

Using AIRS:CrIS SNOs to compare SDR product with and without Polarization Correction

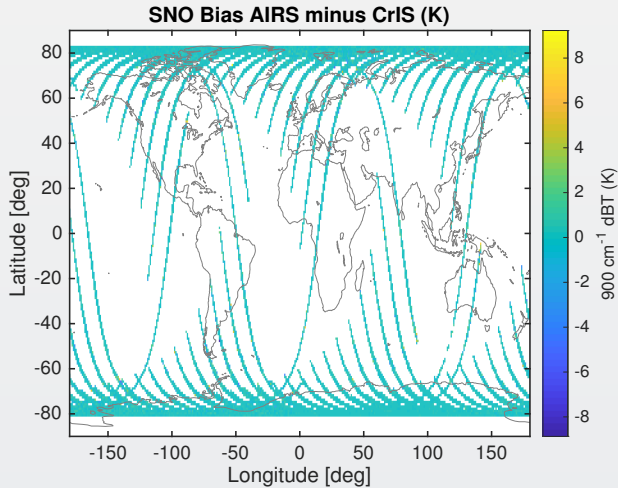
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Overview

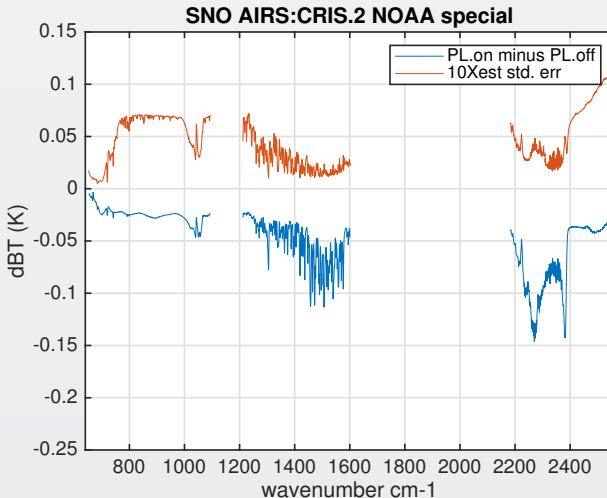
- Use closely matched observations between AIRS and J1-CrIS to determine differences due to polarization correction applied to CrIS.
- NOAA ADL SDR data are available for period December 2018 to January 2019 (2 months), with and without polarization correction applied.
- AIRS L1C data are available for the same time period.
- Simultaneous near over-pass observational pairs are obtained with separations between AIRS and CrIS FOVs of less than 10 minutes and 8 km.
- SNOs for AIRS FOVs 43:48 and CrIS FORs 15 and 16 are used.
- Approx. 242,000 SNO pairs are obtained.

Distribution Map



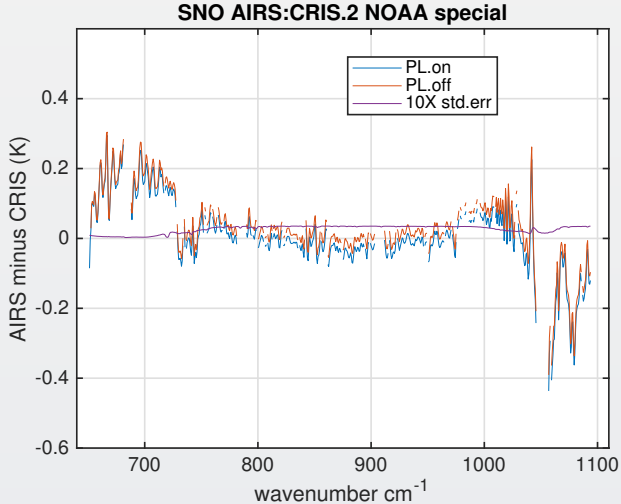
Magnitude of the polarization correction

- Using AIRS as the transfer standard, take the double difference: *(AIRS minus CrIS with correction) minus (AIRS minus CrIS without correction)*



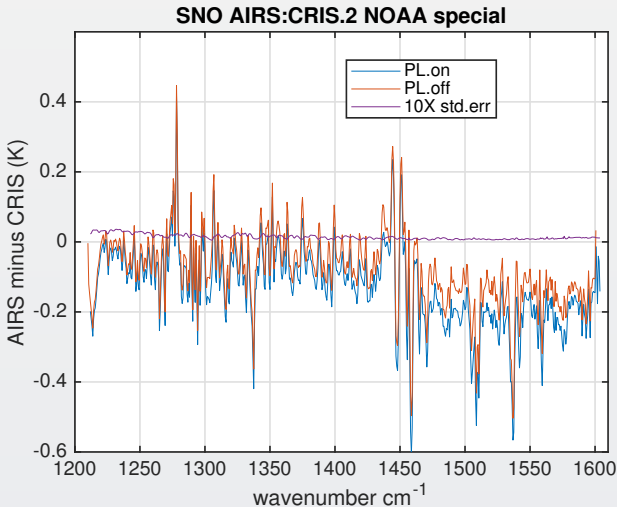
Impact of the polarization correction on the bias with AIRS

- LW band:



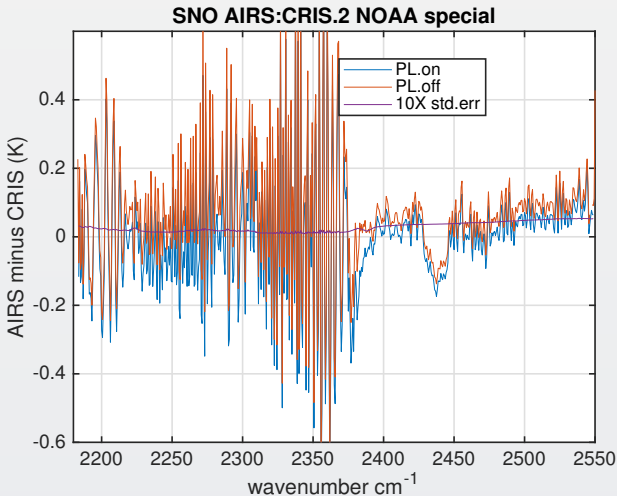
Impact of the polarization correction on the bias with AIRS

- MW band:



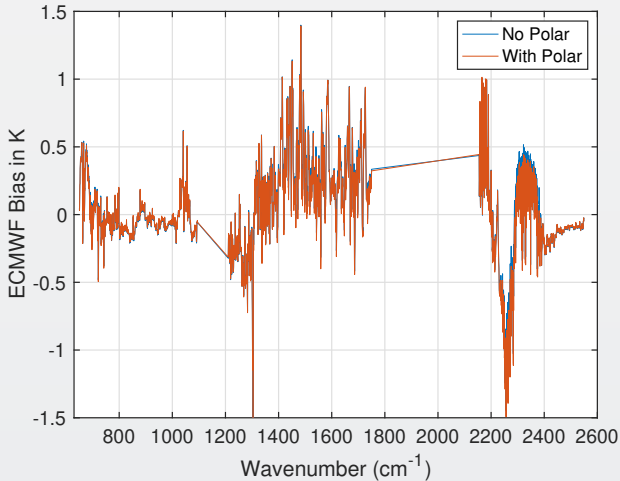
Impact of the polarization correction on the bias with AIRS

- SW band:



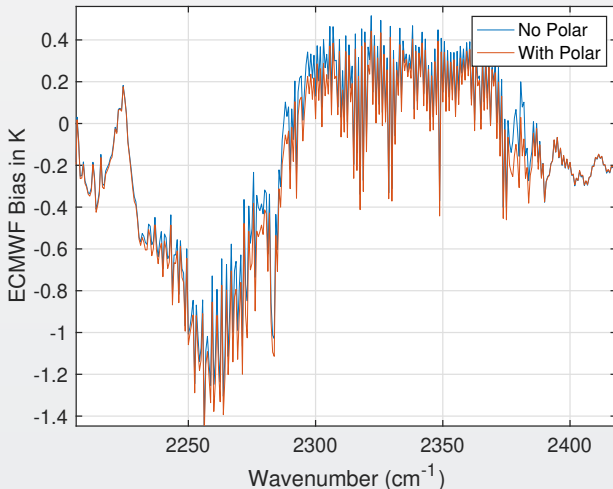
Impact of Polarization Correction on Clear Scenes

Clear Tropical Night Ocean Scene Biases vs ECWMF: 2 Days



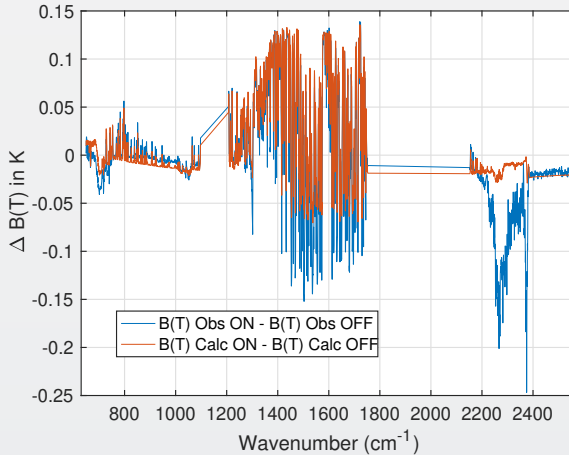
- Very small differences as expected
- Mostly visible in the shortwave

ECMWF Bias Zoom in Shortwave



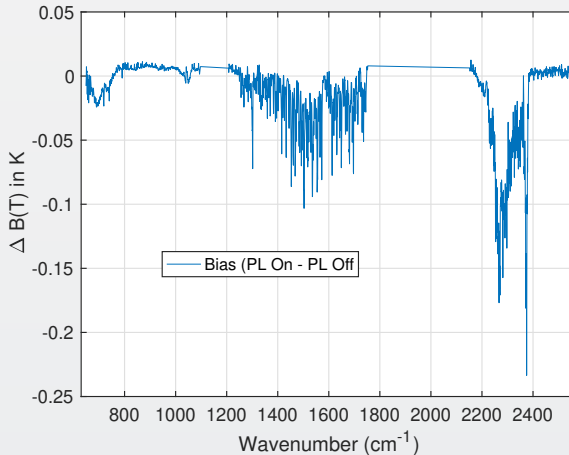
- Differences visible in shortwave, vary in sign with wavenumber
- Accuracy of EMCWF and RTA too large to conclude if polarization corrections are “correct”

A Detail: Clear Processing Includes Random Selection



- Polar On/Off processed separately for clear. Involves random subsetting to lower number of clear (increases geographical coverage).
- This means that the ECMWF “Cals” and clear scene selection for On/Off may be slightly different
- But, the above plot shows this is only a consideration for water vapor

Magnitude of Polarization Correction for Clear Scenes



- Figure shows nominal effect of polarization correction.
- Accuracy of this figure in the midwave water might be slightly compromised.

Discussion

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