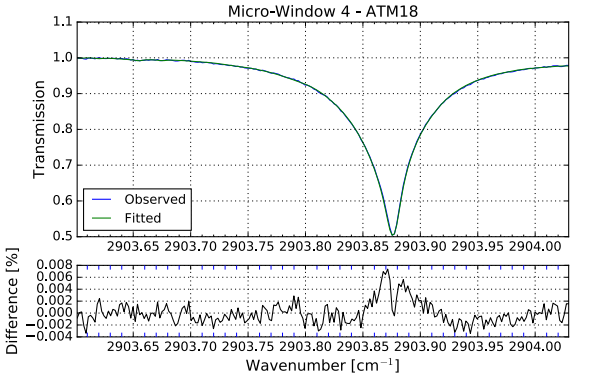
Post retrieval HIT16 / ATM18

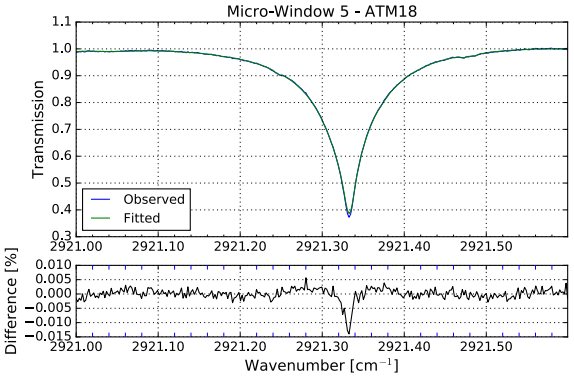
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





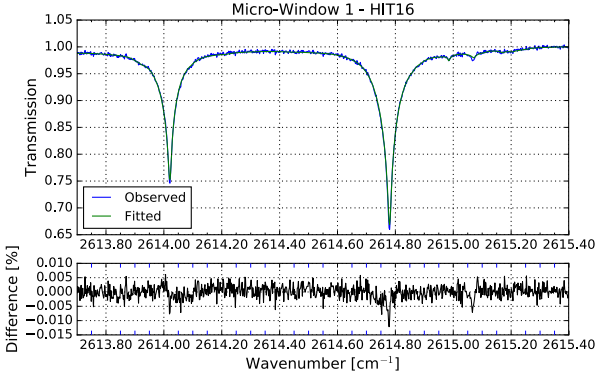


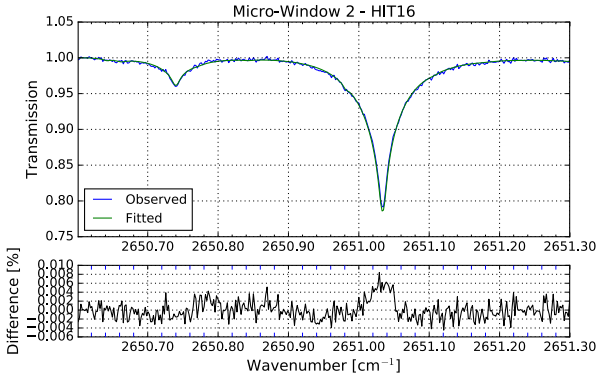


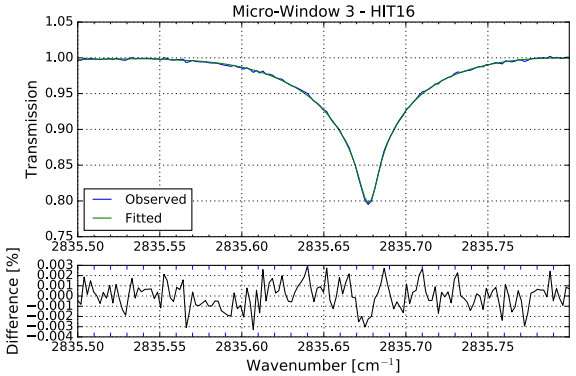


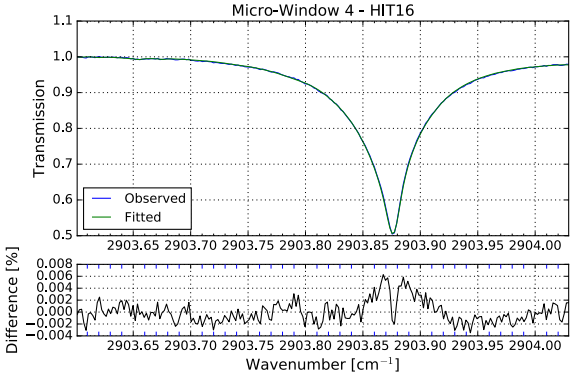
Post retrieval HIT16 / ATM18

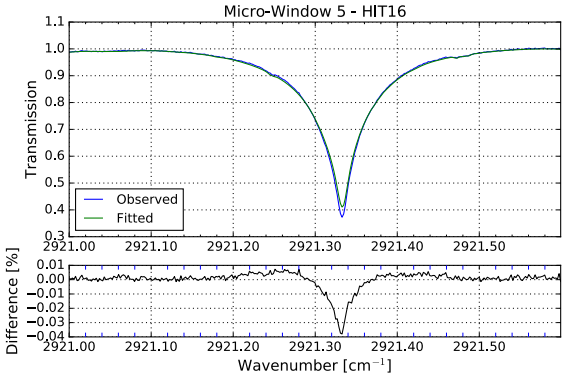
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests





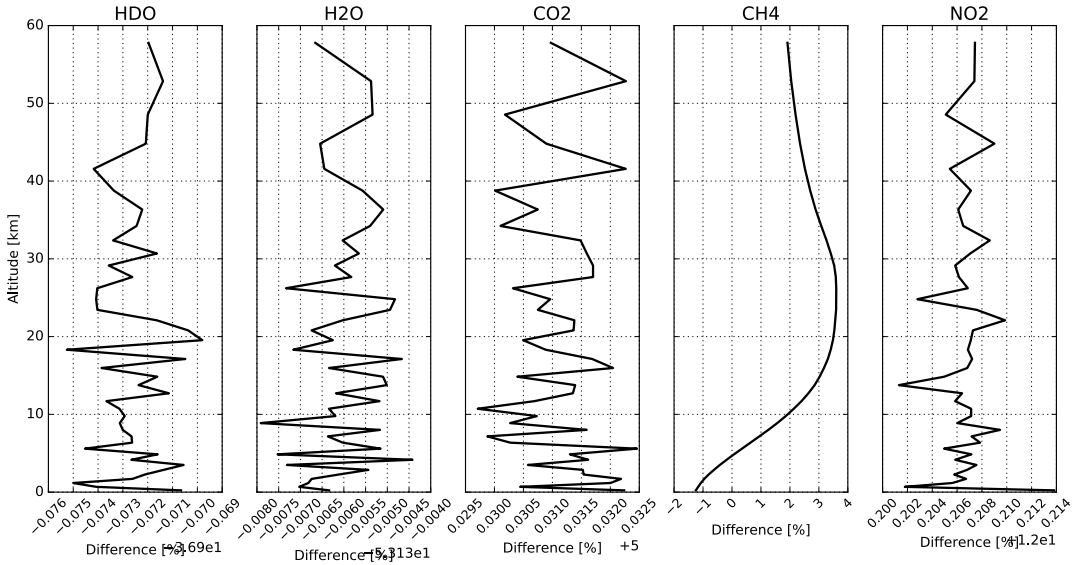






Post retrieval HIT16 / ATM18

CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests



ATM minimizes RMS.
Slight increase in DOF
Slight increase in Column

Version = ch4_ATM18-Ret
Total Column = 3.71959279502e+19
rms = 0.205628
dof = 1.90172320504
Version = ch4_HIT16-Ret
Total Column = 3.70506627462e+19
rms = 0.344832
dof = 1.8135588337

Difference of ch4_ATM18-Ret - ch4_HIT16-Ret

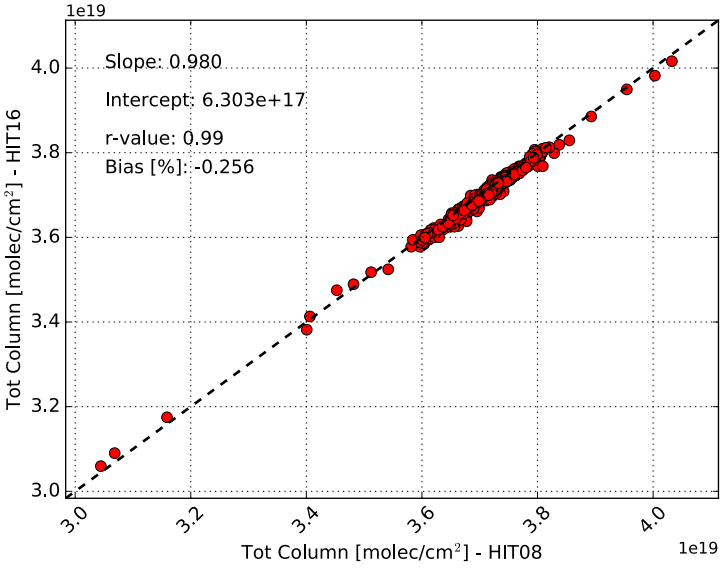
Difference [molec/cm2] = 1.45265204079e+17
Difference [%] = 0.39207181009

Post retrieval HIT16 / ATM18

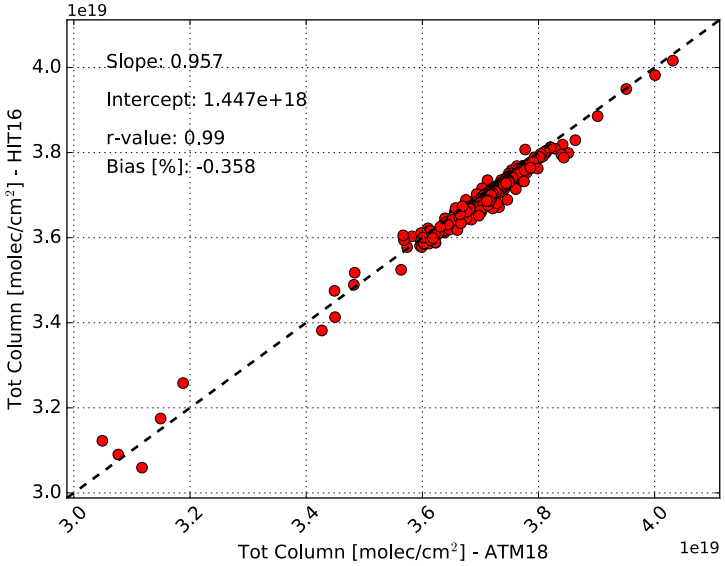
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

Column

HIT08 / HIT16



HIT16 / ATM18

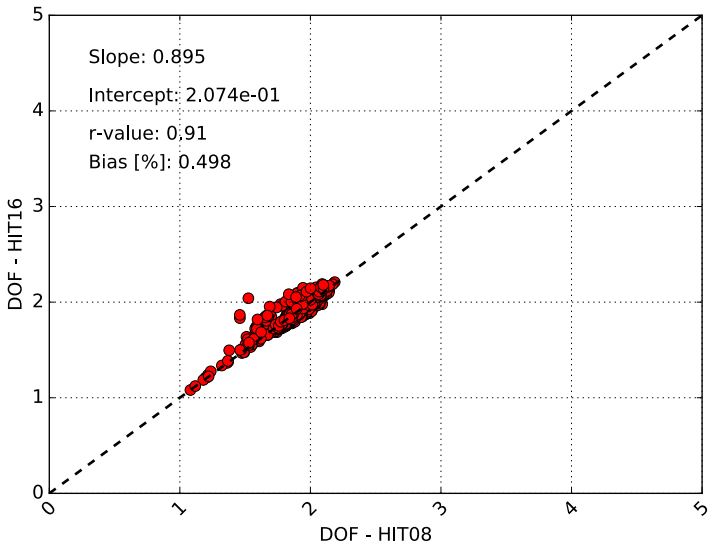


HIT16 produces lower columns then H08 & A18

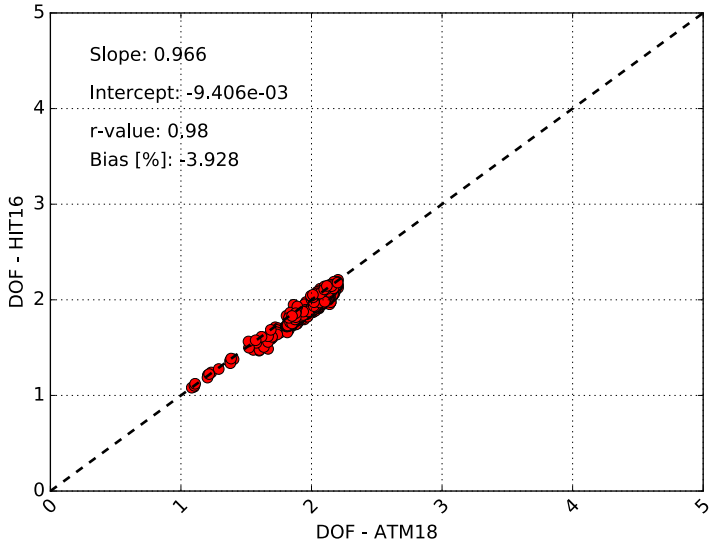
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

DOFs

HIT08 / HIT16



HIT16 / ATM18

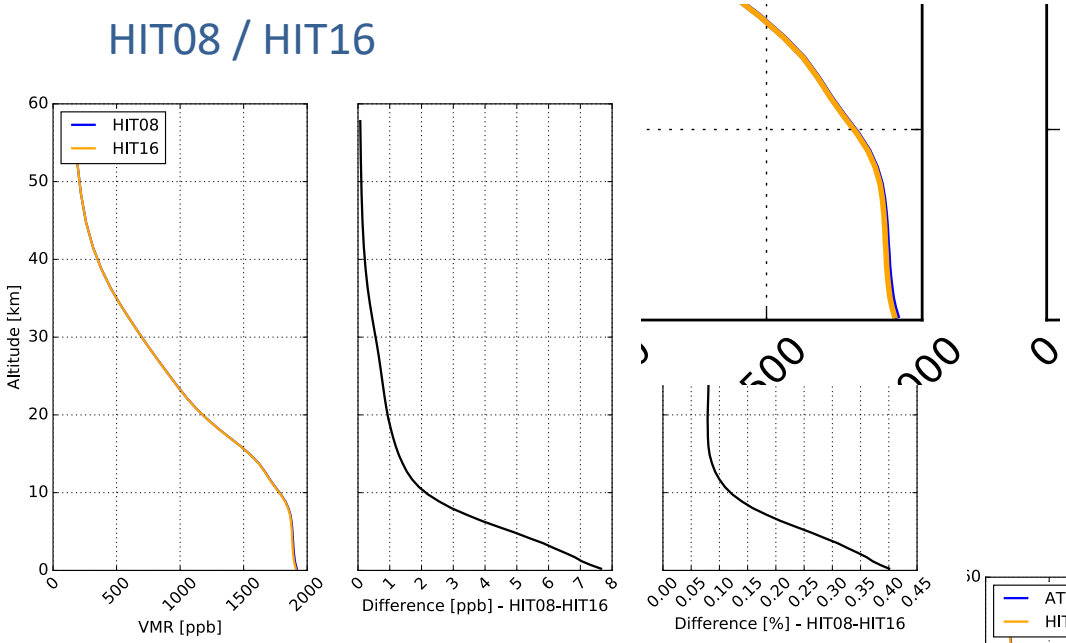


H16 slightly lower dof then H08 **and** slighty lower then A18

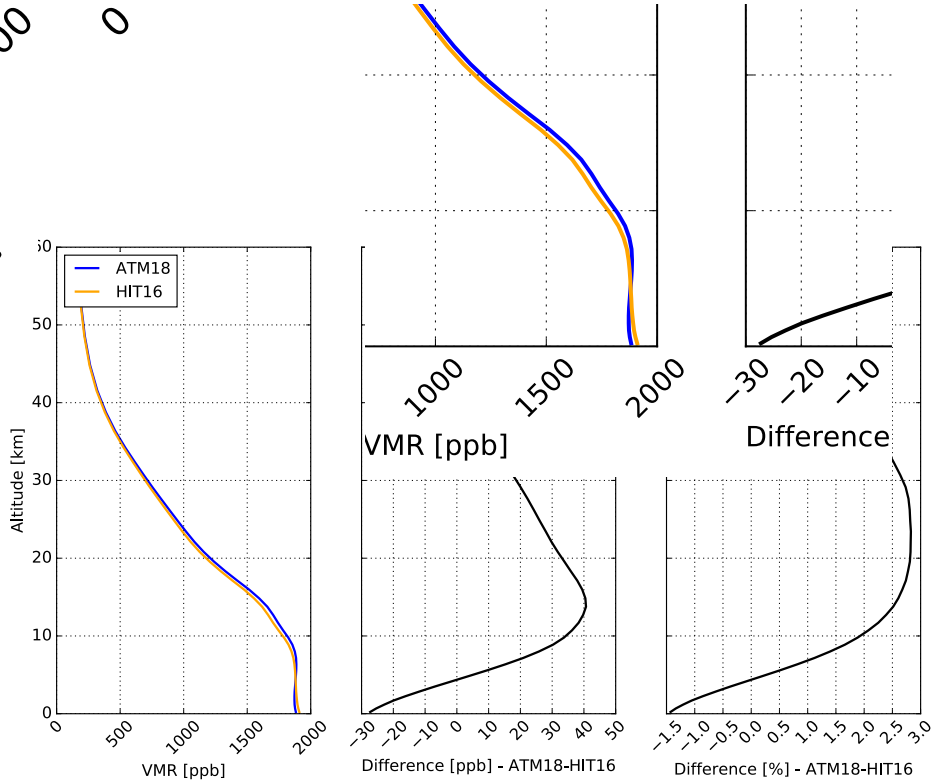
CH4 HITRAN 08 / HITRAN 2016 / Interim ATM18 Tests

Profile

HIT08 / HIT16



HIT16 / ATM18



H08 & H16 profiles very similar.

A18 retrieves more well mixed profile through troposphere then H16.