Abstract

Polar-orbiting multi-band meteorological sensors such as VIIRS and MODIS 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 VIIRS and MODIS products into a variety of output formats, including GeoTIFF and AWIPS, as well as NinJo forecasting workstation formats. Polar2Grid includes perceptual enhancements for products such as the VIIRS Day-Night Band (DNB), and 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 forecasters at the NOAA National Weather Service (NWS) offices in their AWIPS terminals, within minutes of an overpass of the Suomi NPP satellite. This data has proven useful in the issuance of forecasts by the NWS.

Polar2Grid Software Processing Chain

Polar2Grid is partitioned into three major segments: a FrontEnd which abstracts away the specifics of a given instrument and provides well-conditioned swaths and geolocation; a reusable transformation core using a variety of algorithms and implementations to convert swaths to grids; and a BackEnd which converts the gridded data to display ranges and exports in destination-system file formats.

FrontEnd Modules
- VIIRS SDR Front End
- MODIS Front End
- VIIRS CREFL Front End
- CrIS SDR Front End
- CSPP CHR EDR Front End
- AWIPS NetCDF Back End
- NinJo TIFF Back End
- GeoTIFF Back End

BackEnd Modules
- VIIRS M, I, DNB with enhancements
- Funded by NASA, BTemp / Reflectances
- Corrected Reflectance product for true-color
- Brightness Temperature Slices
- Surface parameters, T / WV layers
- NetCDF files, ready for AWIPS injection
- GeoTIFF images

Examples

VIIRS multi-band over TX in AWIPS

NinJo, courtesy Katja Hungershöffer @ DWD

VIIRS Day-Night Band in WMS.ssec.wisc.edu, courtesy S. Batzli & R. Dengel

Fork Polar2Grid @ GitHub!

https://github.com/davidh-ssec/polar2grid

Polar2Grid is built in the Python scripting language, using open-source software including MS2GT, GDAL, libtiff, PROJ.4, numpy, and matplotlib. Community users are welcome to download ready-to-run Linux binary bundles, or build it from scratch on their own systems. Contributors can use github to obtain the full source repository, implement and share new capabilities, and request their integration into future releases. Developer documentation is at http://www.ssec.wisc.edu/software/polar2grid/index.html.

The ready-to-run linux binary bundle can be found at http://cimss.ssec.wisc.edu/cspp/