

Comparison of Suomi NPP VIIRS and EOS MODIS Cloud Retrieval Products Using a Uniform Space-time Algorithm

Paper 437

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I. Introduction

The Suomi National Polar-orbiting Partnership (Suomi NPP) segues the NASA Earth Observing System (EOS) program into the upcoming Joint Polar Satellite System (JPSS) program. In this poster, we evaluate the consistency of cloud top pressure (CTP) retrievals between the Suomi NPP Visible Infrared Imaging Radiometer Suite (VIIRS) and EOS Aqua Moderate Resolution Imaging Spectroradiometer (MODIS) instruments. Because VIIRS lacks the CO₂ absorption channels that MODIS has, the instruments have very different CTP retrieval algorithms and CTP differences are expected.

To quantify these differences we present here the use of a uniform space-time algorithm, recently developed by Smith et al., for a direct grid-to-grid statistical comparison between the Suomi NPP VIIRS and EOS MODIS cloud products for May 2012.

II. Methodology

Why Space-Time Grid satellite data?

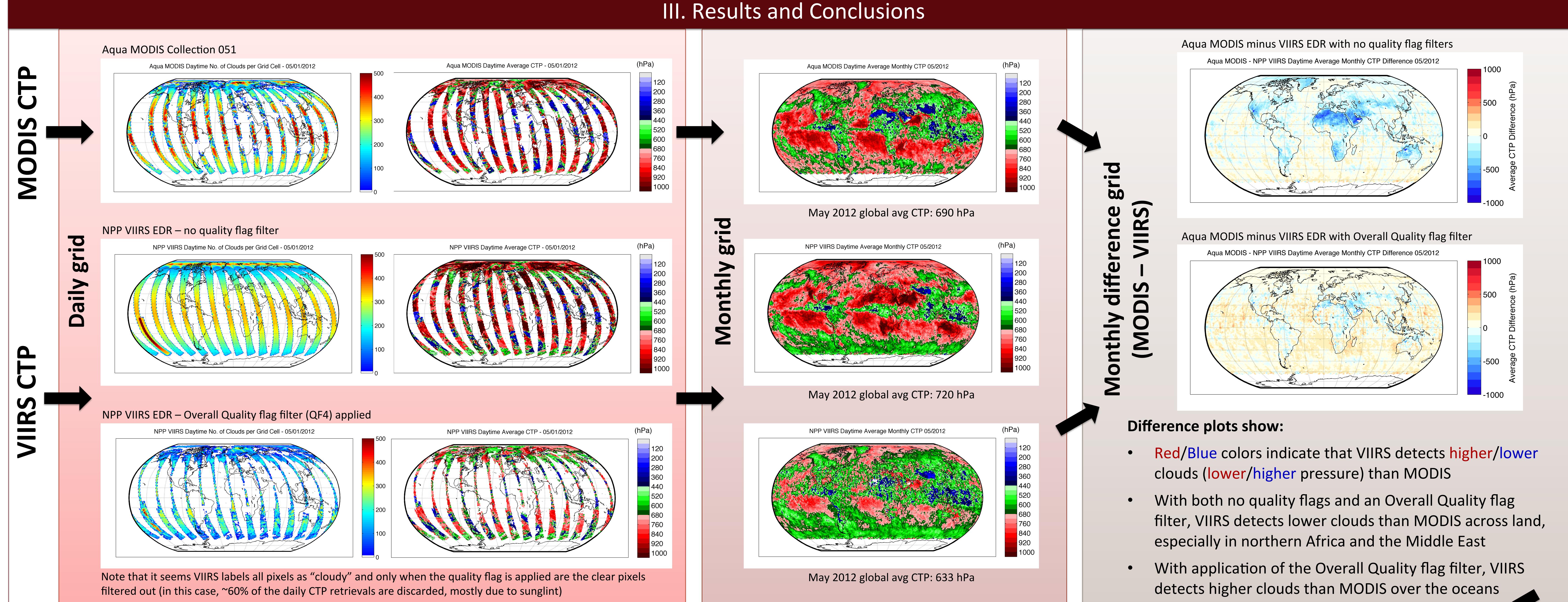
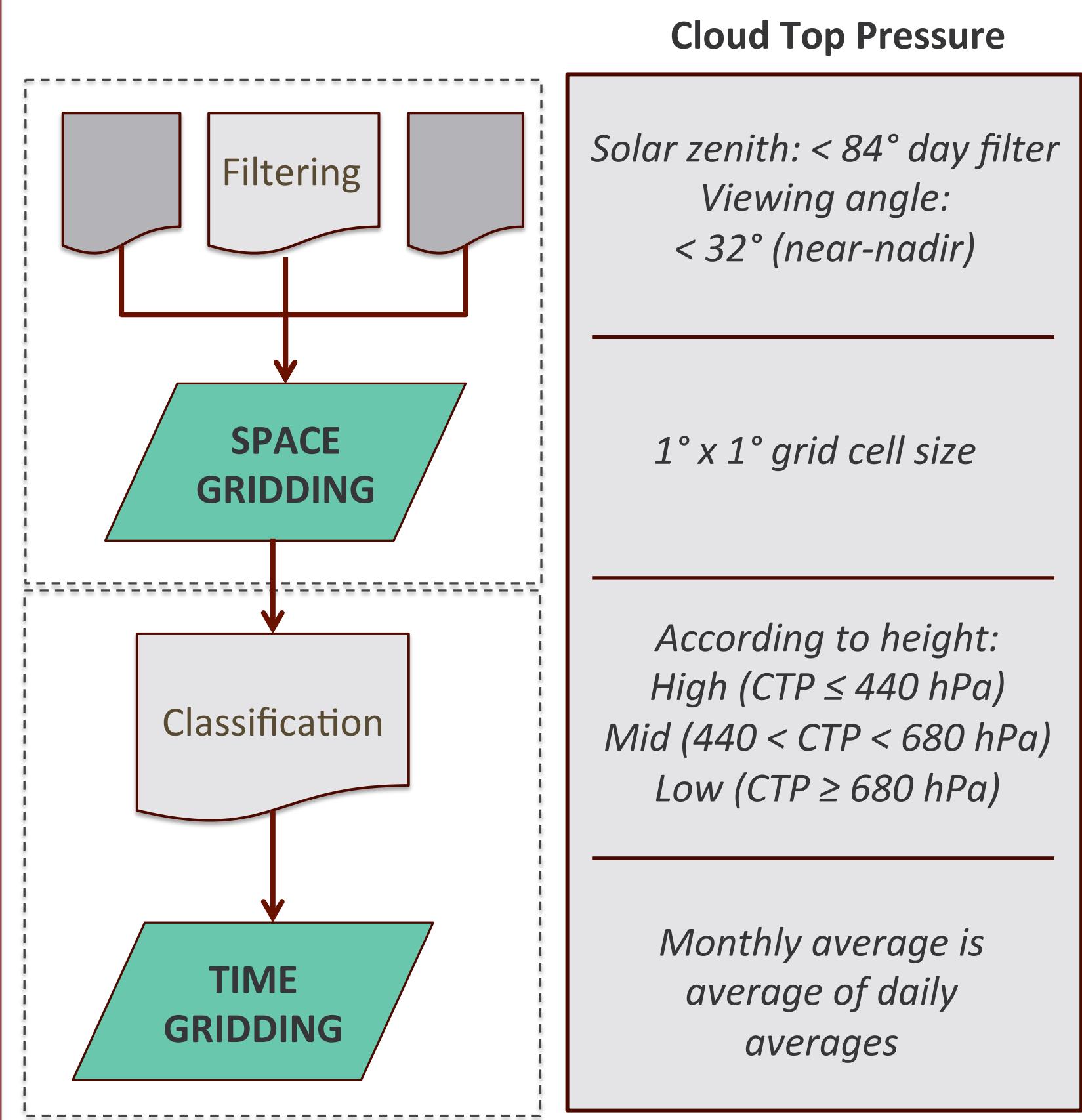
- Put non-uniform observational data into a uniform space-time grid
- Enable multi-instrument data comparisons and time series analyses

Space gridding allows the user to:

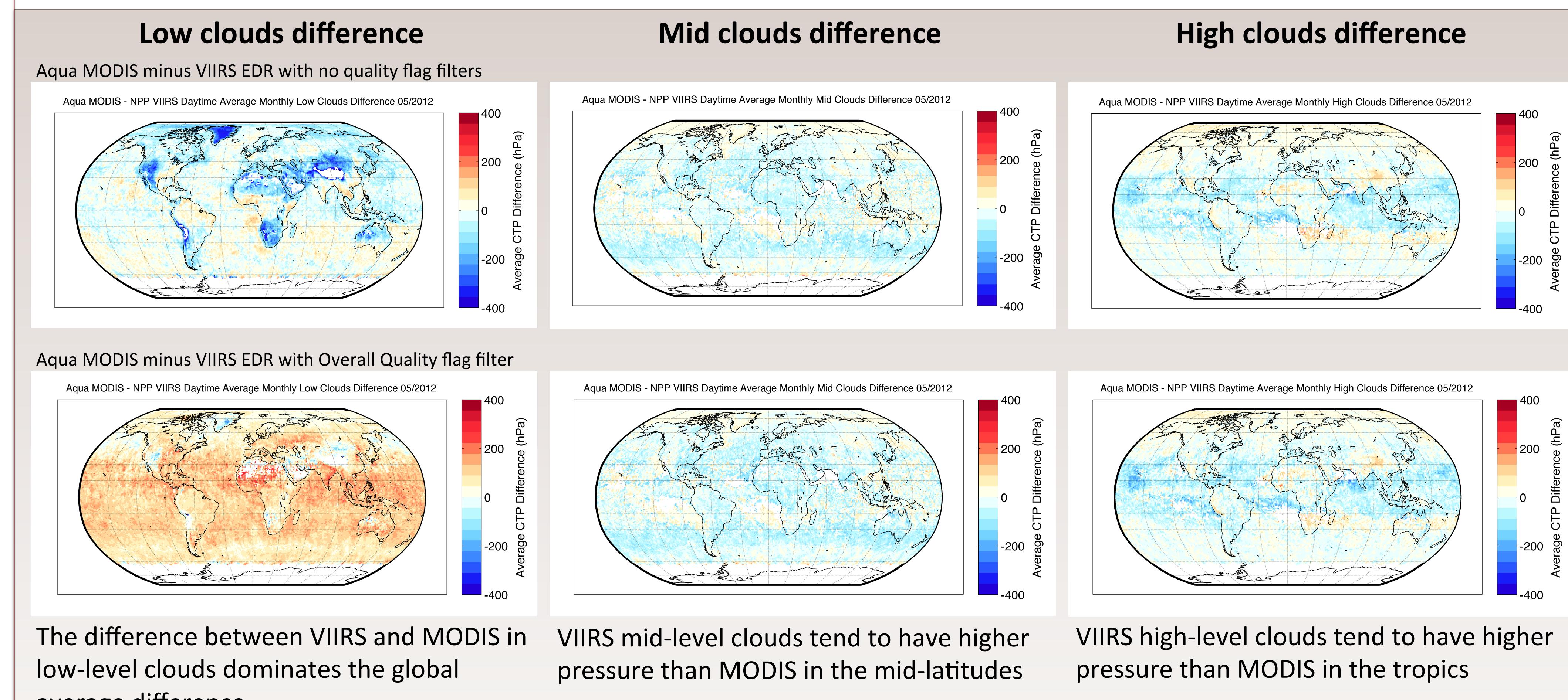
- Implement arbitrary filters such as day/night, nadir/off-nadir, lat/lon, etc...
- Choose the grid size
- Store only the desired parameter value and an index for the total observations

Time gridding allows the user to:

- Set a minimum sample size testing
- Aggregate daily gridded values/statistics over an arbitrary time period
- Perform various statistical analyses (mean, mode, std-dev, etc...)



Monthly difference by height regime



May 2012 average CTP and height regime frequency

| | High CTP (hPa) | High Freq. (%) | Mid CTP (hPa) | Mid Freq. (%) | Low CTP (hPa) | Low Freq. (%) |
|------------------------------|----------------|----------------|---------------|---------------|---------------|---------------|
| Aqua MODIS | 329 | 26 | 559 | 11 | 865 | 62 |
| VIIRS – no quality flag | 340 | 22 | 577 | 17 | 900 | 60 |
| VIIRS – Overall Quality flag | 345 | 23 | 583 | 25 | 783 | 52 |

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- Aqua MODIS Collection 5.1 data collected from the Goddard Space Flight Center LAADS Web: <http://laadsweb.nascom.nasa.gov/>
- NPP VIIRS EDR data collected from the NPP Atmosphere PEATE at SSEC, UW-Madison: <http://peate.ssec.wisc.edu/>

VI. References

Smith, N., W. Menzel, E. Weisz, A. Heidinger, and B. Baum, 2012: A uniform space-time gridding algorithm for comparison of satellite data products: Characterization and sensitivity studies. *J. Appl. Meteor. Climatol.*, doi:10.1175/JAMC-D-12-031.1, in press.

