



Future Plans for the Madrigal Database

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Introduction: CEDAR Madrigal Database

- CEDAR (Coupling, Energetics, and Dynamics of Atmospheric Regions) is a research community investigating the near-Earth space environment
- CEDAR Madrigal database is a community resource for upper atmospheric science data from various ground and space-based instruments from around the world
- Madrigal is installed at various sites around the world and has a central archive at the CEDAR Madrigal database
- Data at each Madrigal site is controlled locally, but metadata is shared between all sites for easy data access
- Haystack atmospheric sciences group maintains the CEDAR Madrigal database



Motivation and Project Goals: Continued Improvement of the Madrigal Database

- Include geographical boundaries at the file and experiment levelimplications for integration with Google Maps/Google Earth
- Track funding agency grant number at the experiment level
- Add new data
 - Data from South Pole and McMurdo stations
 - Magnetometer data
 - Riometer data
 - Photometer data
 - VLF data
 - Quality flags for DMSP SSIES-3 F16 satellite data



Overview of Madrigal Architecture





Overview of Madrigal Architecture





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Corresponding Django form for this page populated by user input— communicates with Madrigal python API to filter experiments by geographical boundaries in the "show experiments" view

Display Funding Agency and Grant Number

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Madrigal database

Funding agency and grant number available for each experiment for reference



Example of Integration with Google Earth

Wedge Plot: Millstone Hill Radar Azimuth Scan



Colored Dots: Jason-2 and Jason-3 Satellite Data





By overlaying Madrigal data on Google Earth, users can visually find which datasets overlap in space and time

New Data Types: South Pole

• Time series data from multiple ground-based instruments: magnetometer, riometer, photometer, and VLF



Summary plots of available South Pole data

Example of new magnetometer data



Created loading script to download South Pole data and upload to Madrigal in HDF5 data format

New Data Types: Quality Flags for DMSP SSIES-3 F16 Satellite Data





- DMSP satellite observes in-situ plasma velocity and temperature at altitude of ~800 km
 - New data quality flags denote sun glint signal contamination

Work Completed

- Updates to Madrigal metadata
 - Geographic boundaries at file and experiment level
 - Funding agency grant number
- New data types: loading script for magnetometer data

Work In Progress (~90% complete)

- New data types
 - Riometer, photometer, VLF
 - DMSP SSIES-3 F16 data quality flags

Future Work

• Google Earth/Google Maps integration with Madrigal data

All changes made will be included in the next release of Madrigal(v 3.3)



MIT HAYSTACK OBSERVATORY

Thank you to...

- Bill Rideout for being an outstanding mentor
- Allan Weatherwax for providing South Pole data
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