```
Running tests...
Test project                                              /tests/test_TL/bld
    Start 1: test_TL.f90
1/2 Test #1: test_TL.f90 ......................      Passed     0.16 sec
    Start 2: test_TL_convergence.f90
2/2 Test #2: test_TL_convergence.f90 ..........***Failed     0.07 sec

50% tests passed, 1 tests failed out of 2

Total Test time (real) =    0.24 sec

The following tests FAILED:
         2 - test_TL_convergence.f90 (Failed)
Errors while running CTest
make: *** [test] Error 8
```

Fig. 1: TL/AD Fortran ctest suite with TL convergence test failing on purpose.

Simple Finite Difference test of the Tangent-Linear case.

$$\frac{F(x + \Delta x) - F(X)}{TL|_x(\Delta x)} \approx 1$$
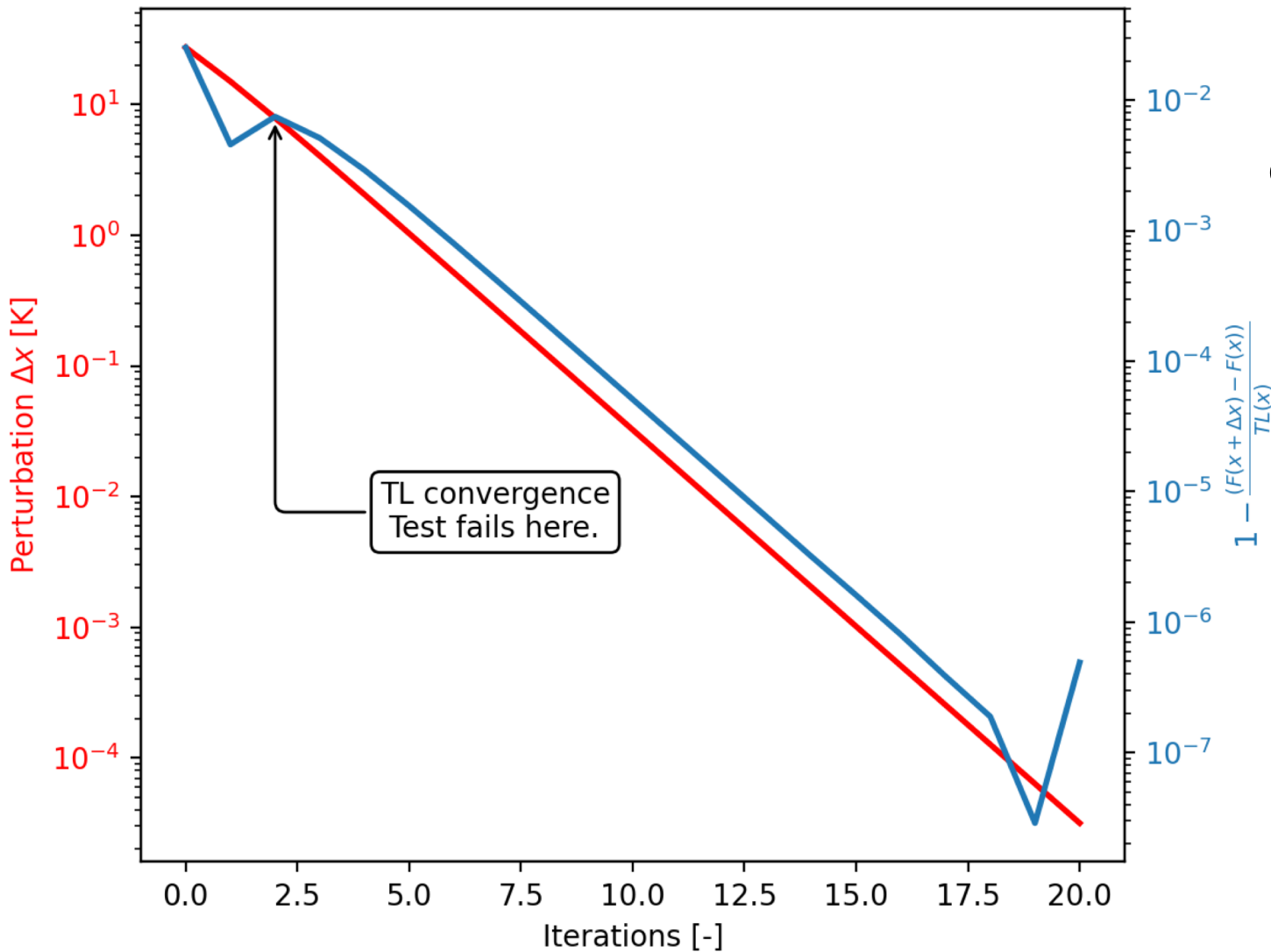
Fig. 2: Failing TL convergence test in more detail.

The figure shows a plot with "Iterations [-]" on the x-axis (ranging from 0.0 to 20.0), "Perturbation Δx [K]" on the left y-axis (ranging from 10^{-4} to 10^1 in red), and $1 - \frac{(F(x + \Delta x) - F(x))}{TL(x)}$ on the right y-axis (ranging from 10^{-7} to 10^{-2} in blue).

An annotation points to approximately iteration 2 with the label: "TL convergence Test fails here."

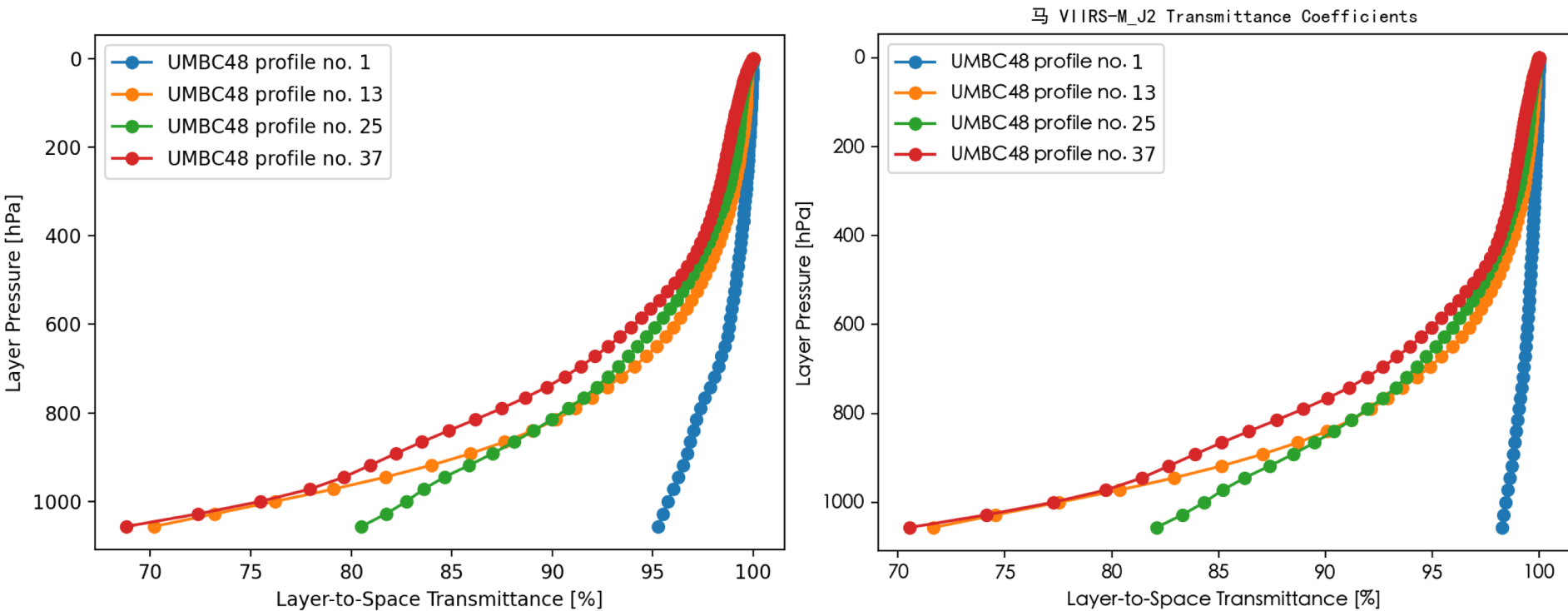# CRTM 1.2 Modernized Transmittance Coefficient Package: VIIRS Comparison
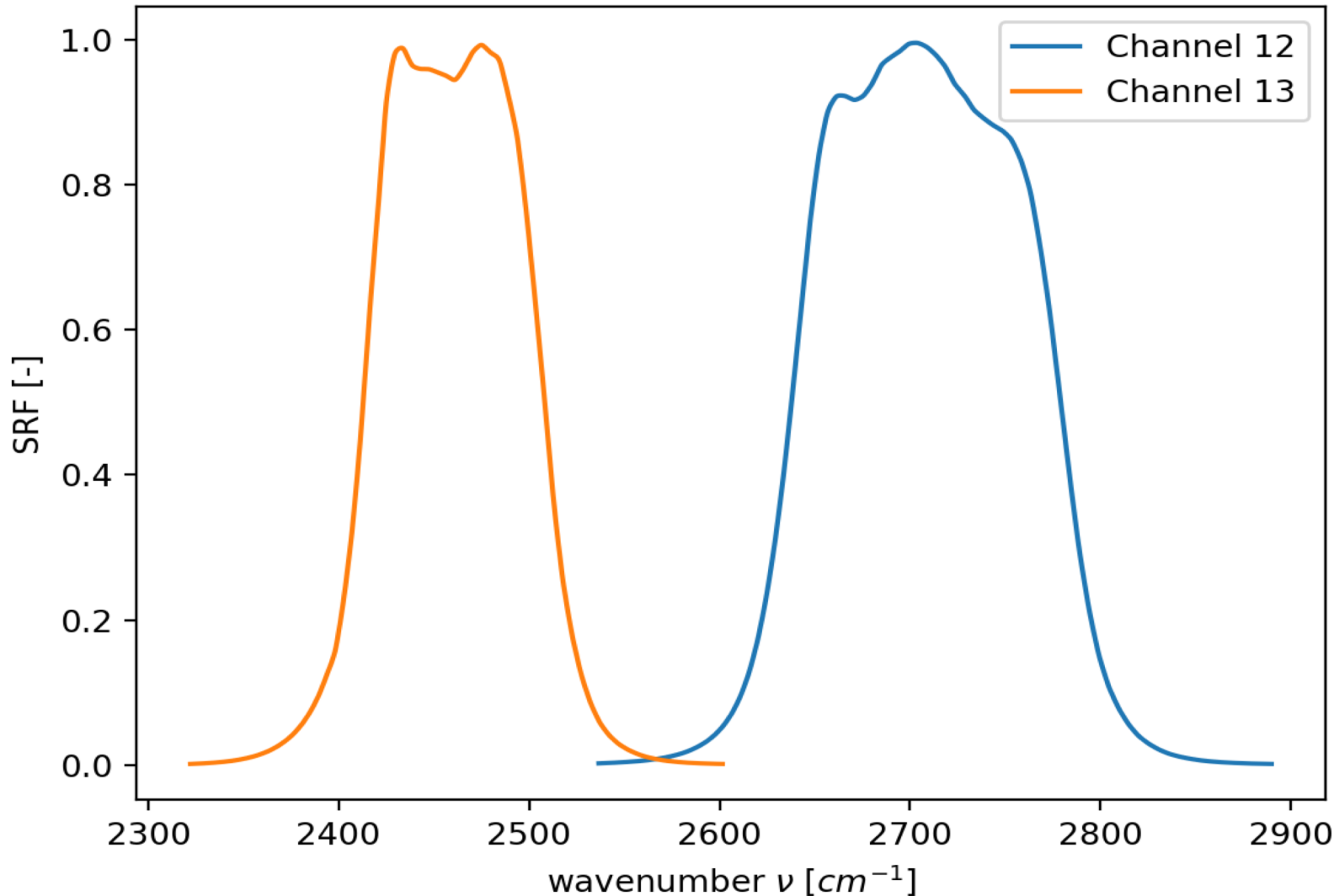
Fig. 3: VIIRS-M_NPP SRFs for Ch. 12 & 13.

VIIRS-M_NPP Restored ODPS Coefficients
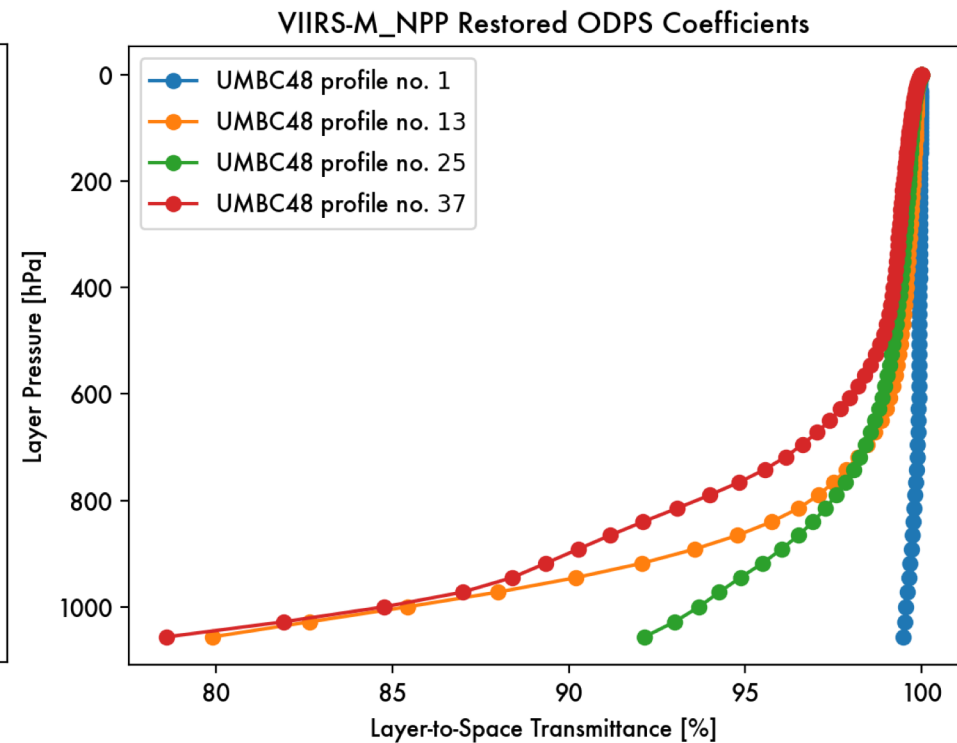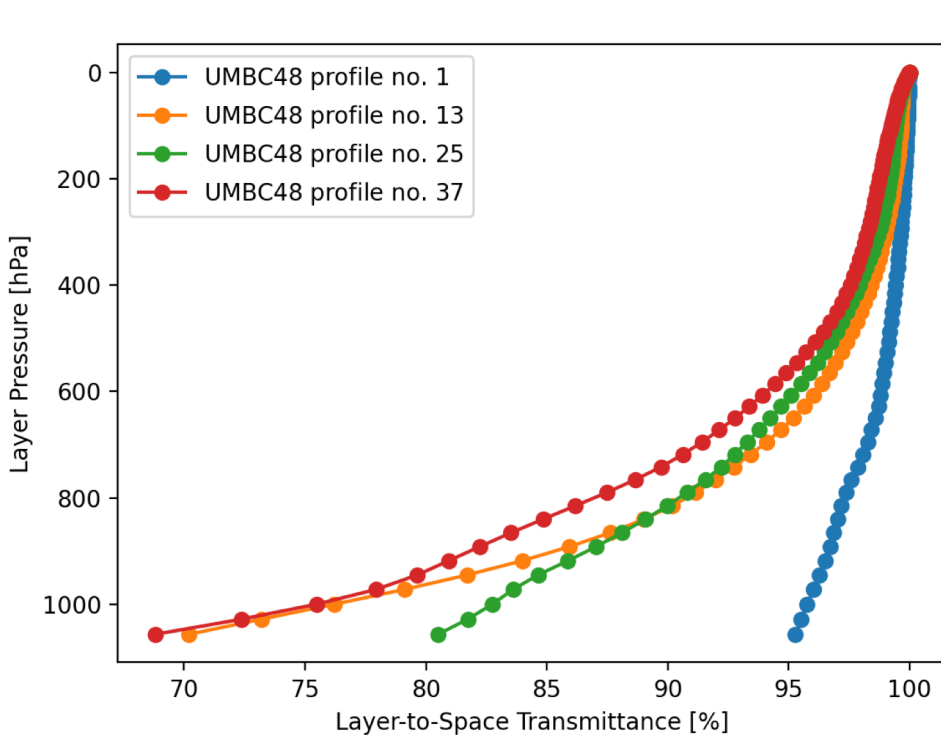
Comment: Qualitative agreement of the layer-to-space transmittance profiles, but significant differences across the board, especially for high pressure values. Absorption is too low.

CRTM 1.2 Modernized Transmittance Coefficient Package: VIIRS Comparison

马 VIIRS-M_J2 Transmittance Coefficients

Comment: Improvement for UMBC48 profiles #13 to #37, but still significant differences, in particular for #1.
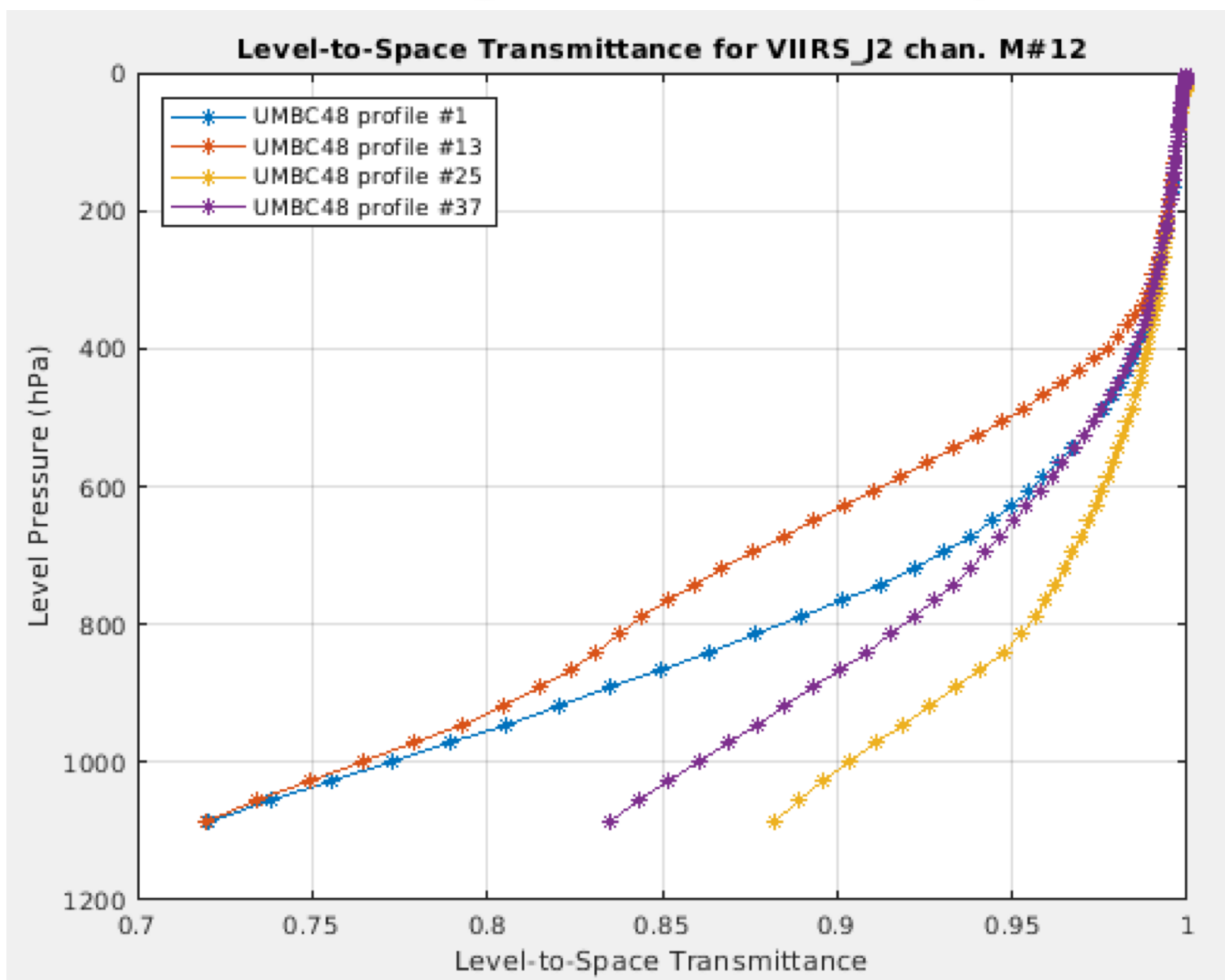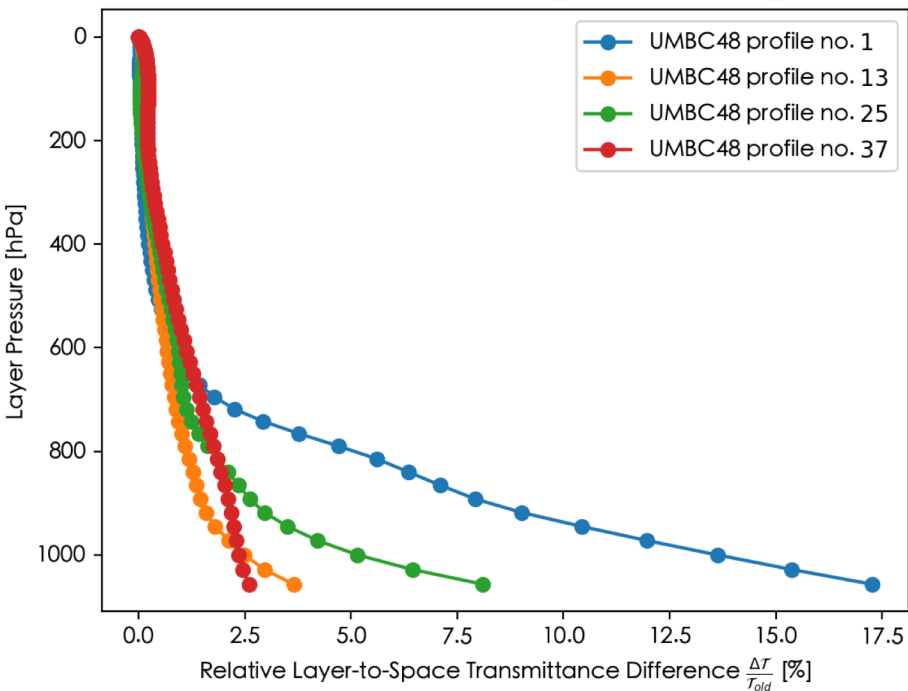
Fig.: VIIRS-M_J2 Level-to-Space Transmittance plot for Ch. 12 by Yingtao.

CRTM 1.2 Modernized Transmittance Coefficient Package: VIIRS Comparison
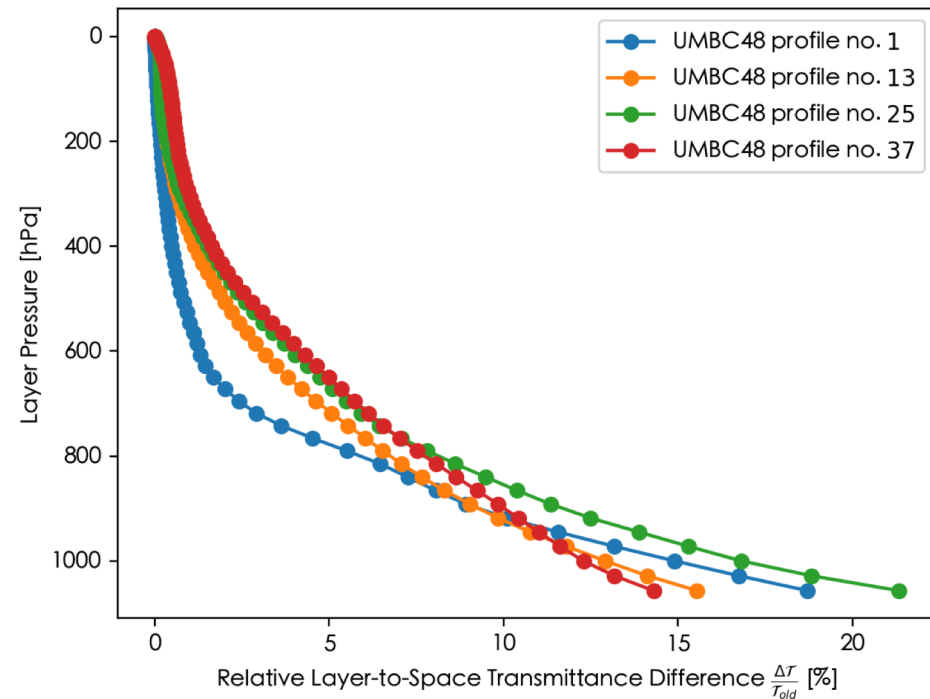
Comment: Overall high differences, consistent for UMBC48 profile #1.

CRTM 1.2 Modernized Transmittance Coefficient Package: VIIRS Comparison

Possible Explanations:

- No ODAS Merge with ODPS for water line absorption.

- SRF Influence?

- Mismatching set of training absorbers: (mol7 all wco molc2 molc3 molc4 molc5 molc6)

- Mismatching training profile (ECMWF83 vs. UMBC48)?

- „Unknown unknowns" ?