Suomi-NPP Science Team
Grant number: NNX14AP65A
Title: Improvement of Cloud Top Properties Using a Combination of CrIS and VIIRS
PI: Bryan A. Baum
Co-I: W. Paul Menzel (SSEC/UW-Madison); Co-I: Irina Gladkova (City College of New York)

Quarterly report for 8/18/2014-11/18/2014
Submitted on November 12, 2014

Dr. Baum is working with his team (Co-Investigators W. Paul Menzel and Irina Gladkova) to develop and analyze the decadal cloud records to advance understanding of our science questions. Dr. Irina Gladkova (City College of New York) and her current graduate student, George Bonev, are improving the software for the derivation of the VIIRS+CrIS 13.3-μm pseudo-channel. We note that previous grad student James Cross has moved on since the original proposal was submitted and that George Bonev is now working towards his Ph.D. on this topic. The tasks and key milestones stated in the proposal are as follows.

Year 1 science objectives:

1. Apply the python package to derive the 13.3-μm pseudo-channel from global MODIS+AIRS/VIIRS+CrIS data and evaluate results.
2. Apply cloud-top property software to the global VIIRS+pseudo-channel data stream for a golden month of data that we can process multiple times.
3. Filter and grid the VIIRS+pseudo-channel products, using our Space-Time Gridding (STG) software, to facilitate comparison to other cloud property data sets
4. Apply gridding software to build daily cloud properties consistently for MODIS Collection 6 and AIRS Collection 6 using the exact same filtering and gridding criteria as for VIIRS.
5. Evaluate VIIRS+pseudo-channel cloud products at each stage, including comparison to heritage MODIS and AIRS cloud products
6. Draft ATBD for the VIIRS+CrIS cloud top pressure/height, cloud emissivity, and IR thermodynamic phase products and send out for peer review. (Baum, Menzel)
7. Document the findings in Year 1 via relevant conference presentations and peer-reviewed publications.

Progress in 1st quarter:

At this point, my team's focus is on getting up to speed with regards to working with the SIPS. The SIPS is, at this time, transitioning from being a PEATE to becoming more of a processing and support center for the PIs on the Atmosphere Team. Given that we are in the process of learning to work with the SIPS, our team is pleased to report that it has completed the first science objective above. Specifically, we built software on the SIPS development system and applied it to a day of MODIS+AIRS data to build the 13.3-μm pseudochannel. An executable was subsequently delivered to the SIPS where it was successfully applied to a full year of MODIS+AIRS data. In brief, our team successfully navigated the new way of doing business and in return was supplied a full year of MODIS data with our own 13.3-μm pseudochannel. These data are being evaluated, and the process will be repeated as issues are found and

addressed. Now that our team has achieved its first goal, we will proceed to the other objectives in short order. The cloud top property software (cloud top height and IR thermodynamic phase) and gridding software packages are both ready for use and will be applied in the 2nd quarter of this grant (i.e., over the next 3 months).

Our focus over the short term (perhaps 6 months) will be on testing our software with MODIS+AIRS data. We are going to delay applying our software to VIIRS+CrIS until the NASA VIIRS and CrIS Level 1B teams can provide actual Level 1B data from the beginning of the S-NPP mission, or at least one full year of it. The process for the Level 1B development is underway. As soon as VIIRS and CrIS Level 1B data are available, we will transition from working with MODIS+AIRS to VIIRS+CrIS.

Issues of interest as Atmosphere Discipline Lead

1. Contacted each of the Atmosphere PIs to gauge where each team is at in working towards its goals at this point in time.
2. Worked with the Atmosphere team to determine interest in having the VIIRS granules being sync'd with CrIS granules to simplify merging the two data sets. A summary of this discussion was sent to all Discipline Leads, Atmosphere PIs, and the project scientists.
3. Worked with new investigators (Bo-Cai Gao and Eva Borbas) as they ramp up with their projects. At the time of this writing, all Atmosphere Team PIs have accounts on the SIPS development system. Bo-Cai Gao also requested and received the MODIS software used for his Terra/Aqua cirrus reflectance product.
4. Determined that our team needed a basic web presence so I initiated development of a set of web pages that can be used to provide background for the Atmosphere Team as we begin to work towards our objectives. The team is now providing some useful guidance so the pages at http://www.ssec.wisc.edu/suomi_npp/Atmosphere_Team/ will be undergoing some changes as my time permits.
5. Initiated discussions with Chris Barnet (Sounder Discipline Lead) so that we are more coordinated on issues of mutual interest, like the VIIRS-CrIS IR cal/val effort. Both teams are going to make use of both VIIRS and CrIS, so we need to have some coordination here.