

Atmospheric Transmission Meeting 2018 Presentation Abstract

Title: Using MODTRAN 6 for Inter-comparisons of NOAA-20 and S-NPP CrIS Spectra

Authors: Joe Kristl, Kori Moore, Mark Esplin, Deron Scott, Ben Esplin

All authors affiliated with Space Dynamics Laboratory, Utah State University Research Foundation

Session: Measurements, theory, and models in remote sensing for retrieval of atmospheric properties

Abstract:

NOAA is improving the satellite datasets that support weather forecasting by adding multiple high-resolution Michelson infrared interferometers to polar orbits. The Cross-Track Infrared Sounder (CrIS) collects spectra used atmospheric soundings with twice daily global coverage. CrIS creates 0.625 cm^{-1} resolution spectra in 3 spectral regions from 4 to 15 micrometers with a nadir footprint of 14 km. A demonstration CrIS is part of Suomi-NPP and has been collecting spectra on orbit since 2013. The S-NPP CrIS has been extensively validated against other satellite sensors and with dedicated simultaneous aircraft campaigns. NOAA-20 launched in November 2017 and its CrIS interferometer data is currently at the provisional status level. Direct data comparisons between the CrIS interferometers are essential to demonstrate that the new system is performing as well or better than the S-NPP CrIS. S-NPP and NOAA-20 are in the same orbital plane but 50 minutes apart, creating view angle and time differences when measuring the same geographical region. This talk demonstrates how these differences can be corrected using the radiative transfer model MODTRAN 6 initialized using atmospheric conditions from NASA atmospheric and NOAA numerical weather models. Initial results show excellent agreement between the two on-orbit data sets and comparisons of the new MODTRAN 6 line-by-line option against measured data.