

AIRS to CrIS translation

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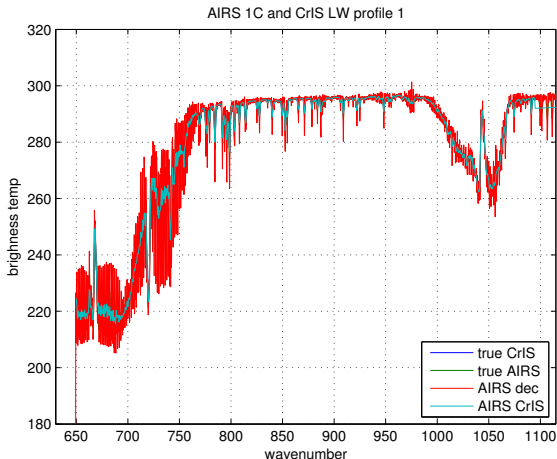
AIRS to CrIS translation

- ▶ let c be a vector of AIRS channel radiances and S a matrix whose rows are AIRS SRFs tabulated at a 0.1 cm^{-1} grid
- ▶ then $d = S^{-1}c$ is the deconvolution of c on that grid
- ▶ this can be reconvolved with a double Fourier transform to the CrIS user grid
- ▶ the useful channels are the intersection of the AIRS and CrIS bands
- ▶ the stability of S^{-1} is significantly improved with the L1c in comparison with the L1b channel set, and further improved with a spacing constraint that drops a few of the closest L1c channels

AIRS to CrIS validation

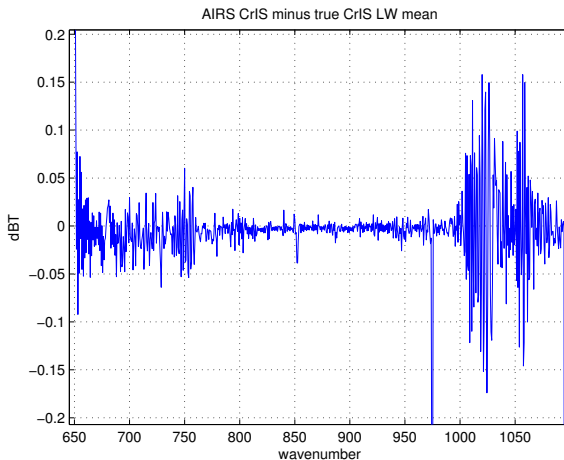
- ▶ “true CrIS” – start with kcarta radiances on a 0.0025 cm^{-1} grid and convolve to the CrIS user grid
- ▶ “true AIRS” – start with kcarta radiances as above and convolve (with our tabulated SRFs) to AIRS 1c channels
- ▶ “AIRS CrIS” – start with true AIRS, deconvolve to an intermediate 0.1 cm^{-1} grid, and reconvolve to CrIS
- ▶ compare AIRS CrIS with true CrIS
- ▶ compare alternate interpolations with true CrIS. These include simple interpolation and interpolation rather than deconvolution to the intermediate grid. Neither worked as well as deconvolution
- ▶ the following tests were done with our 49 fitting profiles

LW spectra



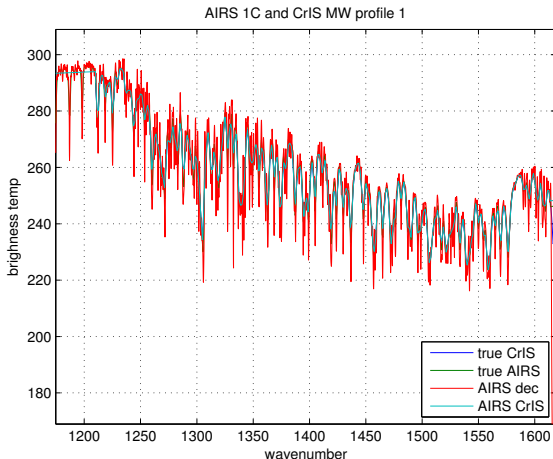
LW true CrIS, true AIRS, deconvolved AIRS, and AIRS CrIS.
The deconvolved data has significant ringing or overshoot but also some detail not apparent in the original spectra.

LW residual



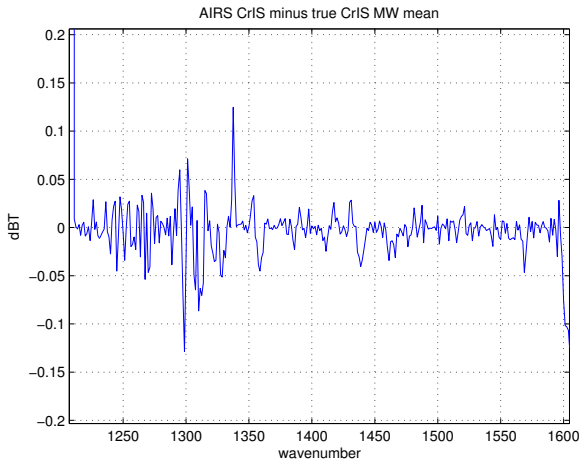
LW AIRS CrIS minus true CrIS, the mean of residuals over 49 fitting profiles.

MW spectra



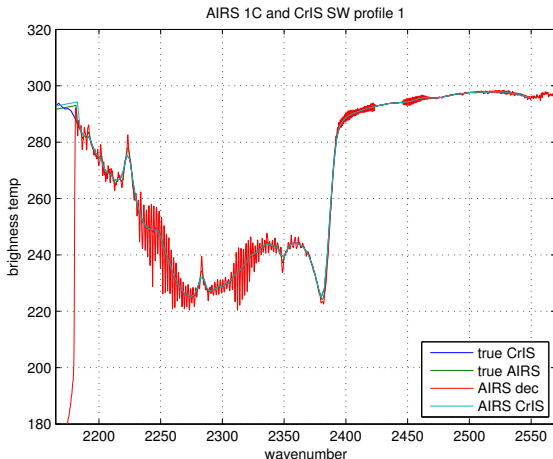
MW true CrIS, true AIRS, deconvolved AIRS, and AIRS CrIS.
The deconvolved data has significant ringing or overshoot but also some detail not apparent in the original spectra.

MW residual



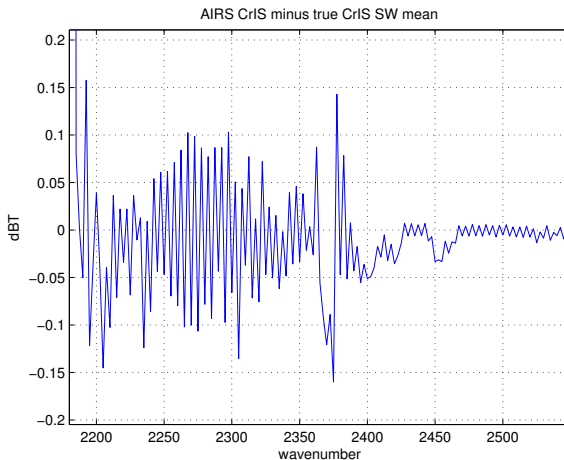
MW AIRS CrIS minus true CrIS, the mean of residuals over 49 fitting profiles.

SW spectra



SW true CrIS, true AIRS, deconvolved AIRS, and AIRS CrIS.
The deconvolved data has significant ringing or overshoot but also some detail not apparent in the original spectra.

SW residual



SW AIRS CrIS minus true CrIS, the mean of residuals over 49 fitting profiles.