



## 1. Introduction

The Suomi National Polar-orbiting Partnership (S-NPP) was launched on Oct 28, 2011. The official Cross-track Infrared and Advanced Technology Microwave Sounder Suite (CrIMSS) sounding Environmental Data Record (EDR) products include the Atmospheric Vertical Temperature Profile (AVTP) and Atmospheric Vertical Moisture Profile (AVMP). These are very useful products for both nowcasting and data assimilation. Before the products are made available for public use, extensive validations are necessary to provide needed quality flag information to users. The Cooperative Institute of Meteorological Satellite Studies (CIMSS) sounding team examines the impacts on the EDR products from 1) the cloud contamination, 2) satellite viewing angle, and 3) scene temperature.

The CrIMSS sounding EDR products are compared with ECMWF analysis. The focus day (05/15/2012) is presented using the official sounding EDR products (MX5.3) as well as the offline version (later MX6.1).

## 2. Impact of clouds on CrIMSS sounding

### EDR

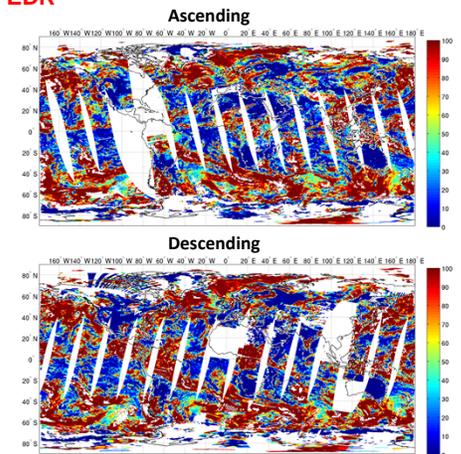


Figure 1. Example of CrIS cloud fraction from collocated VIIRS cloud mask (MX5.3)

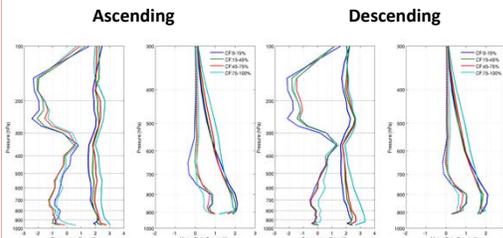


Figure 2. Cloud impacts on the CrIMSS sounding EDR (MX5.3).

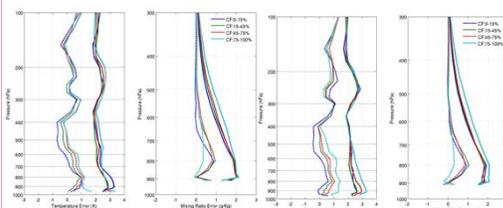


Figure 3. Cloud impacts on the CrIMSS offline sounding EDR (MX6.1).

## 3. Viewing angle impacts on CrIMSS sounding EDR

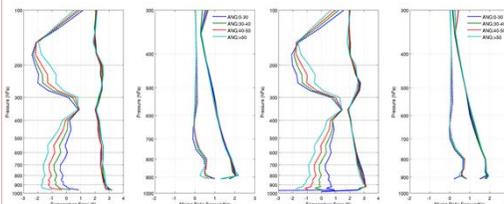


Figure 4. Viewing angle impacts on the CrIMSS sounding EDR (MX5.3).

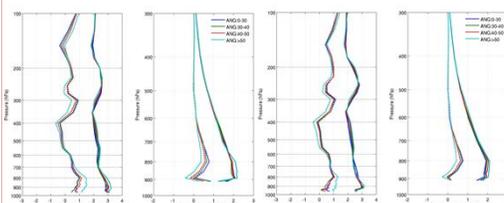


Figure 5. Viewing angle impacts on the CrIMSS offline sounding EDR (MX6.1).

## 4. Scene temperature (Tb 11 um) impacts on CrIMSS sounding EDR

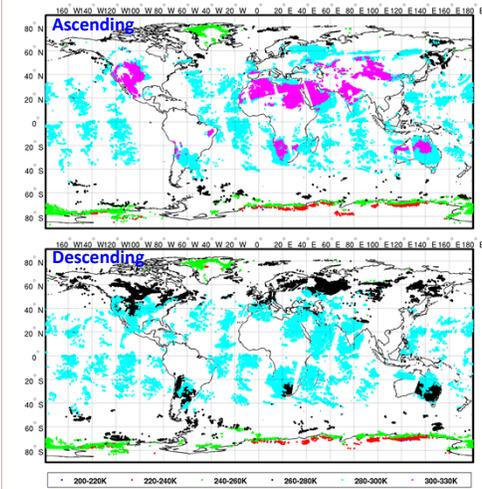


Figure 6. Scene temperature classification based on 11 um Tb

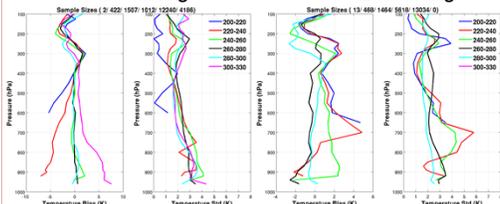


Figure 7. Scene temperature impacts on CrIMSS sounding EDR (MX5.3)

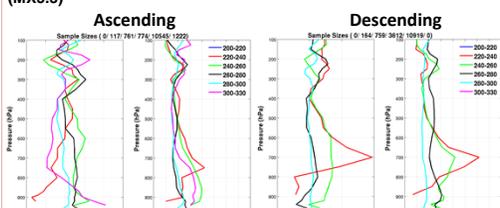


Figure 8. Scene temperature impacts on CrIMSS offline sounding EDR (M 6.1)

## 5. Calculated CrIS Tb VS observations

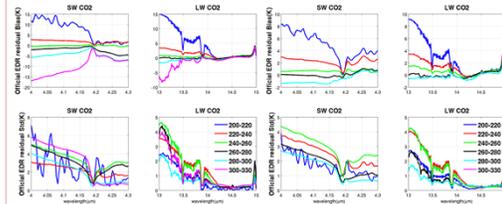


Figure 9. The statistics of CrIS Tb difference (MX5.3).

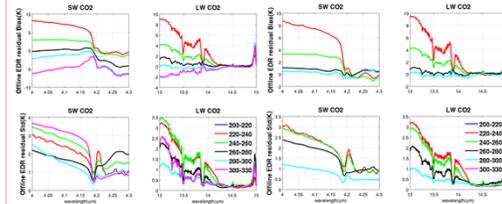


Figure 10. Same as Fig. 9 except for offline.

## 6. Radiative transfer model comparisons

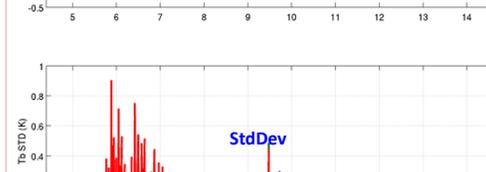
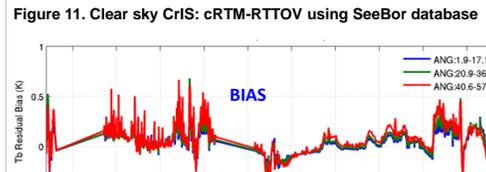
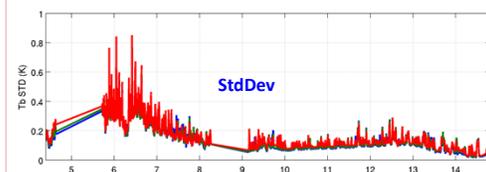
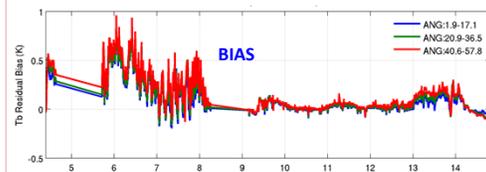


Figure 12. Same as figure 11 except for cRTM - SARTA

## 7. Summary

- Weak cloud impacts in both MX5.3 and the offline version (has been implemented as MX6.1);
- Angle dependency in MX5.3, but not in offline version;
- Scene temperature dependency in both MX5.3 and offline version;
- Calculated CrIS Tb shows substantial differences from the observations;
- Substantial differences among different RT models; could potentially affecting the retrieval.

## 8. Acknowledgement

This work is partly supported by the NOAA JPSS program. The views, opinions, and findings contained in this report are those of the authors and should not be construed as an official National Oceanic and Atmospheric Administration or U.S. government position, policy, or decision.