POSTER ABSTRACTS
CSPP/IMAPP USERS' GROUP MEETING
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Bearson, Nick: "*CSPP Geo GRB*"

(Authors: Nick Bearson, Tommy Jasmin, Scott Mindock, Jessica Braun, and Graeme Martin)

GOES Rebroadcast (GRB) provides the primary relay for full resolution, calibrated, near real-time direct broadcast of imager, lightning mapper, space environment, and solar data captured aboard GOES-16. To support the direct broadcast community's use of GRB, the CSPP Geo team has developed and distributed CSPP Geo GRB: a free and open-source software package that can create easy-to-use NetCDF-4 and FITS files from the GRB stream. We report on the capabilities of CSPP Geo GRB, the opportunities and challenges presented by this new data source, and provide information for users interested in receiving and processing this direct broadcast data stream.

Bloch, Callyn: "*Near-real time CAPE East of the Rockies Combining Hyperspectral IR Satellite Sounding and ASOS Surface Stations: Methodology and Preliminary Results*"

(Authors: Callyn Bloch, Robert Knuteson, Jessica Gartzke, Grace Pryzbyl, and Steve Ackerman)

Near-real time satellite data can give forecasters the extra edge they need to issue timely and accurate watches and warnings. The Convective Available Potential Energy (CAPE) is a measure of atmospheric instability computed from vertical profiles of temperature and water vapor used the National Weather Service Storm Prediction Center (NWS SPC). Measuring CAPE is important in determining whether or not severe storms will occur. The value of using satellite vertical soundings from hyperspectral infrared sensors has been recognized at the NOAA Hazardous Weather Testbed workshops held at the NWS SPC (http://hwt.nssl.noaa.gov/) Satellite overpass times from EUMETSAT METOP IASI at 10:30am/pm and NASA AQUA AIRS, Suomi-NPP CrIS, and JPSS J1 at about 1:30am/pm occur conveniently between the operational 0 and 12 UTC NWS radiosondes. In addition to more temporal coverage, satellite date can provide spatial coverage between NWS radiosonde launch sites. The right hand figure above illustrates the spatial coverage from the NASA AIRS satellite which is comparable to the coverage provided from the ECMWF model shown on the left. The May 20, 2013 tornado touchdown occurred in Moore, Oklahoma indicated by the white circle. The white star indicates the Department of Energy Atmospheric Radiation Measurement (ARM) site location where radiosondes are launched each day at 0600 and 1800 UTC. The ARM site is used in the study for assessment of satellite derived CAPE.

Automated Surface Observing System (ASOS) stations currently operate routinely at U.S. airports and provide surface meteorological measurements at 1 minute intervals reported in METAR format. In this study, we restrict our analysis to ASOS surface stations east of the Rocky Mountains where severe storms are common in spring and summer. The methodology section describes a 2-dimensional interpolation technique to create gridded surface values from the non-uniformly spaced ASOS stations. The gridded ASOS surface observation and IR sounder profiles will be merged before computing surface CAPE values. Using the resources of the SSEC we are able to demonstrate a near-real time estimate of the CAPE in the U.S. east of the Rocky

Mountains using the direct broadcast reception facility at UW-Madison and access to NASA real-time data streams. A preliminary demonstration of near-real time CAPE using JPSS satellite data is intended to be made available via a restricted web page at SSEC. More information is available upon request.

Botambekov, Denis: "*The CSPP CLAVR-x Users' Experience*"

(Authors: Denis Botambekov, Andrew Heidinger, Andi Walther, Yue Li, and Nick Bearson)

The first version of the CSPP CLAVR-x (The Clouds from AVHRR Extended) was released in 2013. The CLAVR-x processing system with CSPP wrapper provide users official NOAA Enterprise cloud algorithms, some surface and other products for AVHRR, MODIS, VIIRS, and many Geostationary Imagers. Since then, many users all over the world appreciated usefulness of the CSPP CLAVR-x. Both CSPP and CLAVR-x teams work closely with all users and answer their questions and requests in a timely manner. Our product developers have met with users at the 6th Asia/Oceania Meteorological Satellite Users' Conference in Tokyo in 2015, and have made a trip to Russian Federation to meet with CSPP CLAVR-x users in 2016. In this poster we will focus on the user's experience with CSPP CLAVR-x and their needs.

Braun, Jessica: "*Aqua and Terra Direct Broadcast Processing at CIMSS/SSEC*"

(Authors: Jessica Braun, Liam Gumley, Kathy Strabala, and Bruce Flynn)

The Direct Broadcast (DB) group at CIMSS/SSEC has been processing MODIS, AIRS, and AMSU data from Aqua and Terra direct broadcast data for over 10 years. A new merged ingest system has recently been implemented, which uses an overpass prediction method to merge collocated Level 0 PDS files ingested from multiple DB sites across the United States. The resulting PDS files have more extensive coverage and higher quality of data, as the majority of dropouts and bad packets are removed. The merged passes are processed into Level 1 and Level 2 products and distributed to operational sites including the National Weather Service (NWS) and NOAA CoastWatch. With the success of the MODIS, AIRS, and AMSU merged pass processing method, development is in progress to extend this merged method to other DB data including Suomi-NPP.

Davies, James: "*IMAPP Direct Broadcast BRDF from MODIS to produce high-quality proxy Advanced Baseline Imager (ABI) VIS/NIR radiances in real time for supporting pre-launch testing of the GOES-R ground system.*"

(Authors: James E. Davies, Kathy Strabala, Tom Greenwald, R. Bradley Pierce, Allen Lenzen, and Hung-Lung Huang)

Key components of pre-launch testing for the GOES-R ground system, and the validation of Advanced Baseline Imager (ABI) product algorithms, are timely realistic ABI synthetic radiance data. For synthesizing ABI solar band (1–6) radiances we use land surface reflectivity based on 16-day running-average MODIS bidirectional reflectance distribution function/albedo products made in real time at SSEC. These are generated using direct-broadcast data and IMAPP Direct Broadcast L2G Lite Surface Reflectance and BRDF/Albedo software (DBBRDF). This poster documents the production flow for generating real time synthetic ABI level 1b radiances and level 2 products with specific emphasis on the preparation of surface datasets for simulating ABI solar bands.

Diop, Bouya: "*Moisture and temperature profile from AMSUA using the neural network*"

(Authors: Bouya Diop, Sarr Djiby, and Abdoulaye Sy)

Numerical Weather Prediction of West Africa is not precise caused by the lack of meteorological data in this region. Radiosoundings network is not dense, furthermore satellite microwave sounders give us the opportunity to retrieve temperature and moisture profiles of large space.

A neural network is used to retrieve temperature and moisture profile from AMSU-A and AMSU-B brightness temperatures. By considering the emissitivity parametrization of the region and use as first guess data radiosoundings and radiances calculate with MPM-Liebe and MODTRAN models.

The results are compared with ECMWF reanalysis, NCEP/NCAR reanalysis and soundings.

Keywords : Temperature and moisture retrieving, Neural Network, MODTRAN, MPM-Liebe, West Africa

Heidinger, Andrew: "*Impact of VIIRS DNB on CSPP CLAVR-x Cloud Products and Applications*"

(Authors: Andrew Heidinger and Andi Walther)

Since 2015, the CSPP-LEO/CLAVR-x package has provided users access to lunar reflectance from the VIIRS DNB and cloud products derived with them. This poster will review the impact to the CLAVR-x Cloud Products when the VIIRS DNB is included in the calculations. Sample products using the VIIRS DNB data with CLAVR-x will be demonstrated.

Heinemann, Thomas: "*A simplified high and near-constant contrast approach for the display of VIIRS day/night band imagery*"

(Authors: Stephan Zinke and Thomas Heinemann)

The European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT) has developed a simplified high and near-constant contrast (HNCC) approach for the display of Day and Night Band (DNB) data of Suomi National Polar-orbiting Partnership (S-NPP) satellite's instrument Visible Infrared Imager Radiometer Suite (VIIRS). Simple applications like service monitoring or operational weather forecasting (nowcasting) can thus take direct advantage of the VIIRS DNB Level 1 data without the need for using Level 2 processing, Level 2 data or using ancillary data like look-up tables. This method is based on a fixed 'correction curve' and simple formulas, and can thus be applied sequentially to single granules as e.g. received through direct broadcast dissemination systems. Especially the European Nordic Countries need to rely on good contrast imagery for operational weather forecasting during the extended twilight periods from autumn to spring.

Hoese, David: "*Polar2Grid: Reprojecting Satellite Data Made Easy*"

(Authors: David Hoese and Kathy Strabala)

Polar-orbiting multi-band meteorological sensors such as those on the Aqua, Terra, and Suomi NPP satellites pose substantial challenges for taking imagery the last mile to forecast offices, scientific analysis environments, and the general public. To do this quickly and easily, the Cooperative Institute for Meteorological Satellite Studies (CIMSS) at the University of Wisconsin has created an open-source, modular application system, Polar2Grid. This bundled solution automates tools for converting various satellite products like those from MODIS and VIIRS into a

variety of output formats, including GeoTIFFs, AWIPS compatible NetCDF files, and NinJo forecasting workstation compatible TIFF images. In addition to traditional visible and infrared imagery, Polar2Grid includes three perceptual enhancements for the VIIRS Day-Night Band (DNB), as well as providing the capability to create sharpened true color, sharpened false color, and user-defined RGB images. Polar2Grid performs conversions and projections in seconds on large swaths of data. Polar2Grid is currently providing VIIRS imagery over the Continental United States, as well as Alaska and Hawaii, from various Direct-Broadcast antennas to operational forecasters at the NOAA National Weather Service (NWS) offices in their AWIPS terminals, within minutes of an overpass of the Suomi NPP satellite. Collaboration with the open source PyTroll group will provide the community with the functionality of Polar2Grid in a unified set of easy to use python packages. Four years after Polar2Grid development started, the Polar2Grid team has released version 2.0 of the software; supporting more sensors, generating more products, and providing all of its features in an easy to use command line interface.

Mindock, Scott: "*SDI GRB Appliance*"

(Authors: Scott Mindock, Jonathan Beavers, Rick Kohrs, and Rose Spangler)

The SDI Team at the University of Wisconsin Madison has developed the SDI GRB Appliance. The SDI appliance is a complete solution for processing the GOES-R GRB data stream into mission-compliant netCDF files available via your network. The SDI appliance combines CSPP GEO software with RabbitMQ, SFTP, NFS and ADDE technologies to provide a hands-off network appliance solution for acquiring and serving GOES-R data. This poster provide technical details to the structure and deployment of the SDI GRB Appliance.

Mindock, Scott: "*CSPP SDR 3.0 - Same old quality, Extra features*"

(Authors: Scott Mindock, Graeme Martin, Kathy Strabala, Ray Garcia, Liam Gumley, Geoff Cureton, and others)

The CSPP SDR software is an established component in the Direct Broadcast Community. The package has proven to be very reliable and is used internally and abroad. The CSPP SDR software will be updated to support JPSS 01, which is scheduled to launch in fall. The software will continue to support SNPP, providing SDR generation for ATMS, CrIS and VIIRS. In addition the CSPP SDR software will now support full spectrum CrIS. The CSPP SDR software will continue to be based on the NOAA operational software base. Come by the poster to share your experiences with the software and learn as much as you want about it internals.

Przybyl, Grace: "*An Extension of the Python SHARPpy GUI to Display Combined Satellite Soundings and ASOS Surface Data in Near-Real Time*"

(Authors: Grace Przybyl, Callyn Bloch, Jessica Gartzke, Matthew Westphall, and Robert Knuteson)

SHARPpy is a program created by Greg Bloomberg and Kelton Halbert that displays data in a sounding format created by NWS storm prediction center (SPC). Currently SHARPpy supports operational radiosonde upper air soundings of temperature and water vapor as well as selected NWP model fields. The soundings show temperature and moisture vertical profiles as well as give a calculated value of Convective Available Potential Energy (CAPE). The NASA Atmospheric InfraRed Sounder (AIRS) sensor operates on a polar orbiting satellite with sun-synchronous overpass at 1:30a.m. and 1:30p.m.. Retrievals of temperature and moisture from the AIRS data

are produced in near-real time. The Automated Surface Observing System (ASOS) is used to measure surface temperature and dewpoint at airports across the U.S.. The SHARPpy GUI (Graphical User Interface) plots points on a map using the latitudes and longitudes present in the locations file. Clicking on an ASOS surface station location will bring up the sounding for the closest AIRS sounding profile with the surface temperature and dewpoint from the ASOS observation data. The extension includes a satellite decoder module which allows for remote access to the sounding locations as well as the profile data. This would allow for users to have access to data in near-real time from satellite overpasses. The use of near-real time satellite and surface observations may help assist meteorologists in the nowcasting of severe weather. This will allow for faster, more accurate predictions that could help with issued watches and warnings.

Straka III, William: "*The STAR Algorithm Processing Framework with Applications for CSPP GEO Direct Broadcast GOES-16 L2 Products*"

(Authors: William Straka, Claire McCaskill, Shanna Sampson, Walter Wolf, Aiwu Li, Graeme Martin, Alan De Smet, and Ray Garcia)

The STAR Algorithm Processing Framework (SAPF) was originally developed by the Algorithm Scientific Software Integration and System Transition Team (ASSISTT) at NOAA/NESDIS/STAR as a testbed for algorithm product development and validation. Currently, the SAPF is used as tool to help transition research algorithms to operations, ensuring they are meeting mission requirements.

The SAPF is designed to be a `plug and play` system, allowing users flexibility in choosing ingested and produced data. The large volumes of ingested data needed for algorithm processing as well as data produced while running the SAPF are stored in memory to reduce processing time and decrease I/O. The ingested data includes radiance data and semi-static and dynamic ancillary, such as NWP GFS and Reynolds global SST. The memory storage also allows for easy implementation of algorithm precedence, where one algorithm needs to be run before another. The controlled common environment for running the algorithms within SAPF produce results with consistency and scientific accuracy.

ASSISTT is working with the Community Satellite Processing Package for Geostationary Data (CSPP GEO) team to adapt the SAPF for distribution to direct broadcast users, to be used with GOES-16 data. The SAPF for CSPP GEO will ingest GOES-16 L1b data to produce GOES-16 Advanced Baseline Imager (ABI) L2 products, which closely mimic the ABI L2 products from the ground system (GS). The first distributed version of the SAPF will be capable of producing nine ABI baseline L2 products: Aerosol Detection, Aerosol Optical Depth, Cloud Mask, Cloud Height, Cloud Phase, Cloud Optical Depth and Particle Size Detection, Imagery, and Land Surface Temperature. Later SAPF releases will expand the number of ABI baseline L2 products available as output.

The design details of the hardware and software of the SAPF, ABI algorithm processing, and basic comparisons between SAPF L2 products and GS products shall be discussed.