Brief overview of the Madrigal database

The Madrigal database stores data from a wide variety of upper atmosphere research instruments

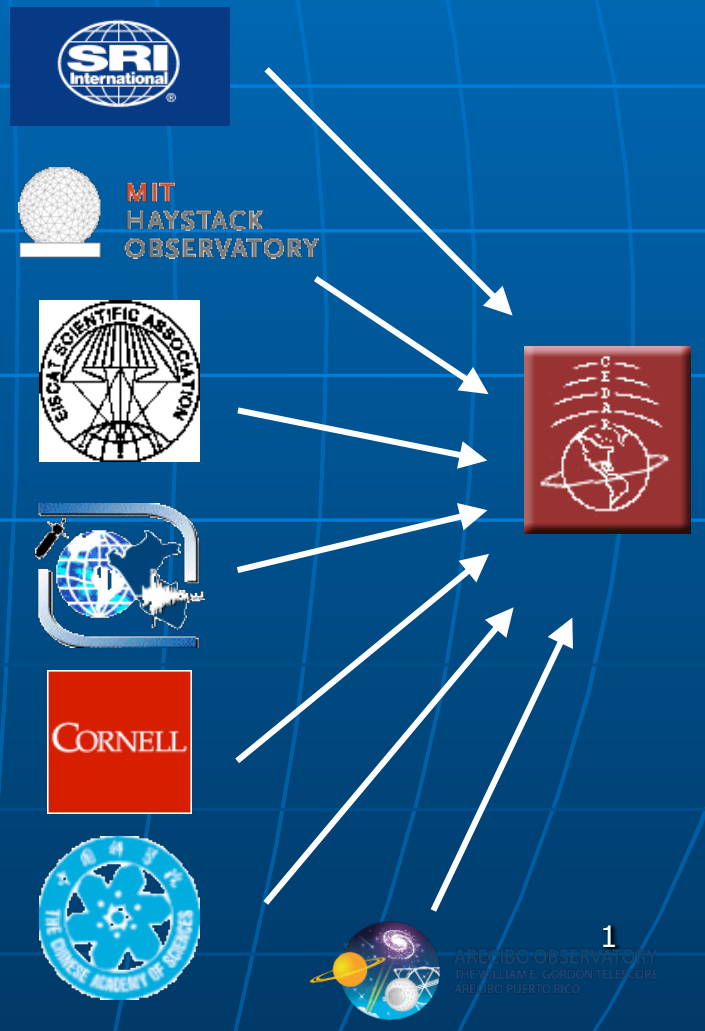
Incoherent Scatter Radar

TEC via GPS

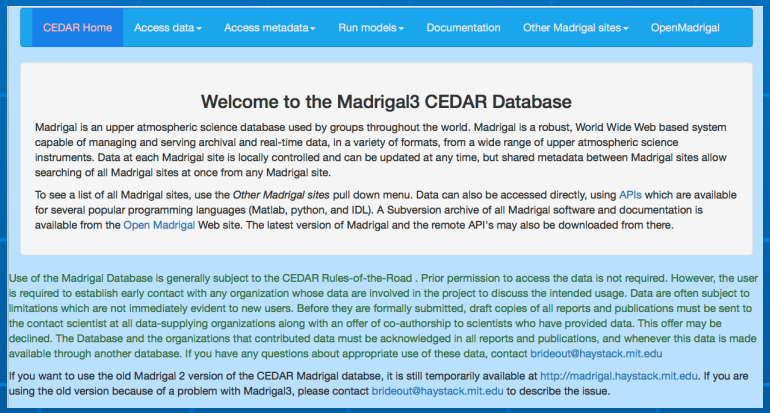
Examples of number of instruments in Madrigal:

- Incoherent scatter radars: 22
- MST radars: 3
- MF radars: 16
- Meteor radars: 11
- FPI: 32
- Michelson Interferometers: 6
- Lidars: 9
- Photometers: 7
- DMSP

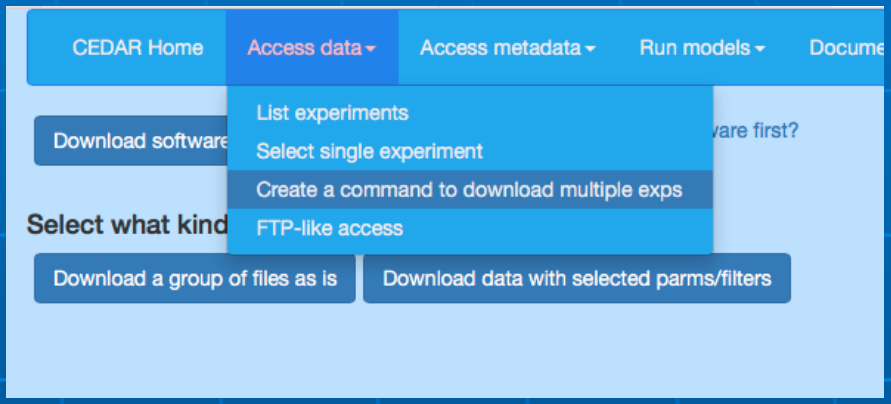
The Madrigal database is distributed, but all sites archived to CEDAR Madrigal



How can the Madrigal database be accessed?



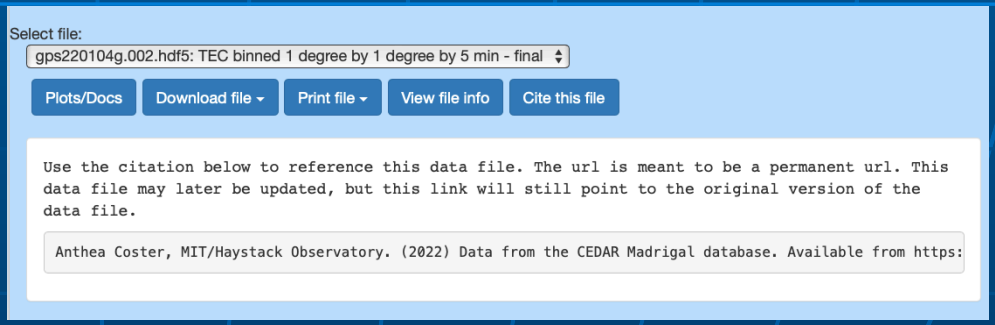
Web browsing - for data discovery/ small downloads



Use web interface to create scripts to fetch any amount of data in python, Matlab, or IDL - large downloads

Web services API

- From anywhere on internet
- Python API
- Matlab API
- IDL API
- Allows automated downloads



Every file has permanent citation available; citations to groups of files can be created with API

How can I put my instrument's data on Madrigal? (Hint: its really easy…)

Send data to CEDAR Madrigal

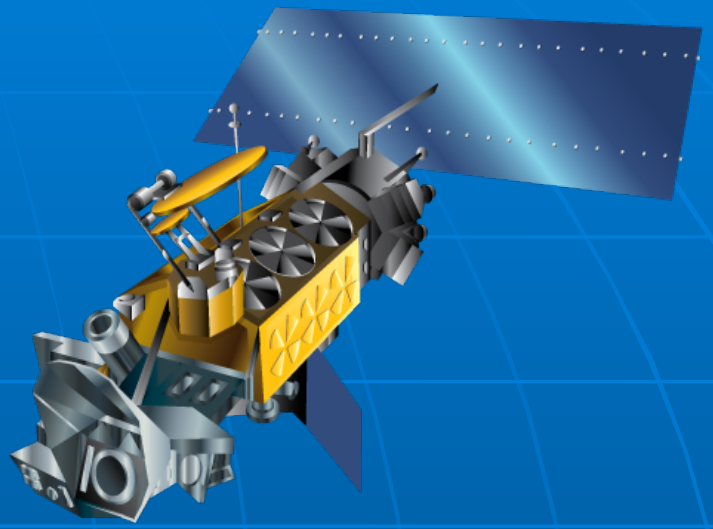
Set up your own Madrigal site

Madrigal DB

- Send data/plots to MIT Haystack in **<u>your own format</u>**
- Loading program written by MIT Haystack, verified by you
- Add new data in batch or via automated upload (eg, sftp, web access, etc)

- MIT Haystack will help with installation and writing needed loading programs
- You control when data uploaded
- Automated backup to central CEDAR Madrigal site

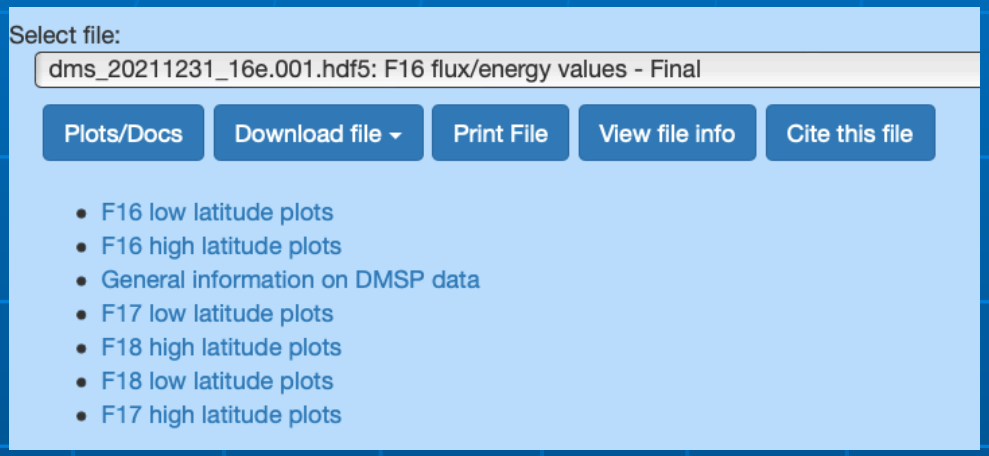
Example of satellite data in Madrigal



- DMSP
  - We create one file per satellite per UT day per data type
  - Types: scalars at one second cadence, scalars at four second cadence, vector flux values at one second cadence
  - Madrigal can handle scalar data or data with any number of independent parameters

Adding plots of satellite data in Madrigal

Any number of plots can be shown, including documentation



Typically plots are created by the instrument PI, since they have the most experience making their data easily understood - Generic plots are rarely satisfactory