Implementing Radiance Assimilation in NAVDAS-AR: Lessons Learned

Nancy L. Baker, Ben Ruston, Tom Rosmond (SAIC)
Naval Research Laboratory, Monterey, CA

**Comparisons between RT Models**

**RTOV-6 vs. RTOV-8.7 vs. CRTM v1812**

**Issue**
- Operational RT model RTOV-6 is no longer supported
- Cannot add assimilation of new sensors (AIRS, IASI, METOP-A AMSU) without upgrading RT models
- Previous tests with JCSDA CRTM gave worse NWP forecast skill, even with an additional AMSU-A sensor
- Ongoing testing with RTOV-8.7 and CRTM v1812
- Added stricter QC, new RT models have smaller forward model errors

**Results**
- RMS statistics for assimilated channels very similar for the two RT models.
  - Ob counts are similar, except for the higher-peaking channels.
  - The RTOV-8.7 setup uses NESDIS ATOVS retrievals to provide the background above the model top (4 HPA).
  - For CRTM, the input profile is limited to 4 HPA and below.

**Figures**
- Differences between temperature and humidity background profiles for 30 pressure-level (prep; green and red) and 30 sigma level (AR; magenta and yellow) backgrounds for the RT model. AMSU-A locations is in the tropical western Pacific.
- Bias-corrected innovations for the two RT models.

**Acknowledgements:**
This work was funded by the Office Of Naval Research and the Space and Naval Warfare Systems Command PMW-120.