Operational Calibration Approach

VSWIR

- Inomed. The VSWIR instrument background is dominated by the broadband emission from the ambient temperature spectrometer cavity ("inomised" of the gasket), and changes in this background can occur during calibration sequence due to temperature variations.

- This background is isolated by periodically closing a shutter over the objective lens, and in addition spectrometer temperatures are continuously monitored during each measurement.

- Operating the VSWIR outside is subject to significant background noise increasing noise and radiometric drift, so it was move operated inside in a controlled environment.

- For these reasons, during calibration and visibility data acquisition, spectrometer temperature were typically run by CO.04 during a given measurement, resulting in an insignificant background change.

MAPS

- For the MAPS module, the gaging spectrometer operates at 13K inside a dewar. Its background therefore is due to background emission from the extensive objective lens and is much less susceptible to ambient temperature changes.

- The MAPS was routinely operated at 11K, and was calibrated in position outside.

Independent vertical pieces of information, otherwise referred to as Degrees of Freedom for Signal (DFS) within the retrieval community...

- Below are derived equations of DFS, CO, from the ground, in the boundary layer of the TBM at 720 mb, and at the TBM at 820 mb.

- A radiometric measurement, every (DFS) times, another independent aggregate layer, consisting of a given gaseous component, is referred to its a DFS.

- As one would be expected at an tight constant (as specified for the solution variance matrix C M) in dependence the of the.

- The example for a DFS the measurements of the following measurement, see: Eq. 1.6, 7 and 8. Another measurement, the DFS, is to be expected to be calculated from the gaseous component, the calculations of the measurements of the measurements of the measurements of the measurements of the measurements of the measurements of the.
We have successfully completed our objective to demonstrate high quality CO retrieval from the TIMS measurements of atmospheric spectra.

- We have demonstrated that VSWIR CO column retrieval precision scales to better than the requirement of 10% for the minimum GEO-CAPE footprint.
- Our CO retrievals are consistent with validation data.
- We have demonstrated unprecedented two-layer CO retrieval:
  - Only recently has the MOPITT begun to achieve this capability.
- We have demonstrated high precision for retrieval of ancillary, but important, CH₄ (<1%), H₂O (<4%) and albedo (<0.3%) in the GEO-CAPE scenario.
- The GEO deployed TIMS will be able to meet all the GEO-CAPE CO measurement requirements for foot print size, areal coverage rate, and vertical resolution.
- We have presented an instrument concept for the GEO-CAPE application.
- We have shown how the instrument can be upgraded with very little extra effort to also make measurements in the ozone regions 9.45, 3.61 and 3.29 μm.
- We have shown that these measurements should provide vertical information on ozone in the troposphere that is enhanced compared to previous measurements (e.g., TES & IASI) due to the:
  1. Use of the additional solar reflective spectral regions.
  2. The GEO TIMS NEAR and rms signal to noise is enhanced relative to the TES & IASI.