

Reading/Manipulating ABI data with Exercises

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Wed, July 10, 1:00-2:00 pm

Description

This one-hour course will provide the student with hands-on exercises reading, plotting, and manipulating data from GOES Advanced Baseline Imager (ABI). Satellite imagery is more than just pretty pictures, and this course will show students how to use the data for quantitative applications. Code to read and plot ABI is provided, and we will spend time describing the code and explaining how it works. We will walk through two major exercises in this class. The first exercise for Hurricane Willa will demonstrate how to locate the hurricane eye in the data, prepare cross-sections through the eye, and estimate the width of the eye. The second exercise for a supercell near Lubbock, Texas will demonstrate highlighting certain features using different enhancements, creation of the “sandwich” product that is valuable for severe weather applications, identifying thunderstorm anvils and overshooting tops, and compare satellite imagery features with storm reports, showing the effect of parallax.

Preparation

Download and install the Anaconda Python distribution on your laptop (<https://www.anaconda.com/distribution/>). We recommend getting the Python 3.7 version because Python 2.7 will not be maintained after the end of the year. If you have questions or problems, see the installation instructions specific to your hardware (<https://docs.anaconda.com/anaconda/install/>). You will also need the `netcdf4` and `basemap` packages, not included in the basic installation, for the hands-on exercises. You can install these from a command line terminal using the commands:

```
conda install -c anaconda netcdf4
conda install -c anaconda basemap
```

You can test that your installation was successful by running these commands in Python:

```
import numpy as np
import scipy
import matplotlib.pyplot as plt
from netCDF4 import Dataset
from mpl_toolkits.basemap import Basemap
```

If successful, nothing apparent should happen – that is, no error or warning messages.

Download the class materials:

<https://github.com/kylehilburn/SatelliteSummerSchool2019>

You will find code for reading and manipulating ABI data:

```
abi_exercises.py
plot_abi.py
read_abi.py
utilities.py
```

the ABI data files:

```
OR_ABI-L1b-RadF-M3C13_G16_s20182951600373_e20182951611151_c20182951611211.nc
OR_ABI-L1b-RadM1-M6C02_G16_s20191252300365_e20191252300422_c20191252300459.nc
OR_ABI-L1b-RadM1-M6C13_G16_s20191252300365_e20191252300434_c20191252300468.nc
```

and a file with storm reports:

```
storm_reports.txt
```

Put all the code and data files in the same directory on your machine, some place that you can easily find and work in for class. The instructors will demonstrate usage of Python from the command line, using the “vi” editor. The students may use any text editor they like or work within a development environment.

We also recommend that before class the students read the BAMS article by Schmit et al. (2017) that provides valuable background information on the ABI sensor:

<https://journals.ametsoc.org/doi/full/10.1175/BAMS-D-15-00230.1>