CLOUD PRODUCTS FROM CSPP CLAVR-X

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What is CSPP?

CLAVR-x/CSPP gives access to the DB Community to the NOAA Enterprise Cloud Products that will be operational for JPSS-1 and GOES-R.

http://cimss.ssec.wisc.edu/cspp/
More than 1100 people have registered since the first CSPP release in March 2012.
CLAVR-x Introduction

- CLAVR-x is the Clouds from AVHRR Extended Processing System.
- Run most of NOAA Enterprise Cloud Algorithms. CSPP gives access to DB community.
- Operational in NESDIS on AVHRR since 2002. Responsible for AVHRR and GOES cloud products.
- Serves as the PATMOS-x* climate data set processing system. Climate Data Records hosted at NCDC.
- This work funded by NOAA JPSS and GOES-R.

NOAA/NESDIS Cloud Products (examples to be shown).

Other NESDIS AVHRR Products (that we run on all sensors)

Sensors supported by CLAVR-x in CSPP include: AVHRR, MODIS, and VIIRS.

However, many other sensors and products can be generated by the CSPP CLAVR-x: GOES-IM, GOES-NOP, MSG/SEVIRI, MTSAT-1R/2, COMS, and AHI (some adjustments needed).
Cloud:  Mask, Probability, Phase, Type, Height, Pressure, Temperature, Emissivity, IR-Particle Size, Optical Depth, Particle Size, Ice/Liquid Water Path. Uncertainty Estimates.

Surface:  SST, TOC NDVI, Land Surface Temperature, Remote Sensing Reflectance (Oceanic Turbidity)

Aerosol:  Optical depths at 0.63, 0.86 and 1.6 μm.

Fluxes:  Solar Flux at Surface (Insolation) and Outgoing Longwave Radiation (OLR).

Radiiances:  Calibrated Reflectance, Brightness Temperatures and some statistics useful for filtering products.
Cloud Detection

- Naïve Bayesian formulation also used (Heidinger et al., 2012).

- Determination of test thresholds accomplished through an analysis of CALIPSO data.

- Compared against PPS and MAIA masks in CREW and other analysis. See Jan Musial’s EUMETSAT 2012 paper.

Cloud Type

- Derive 7 cloud types (less than PPS and MAIA)
- Algorithm is based on pre-AWG approach.
- Operates on all sensors.

Cloud Types:
1. Clear
2. Probably Clear
3. Near-surface cloud
4. Water cloud
5. Super Cooled Water
6. Opaque Ice
7. Cirrus
8. Overlapped Cirrus
9. Deep Convective
10. Unknown

SNPP - VIIRS, TS Etau, September 8, 2015

We run the NESDIS Single Channel Algorithm over land and a split-window NLSST over Ocean.

Data is generated without regard to quality flags.

Cloud Mask is available to filter data.

Users can also add filters using cloud probability and other metrics.

Aqua - MODIS, TS Etau, September 8, 2015
Radiative flux algorithms are taken from PATMOS heritage (NESDIS Climate Project).

False Color Image
(0.65, 0.86, 11µm)

Downward Solar Flux at Surface (W/m²)

Upward Longwave Flux at TOA (W/m²)
CLAVR-x Cloud Products on AHI (1)

False Color Image (0.65, 0.86, 11μm)

Cloud Type

Cloud Optical Depth

Himawari 8 - AHI, TS Etau, September 8, 2015
CLAVR-x Cloud Products on AHI (2)

False Color Image
(0.65, 0.86, 11µm)

Cloud Top Temperature

Cloud Top Pressure

Himawari 8 - AHI, TS Etau, September 8, 2015
CLAVR-x Future Changes

- Implement combined VIIRS + CrIS processing.
- Add support for GOES-R ABI, KMA AMI and CMA FY-3.
- Improve performance of cloud detection and optical depth over snow.
- Implement GSICS corrections automatically.
For any feedback or questions:
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