
visuamir Documentation

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CHAPTER 1

Overview

visuamir provides a basic data visualization tools for working with Advanced Modular Incoherent Scatter Radar (AMISR) data.

CHAPTER 2

Installation

First clone this repository:

```
git clone https://github.com/asreimer/visuamisir.git
```

Next, *cd* into the repo and install using *pip* file:

```
pip install .
```

or with *pip*:

```
pip install .
```


CHAPTER 3

Usage

First, you will need some data! I grabbed a fitted file from <https://amisr.com/database>, specifically, some PFISR Themis36 data from 2 March, 2016: <https://amisr.com/database/61/experiment/20160302.001/3/2>. The 20160302.001_lp_1min-fitcal.h5 file is 192 MB in size.

Beam Plot in Polar Coordinates

A visualization of the beam pattern used by the radar can be made in polar coordinates:

```
import visumisr
isr = visumisr.Analyze('20160302.001_lp_1min-fitcal.h5')
isr.plot_polar_beam_pattern(min_elevation=10)
```


CHAPTER 5

RTI Plotting

Range Time Intensity (RTI) plots are a great way to visualize the data products of an incoherent scatter radar. To make an RTI plot in *visuamISR* for one beam of data:

```
import visuamISR
from datetime import datetime
isr = visuamISR.Analyze('20160302.001_lp_1min-fitcal.h5')
isr.rti(['density', 'Te', 'Ti', 'velocity'],
        time_lim=[datetime(2016,3,2,6,0),datetime(2016,3,2,17)],
        ylim=[100,500],bmnum=10)
```

Profile Plotting

The altitude profile of various parameters can be plotted. For example:

```
import visumisr
from datetime import datetime
isr = visumisr.Analyze('20160302.001_lp_lmin-fitcal.h5')
isr.profile_plot(['density', 'Te', 'Ti', 'velocity'],
                 datetime(2016, 3, 2, 14, 55), bmnum=10,
                 param_lim=[[10**10, 10**12], [0, 5000], [0, 4000],
                           [-1000, 1000]], use_range=True)
```


CHAPTER 7

3D Beam Plotting

A 3 dimensional plot of the beams of the radar colour coded by a plasma parameter can be made:

```
import visuamISR
from datetime import datetime
ISR = visuamISR.Analyze('20160302.001_lp_1min-fitcal.h5')
ISR.plot_beams3d('density', datetime(2016, 3, 2, 14, 55), sym_size=5, clim=[10, 12])
```