AIRS RTA and BT Tuning:

RTA Tuning Telecon

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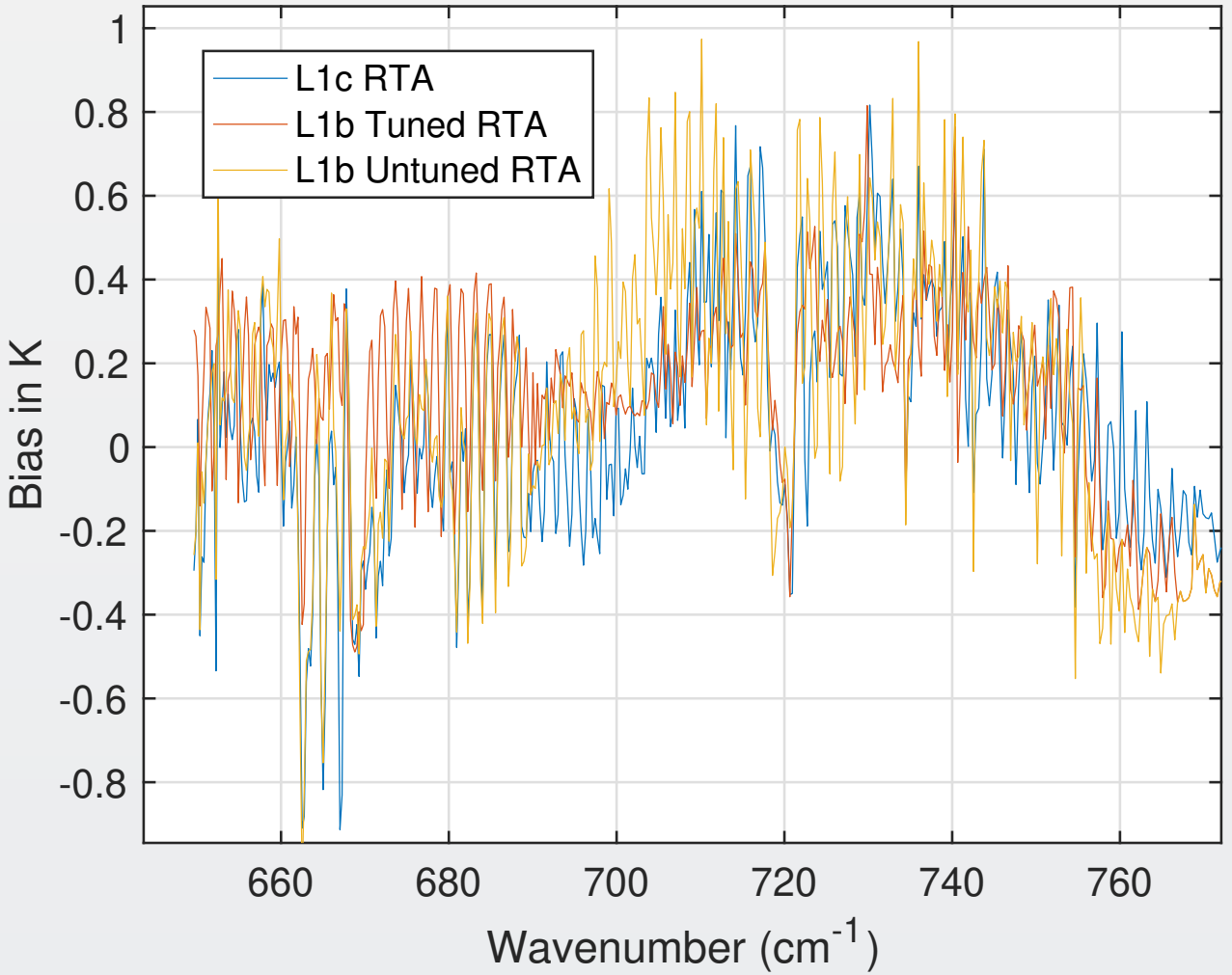
Introduction

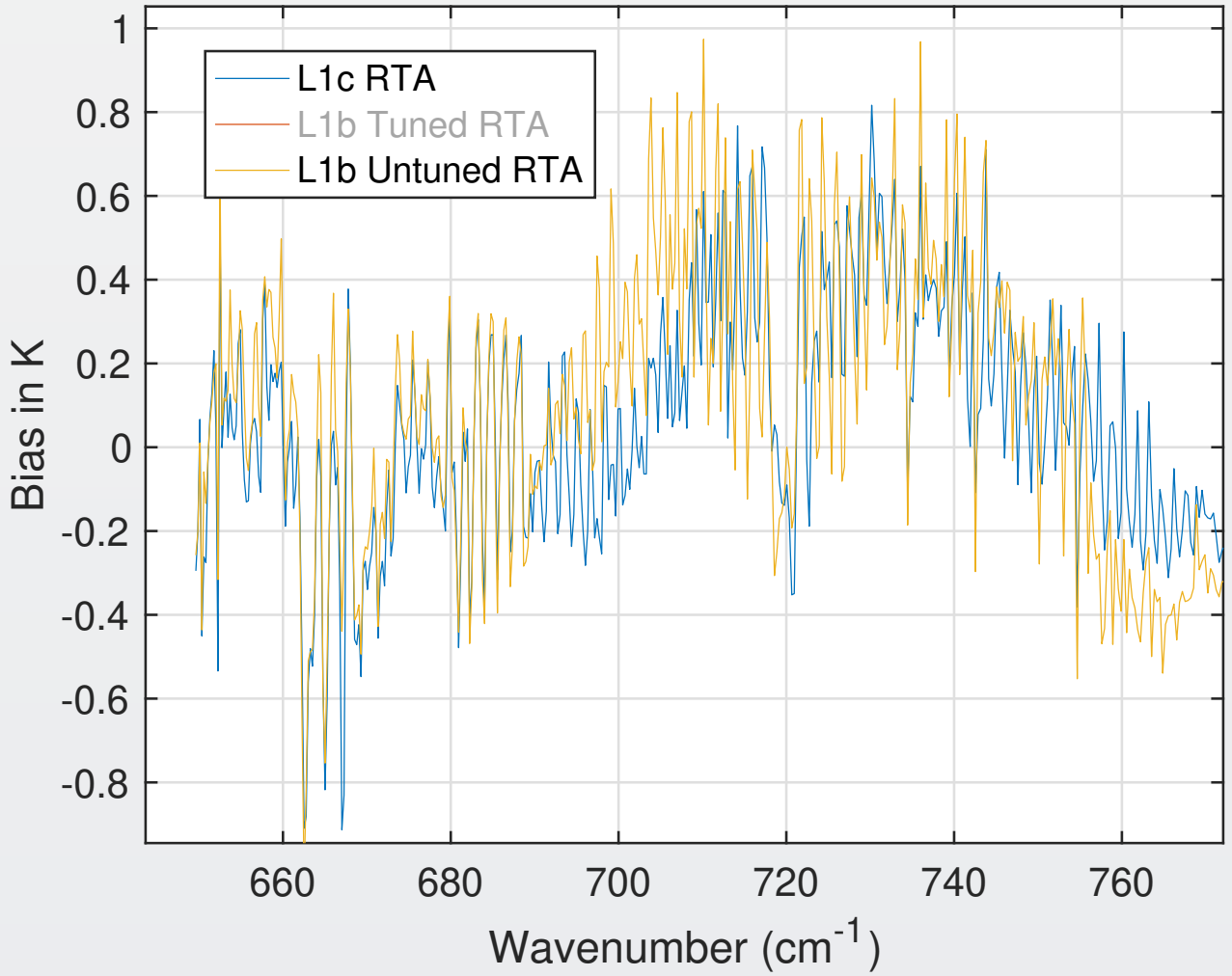
- 17 days of AIRS clear ocean scene radiances are compared to ECMWF simulations
- Three RTA variants tested:
  - L1c RTA
  - L1b RTA as tuned for V6 Level 2 retrievals
  - L1b RTA without tuning
- The L1c RTA uses HITRAN 2016 and new (improvements?) to the continuum and line mixing
- The L1b RTA is circa 2008
- Conclusions here assume ECMWF is "truth". Better than 5% -> 0.3K?

Longwave Biases: All RTAs



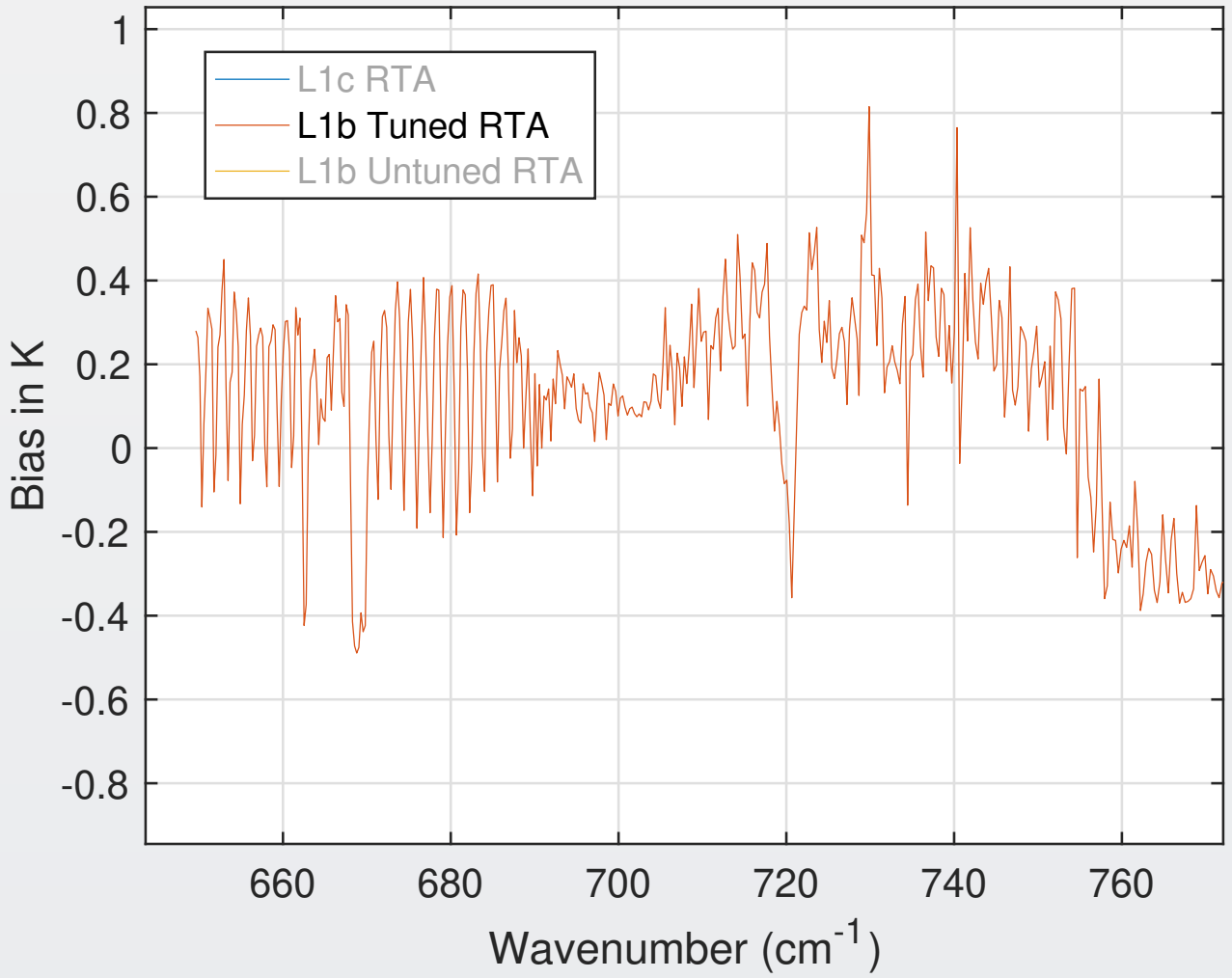
Longwave Biases w/o L1btuning RTA

L1c RTA appears a bit better. (Note fill channels included!)



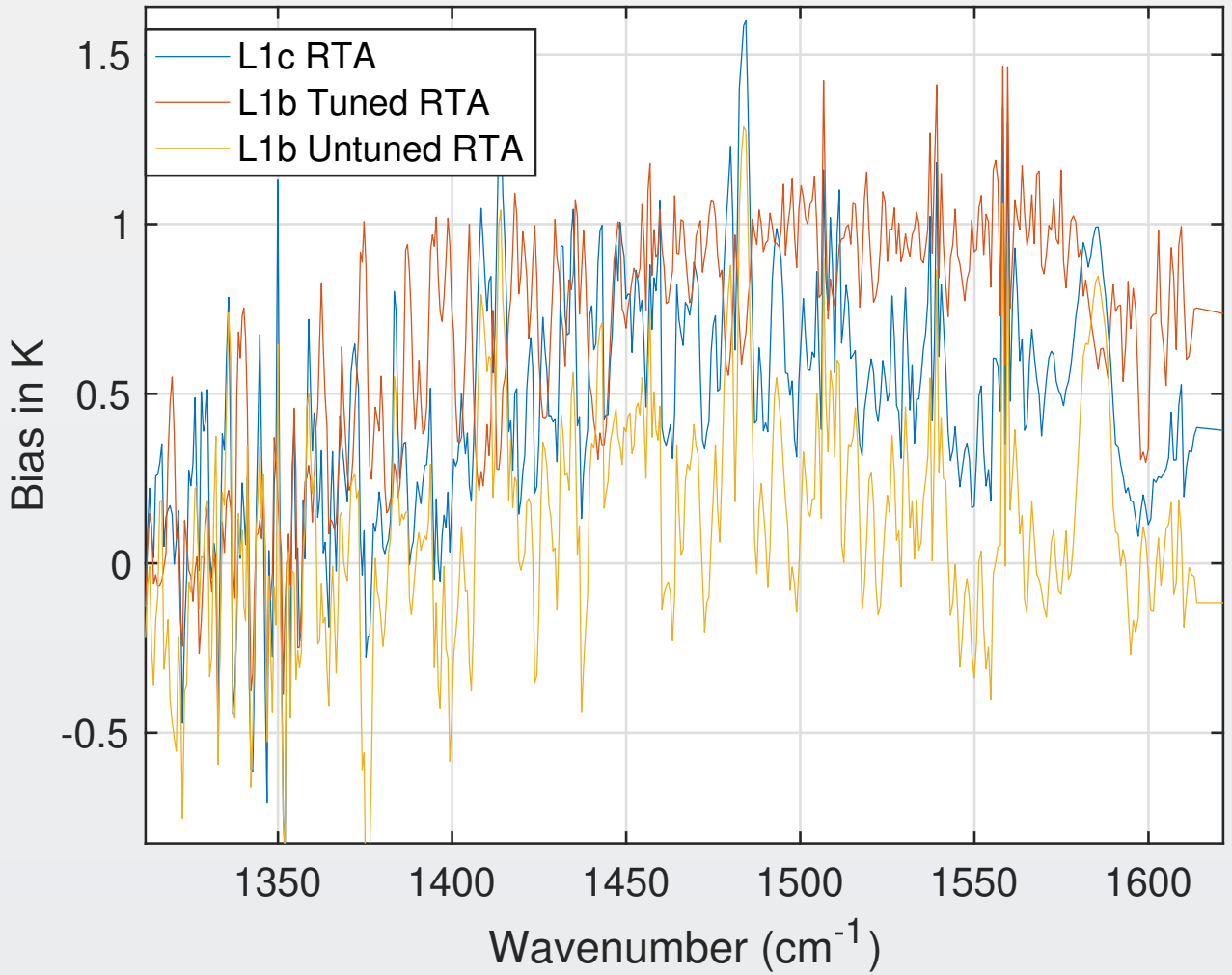
Longwave Biases just L1btuning RTA

Tuning removes biases mostly to levels lower than either RTA, esp. for trop. channels



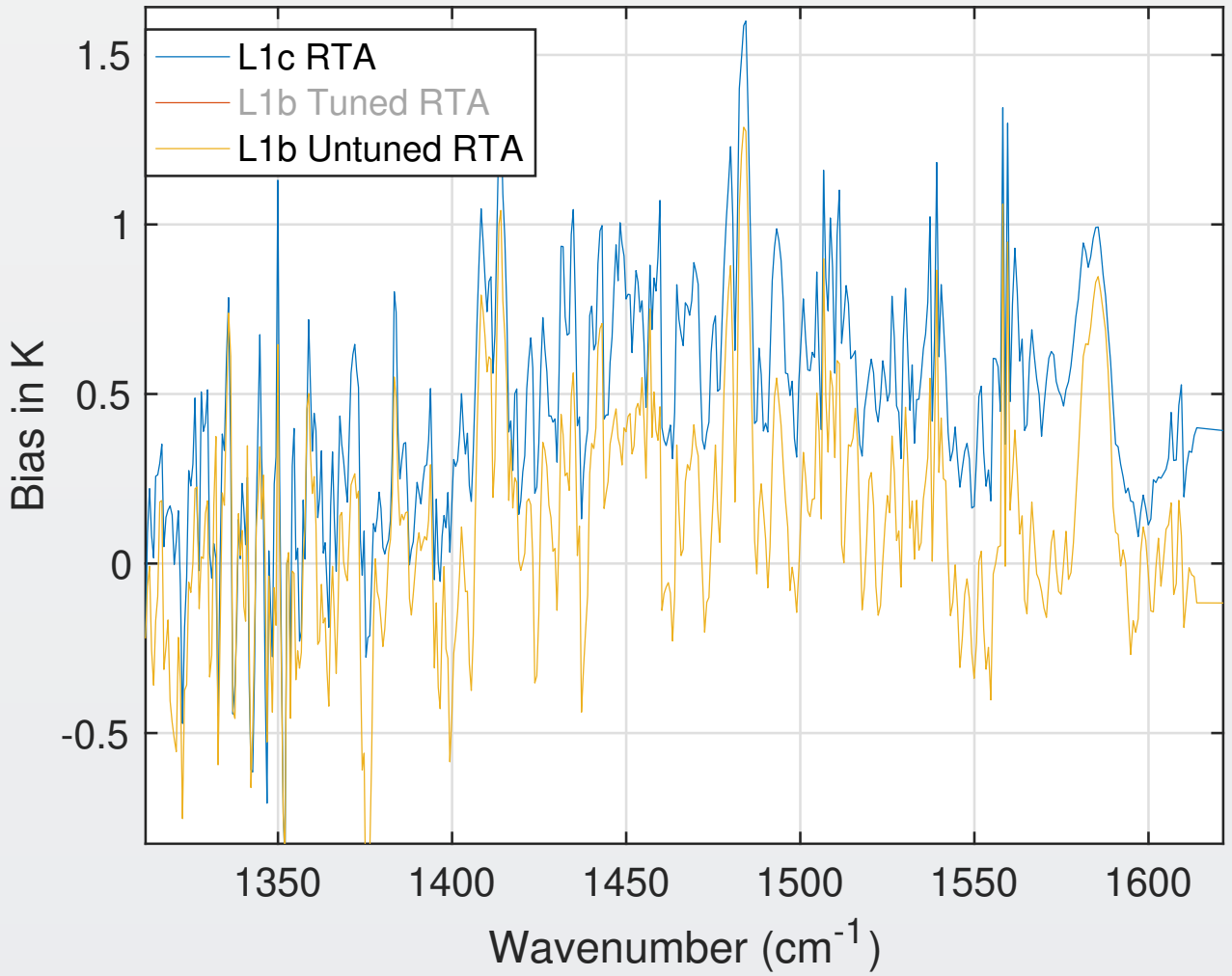
Midwave Biases: All RTAs

L1c slightly "worse" than L1b. Tuned L1b high bias, but smooth with cm^{-1}



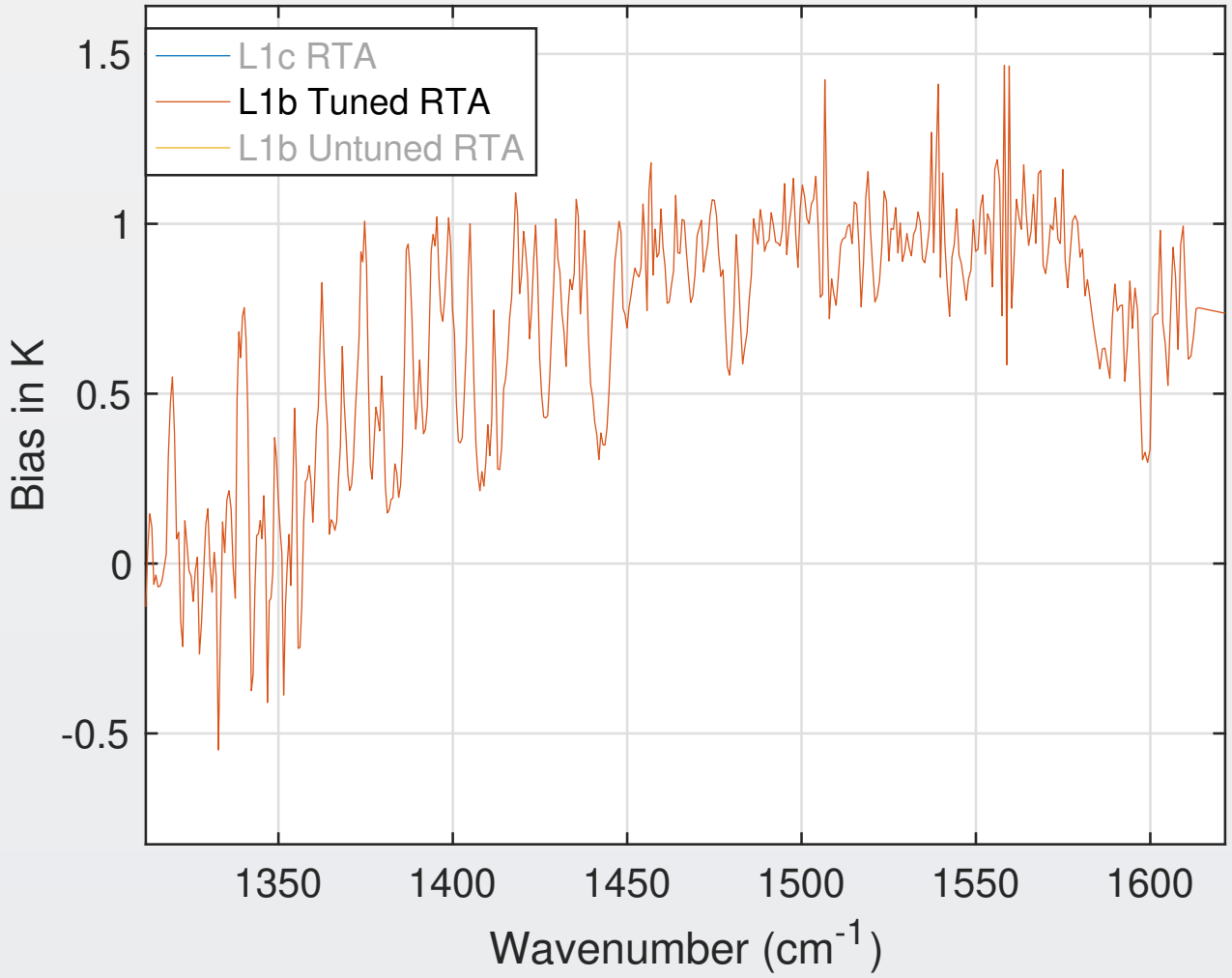
Midwave Biases w/o L1btuning RTA

Mixed bag: although L1b untuned biases are smaller on average



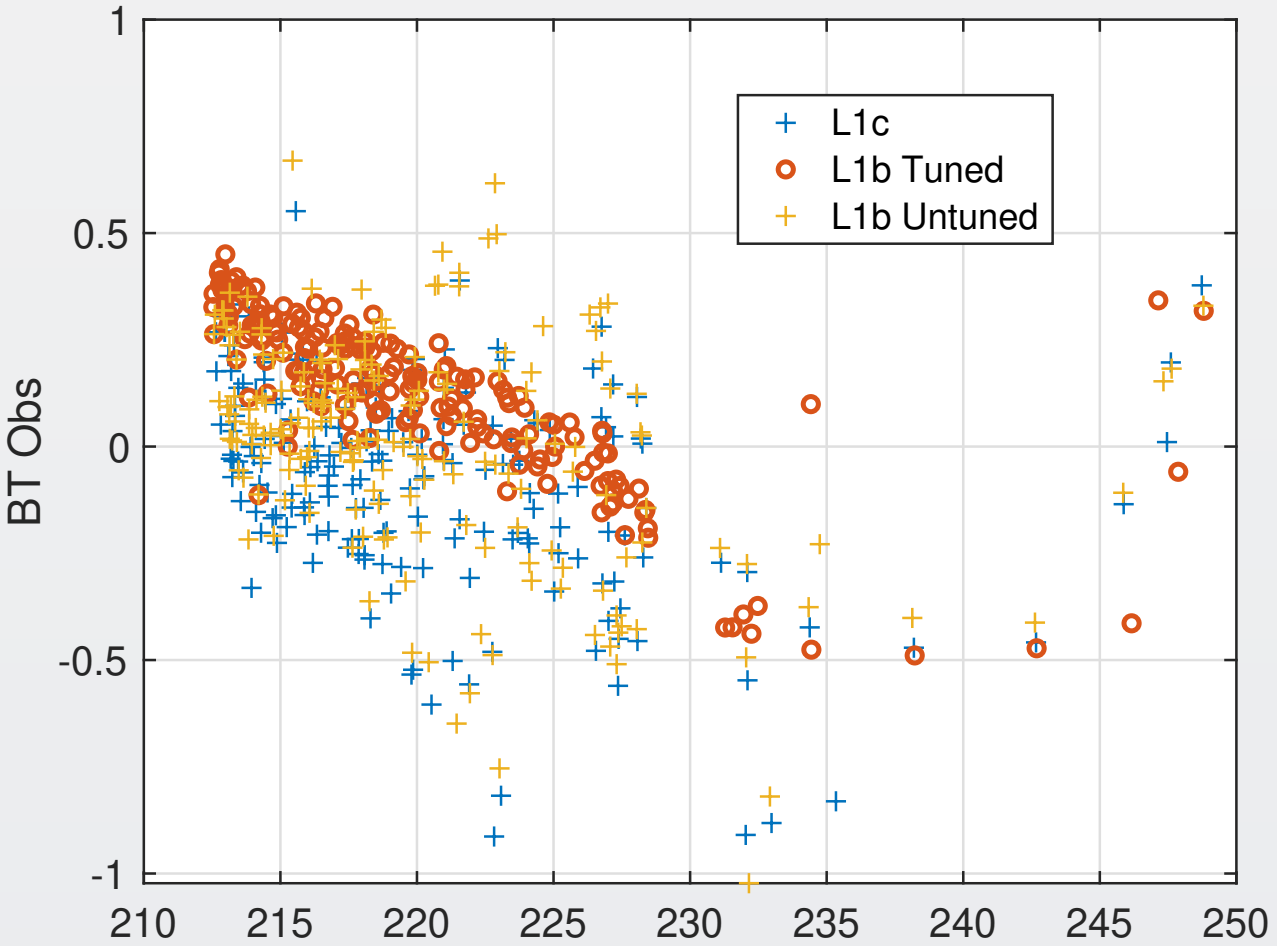
Midwave Biases Just L1btuning RTA

Clear that L1b tuning removes channel-to-channel variability (help convergence?)



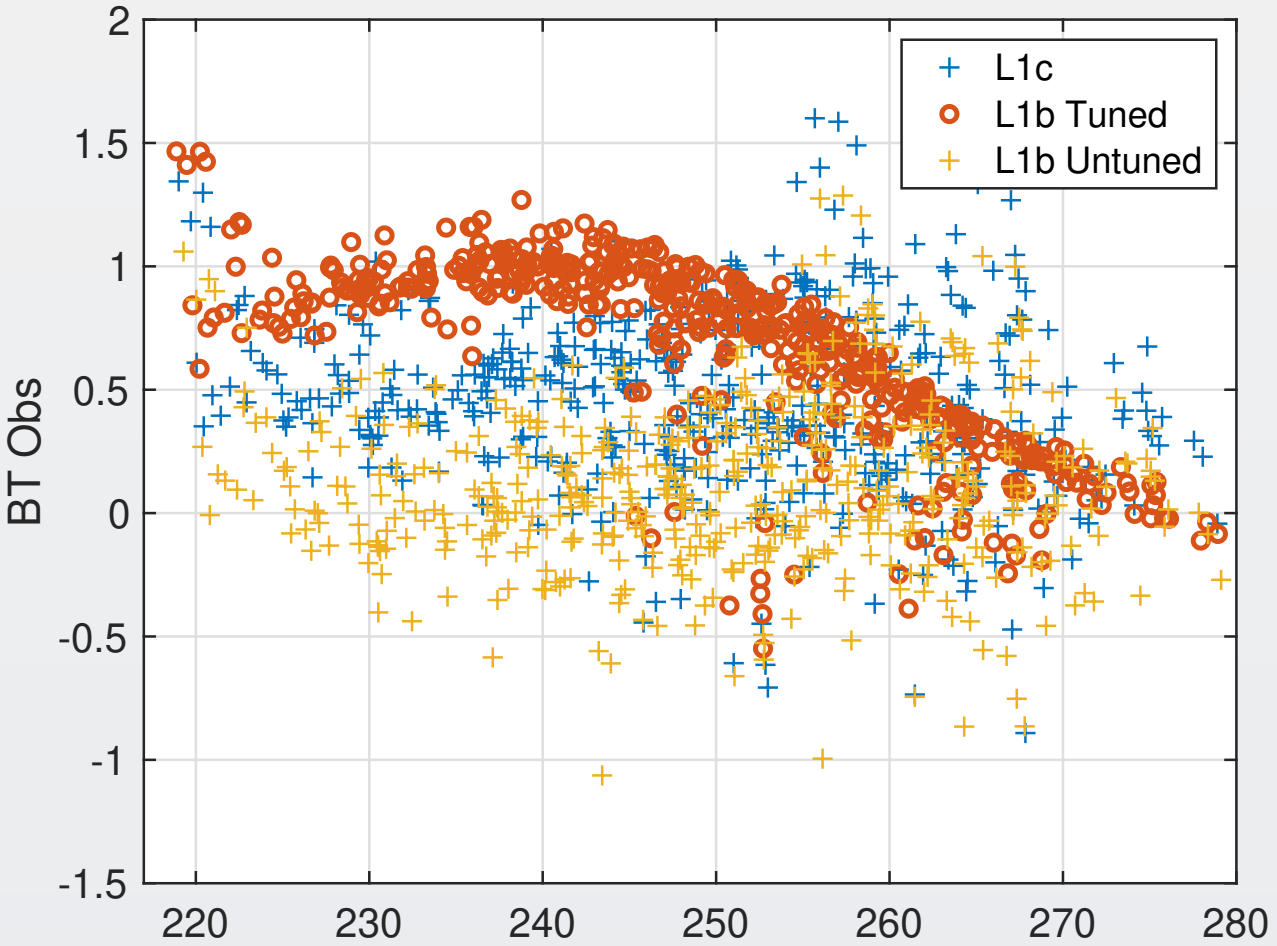
650-700 cm^{-1} Biases vs BTobs

Strat channels: L1b tuned clear bias trend with BTobs, unlike untuned RTAs



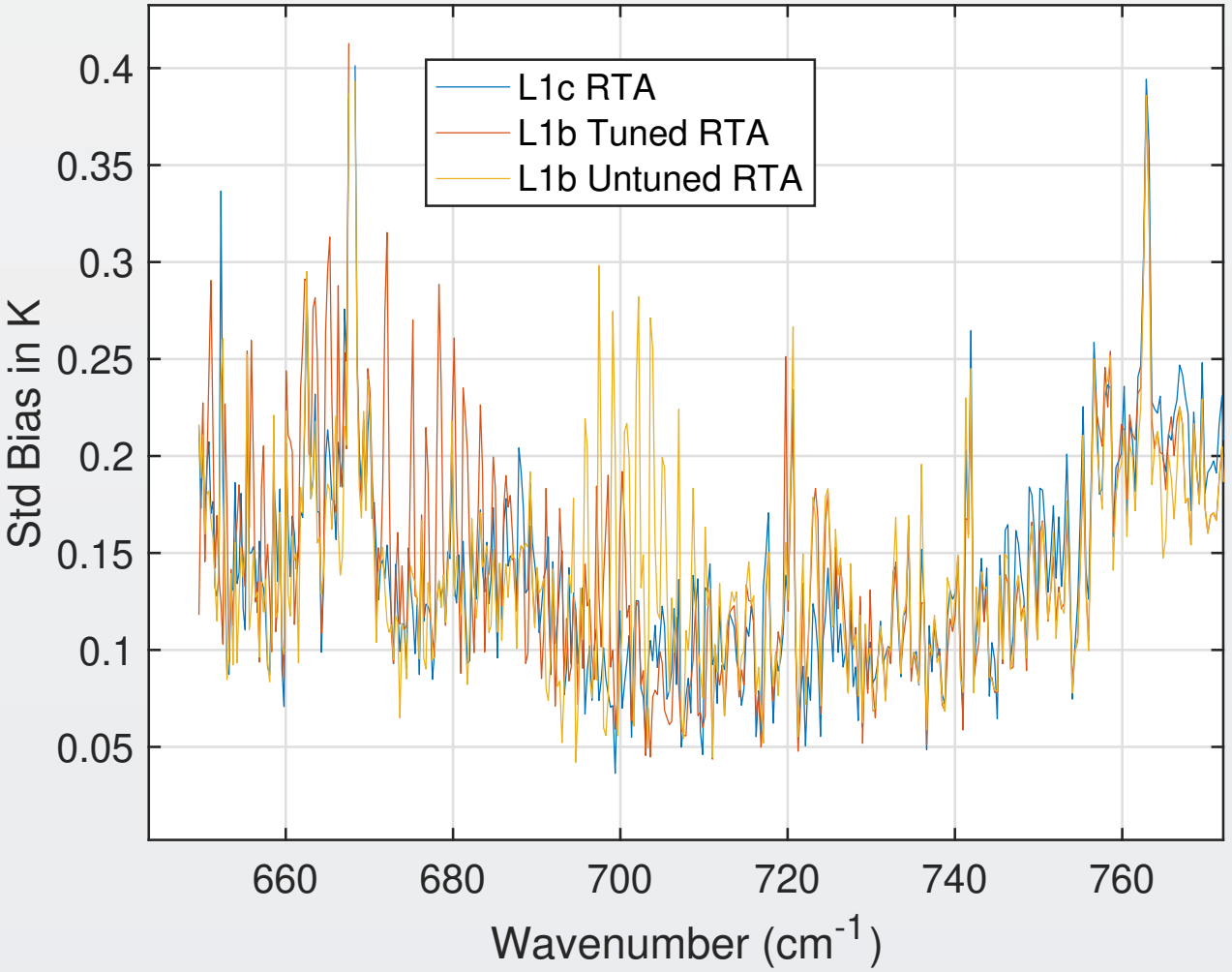
1320-1614 cm^{-1} Biases vs BTobs

Similarly for water band, L1b tuned clear bias dependence on BTobs



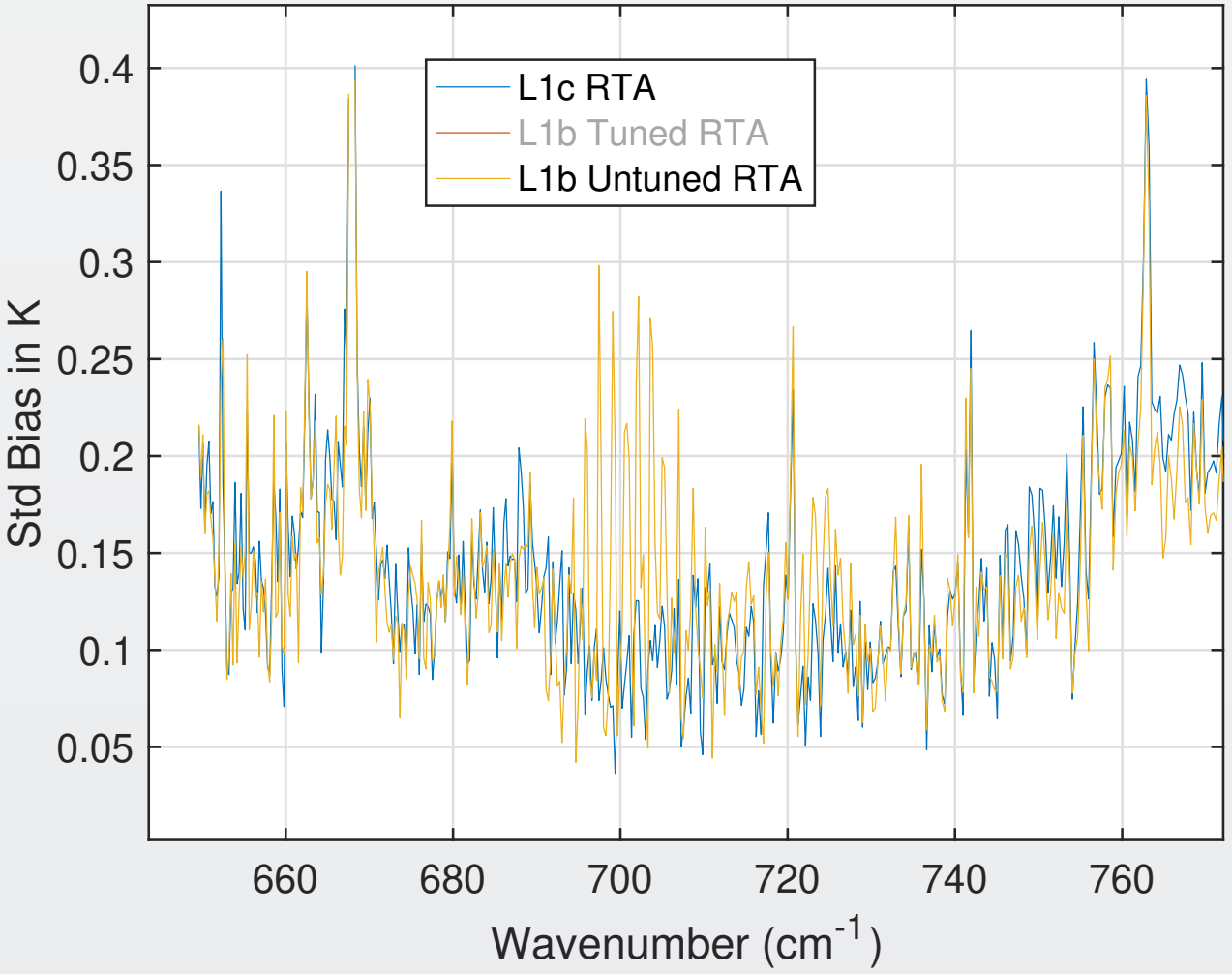
Longwave Bias Standard Deviations (with Latitude)

L1c stds often smaller than L1b (tuned or untuned)



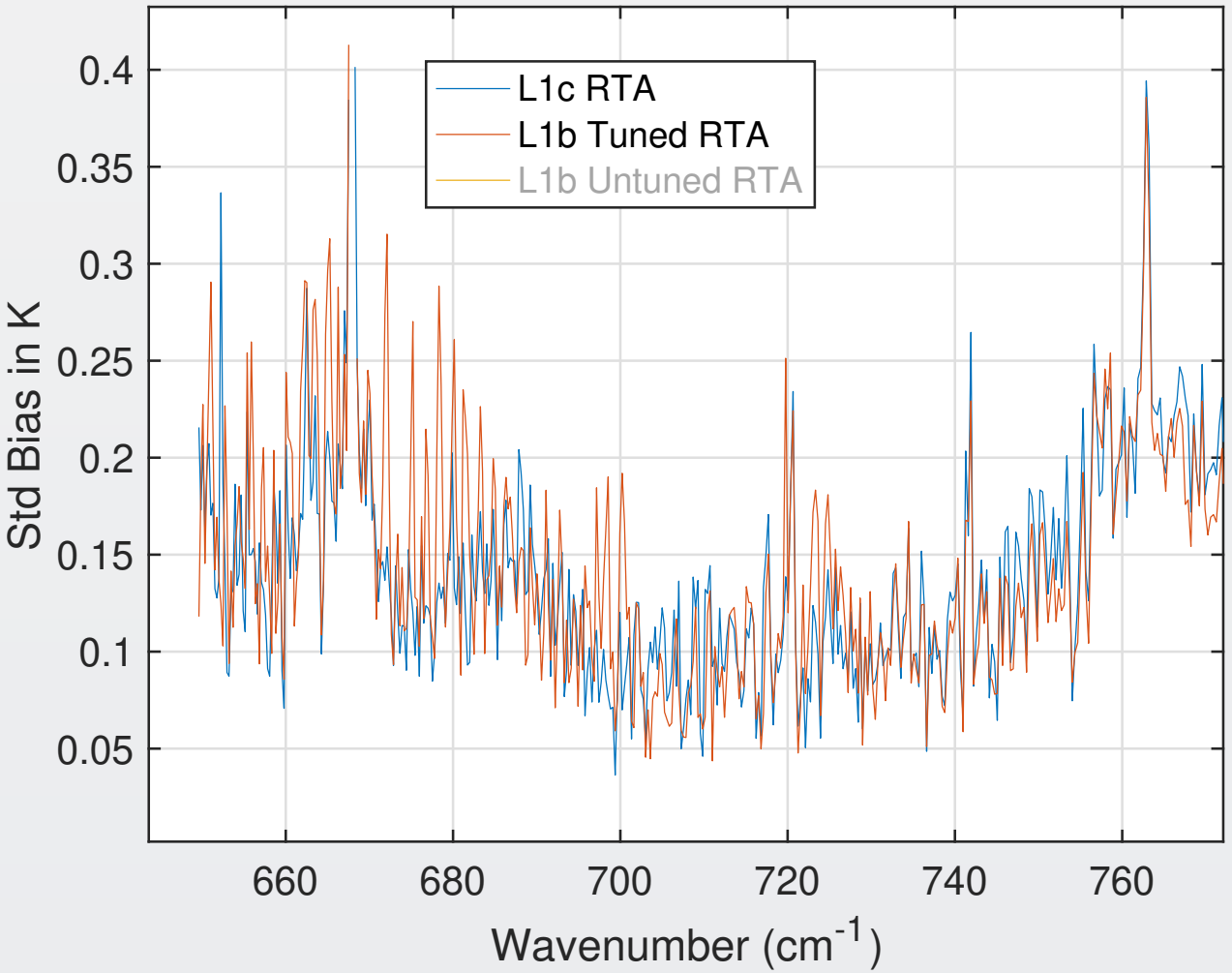
Longwave Bias Stds w/o L1btuning RTA

Tropopause region much smaller STD for L1c vs L1b (untuned)



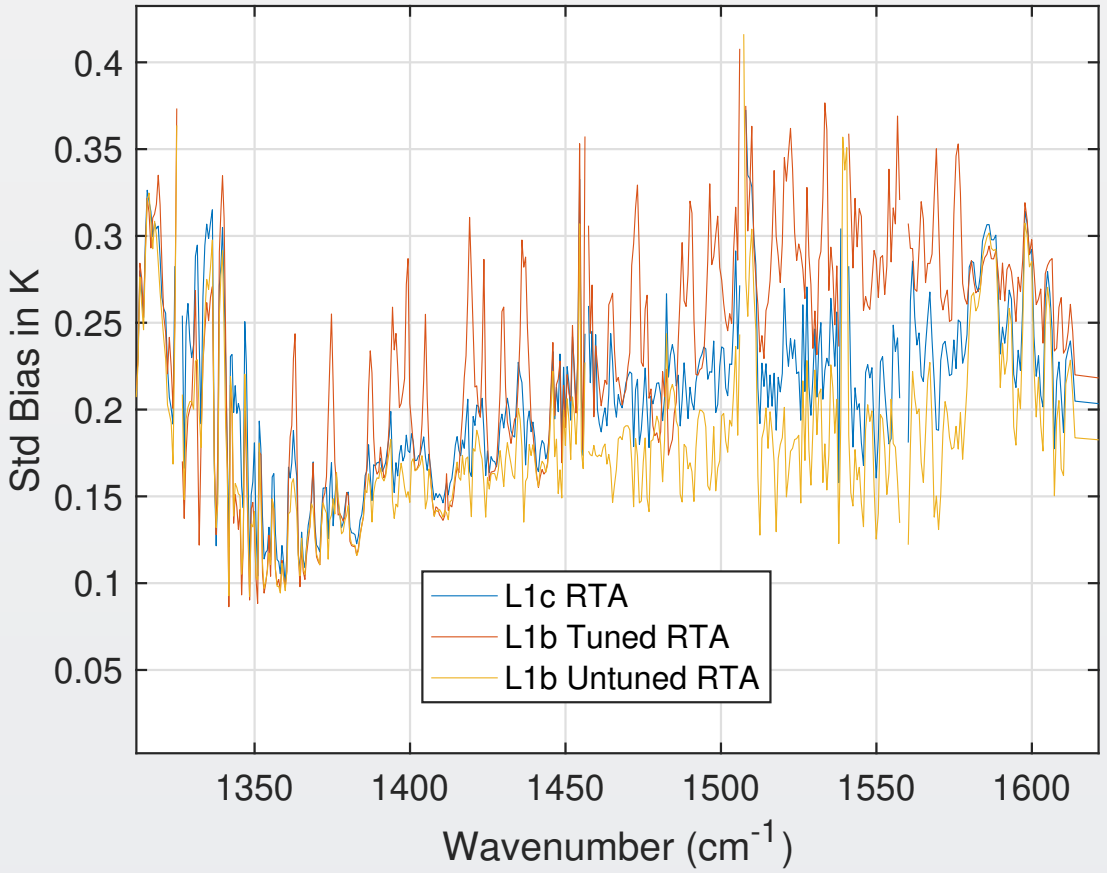
Longwave Bias Stds w/o L1b(untuned) RTA

L1b tuning mostly removes higher L1b STD, but strat channels worse



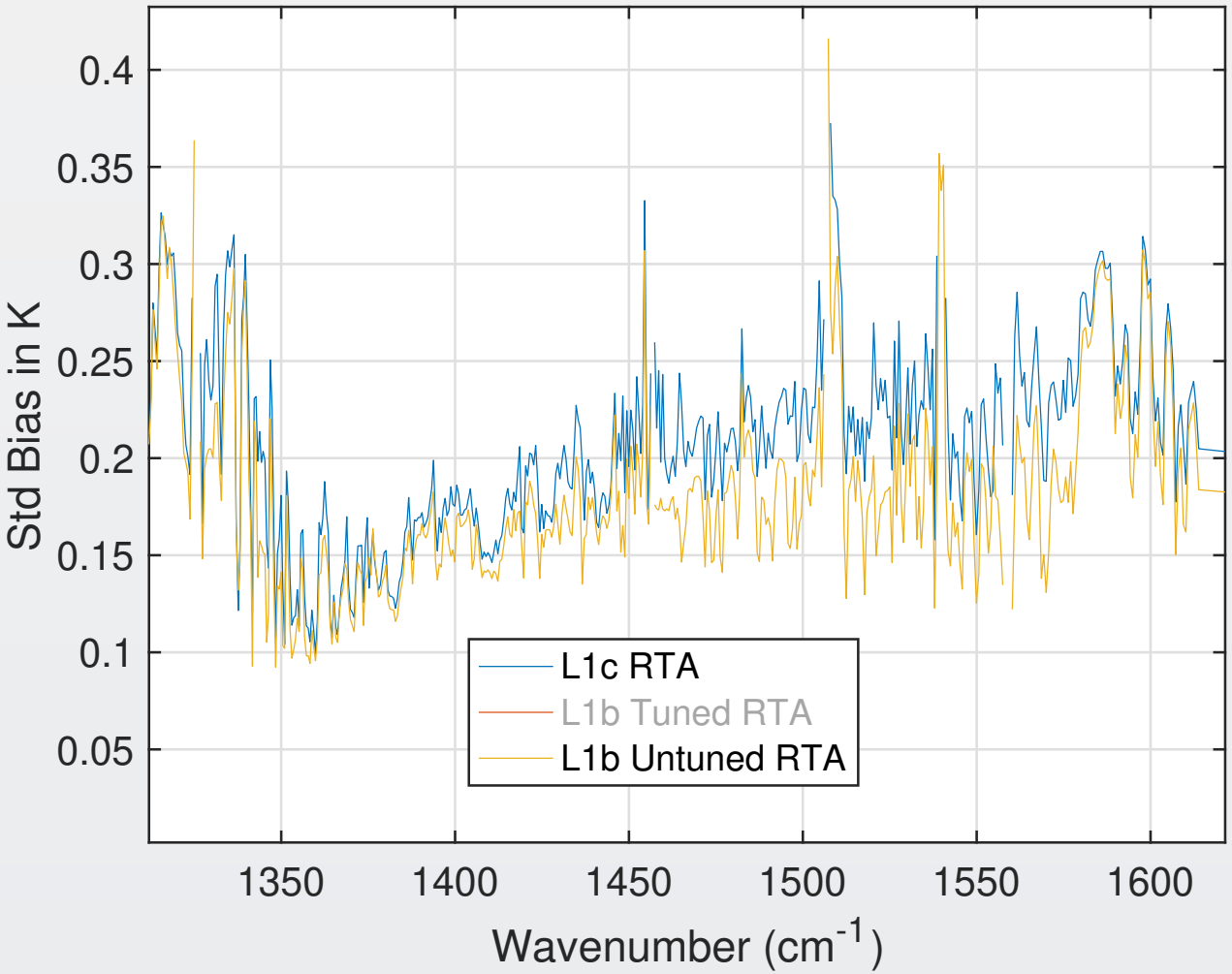
Midwave Bias Stds: All RTAs

- Very clear: L1c RTA channel-to-channel STDs very similar
- L1b tuned STDs far higher than L1c, L1b untuned even lower



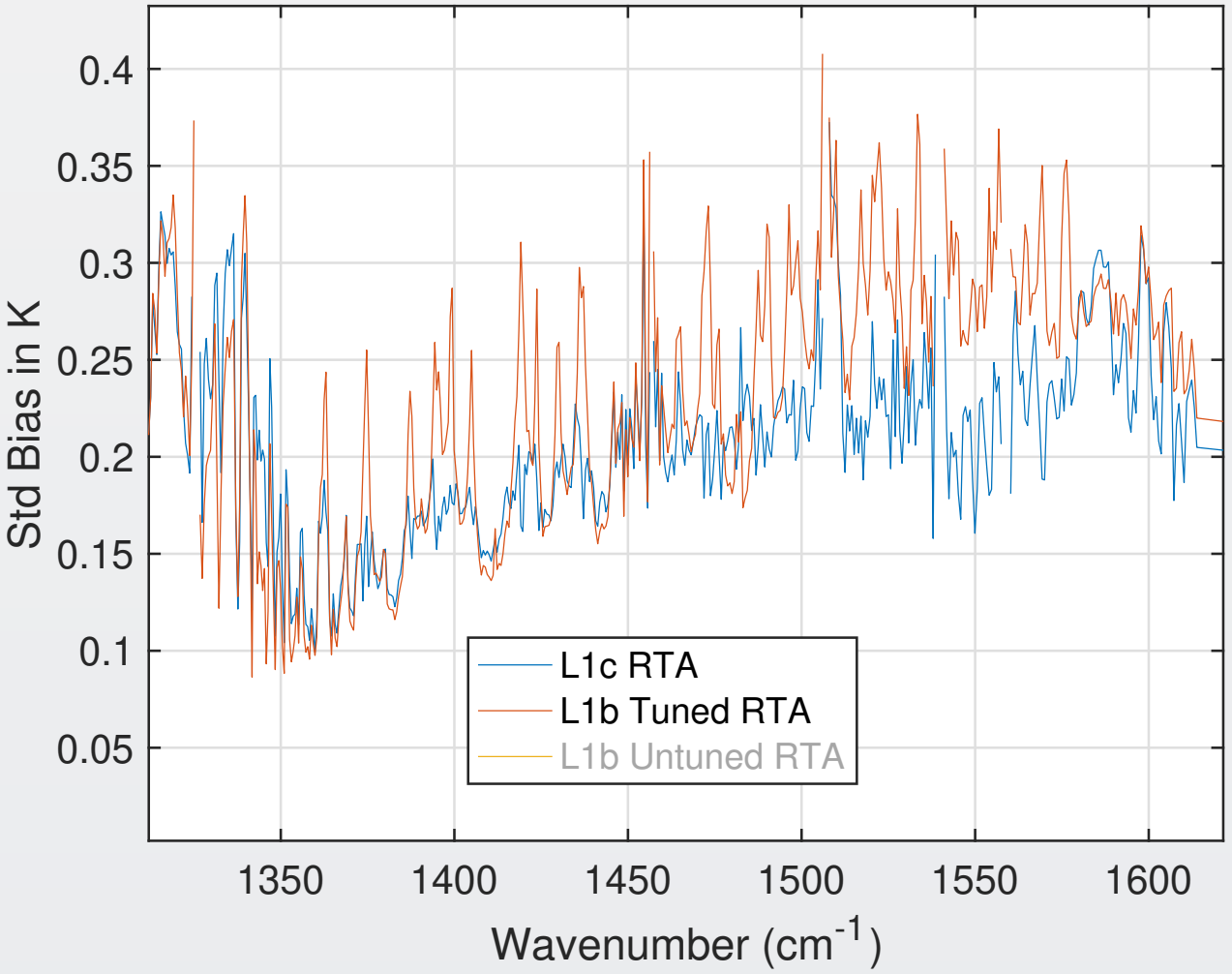
Midwave Bias Stds w/o L1btuning RTA

Direct comparison L1c RTA versus L1b untuned RTA: HITRAN worse?



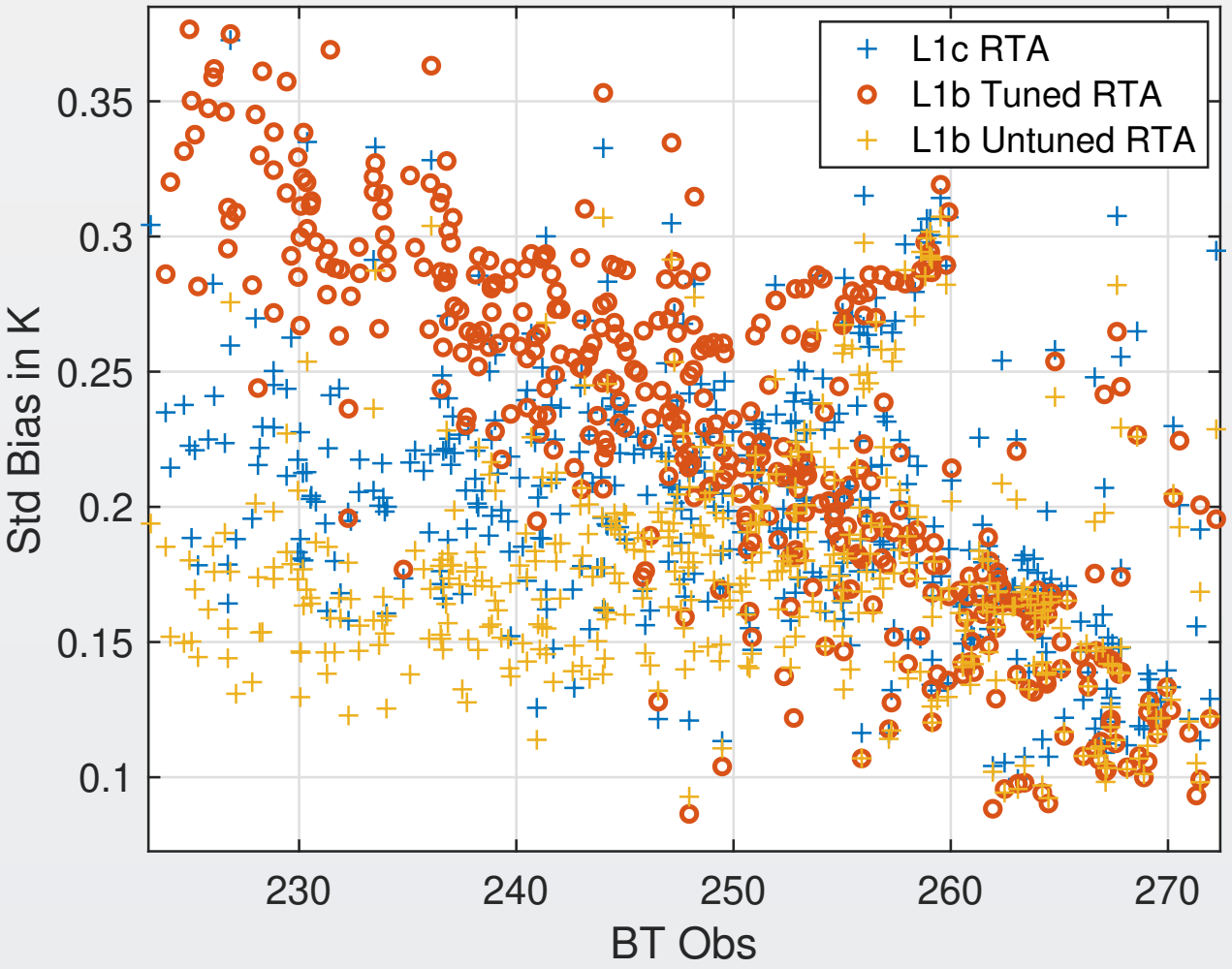
Midwave Bias Stds w/o L1b(untuned) RTA

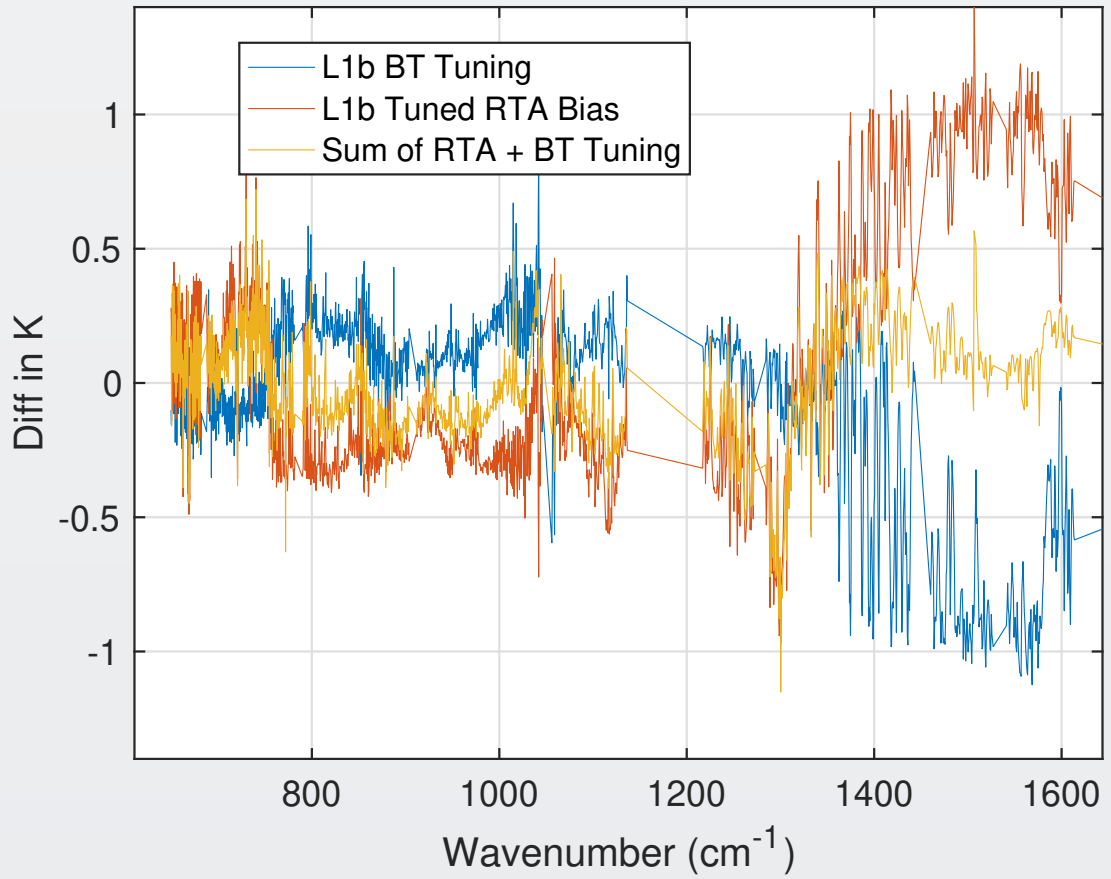
Direct comparison L1c RTA to L1b Tuned RTA: Tuning not catching scene variability?



1320-1614 cm^{-1} Bias Stds versus BTobs

Scene dependence of STD, clear increase for cold scenes for L1b Tuned RTA



Final Effect: L1btuning RTA + Level 2 BT Tuning

- V6 Level 2 retrieval uses tuned RTA BUT
- It also does BT tuning.
- Except in longwave, they cancel each other out! NOT GOOD.