Matlab GUIs for Ocean Satellite Data Products

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Acknowledgements

- Meri Sheremet - GSO/URI
- Christian Buckingham - GSO/URI

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Data Set Specific GUIs

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A Thematic Data Portal to Satellite-Derived Ocean Surface Properties

- Sea surface temperature
  - MODIS
  - AVHRR Pathfinder 4km
  - GOES
  - AIRS
- Surface winds and wind stress
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(A GUI also exists for HYCOM $\frac{1}{12}^{\circ}$ North Atlantic output.)

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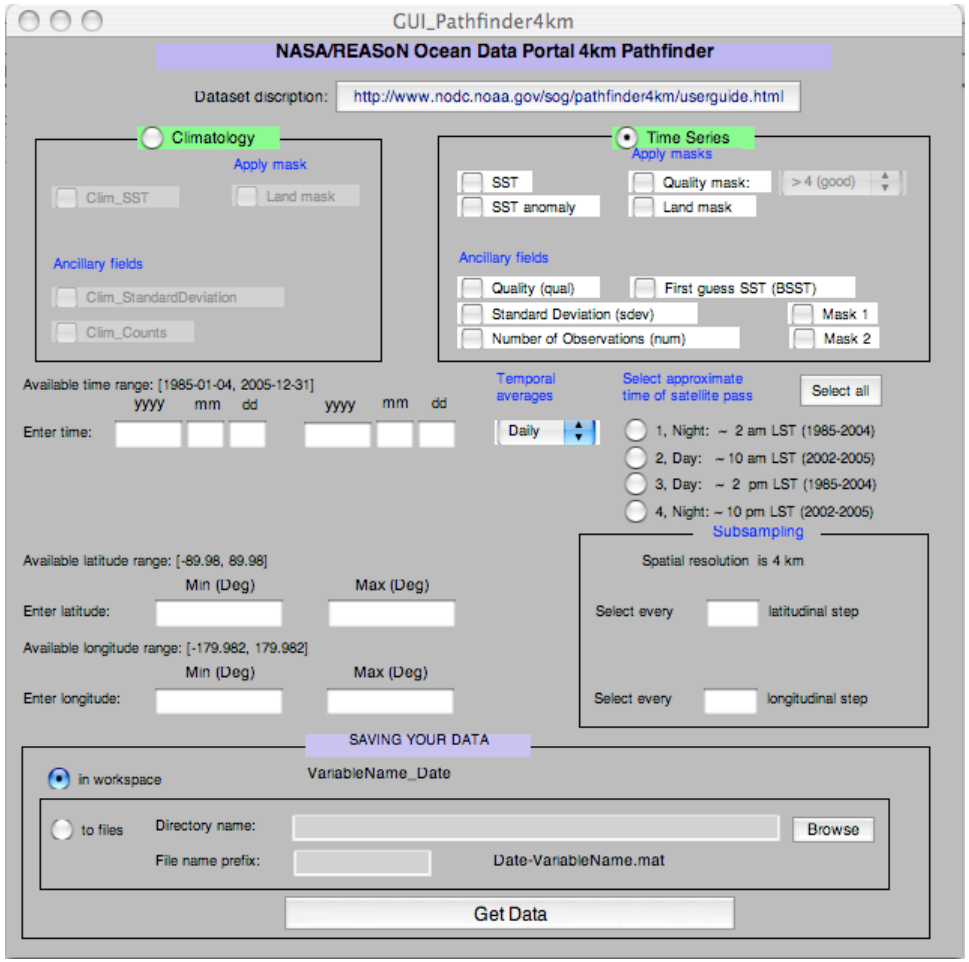

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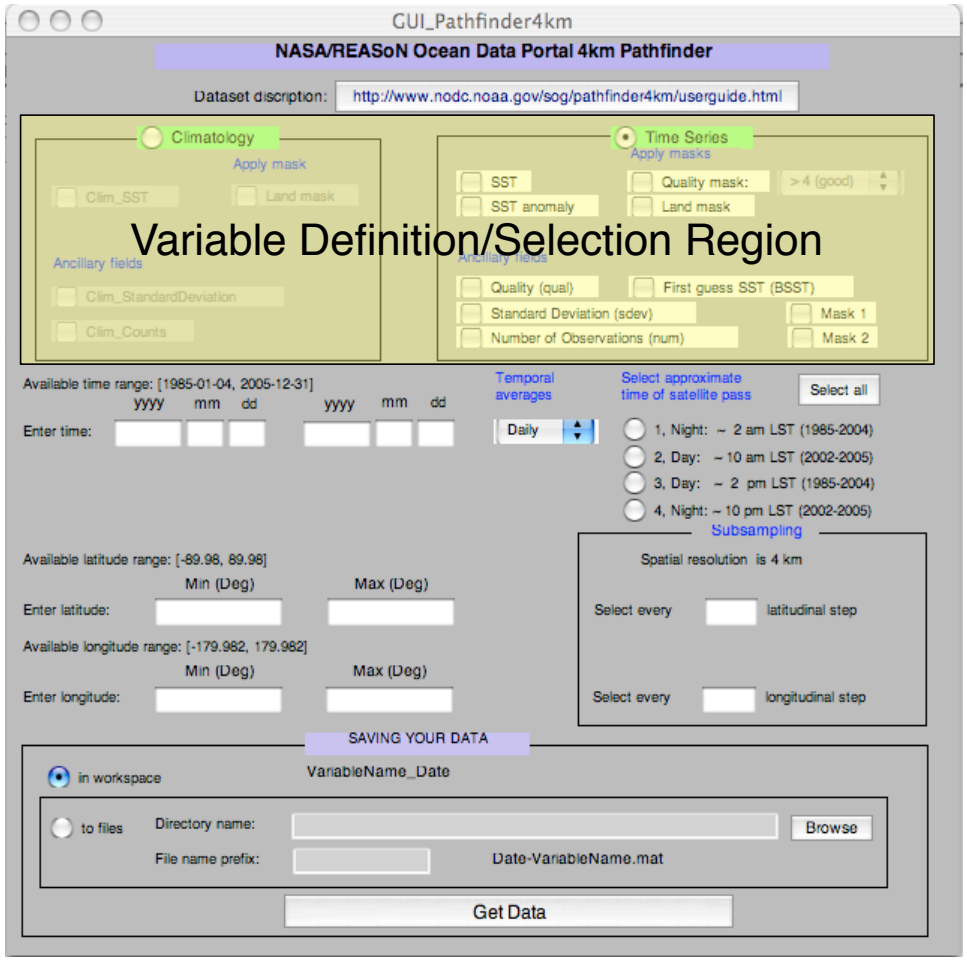

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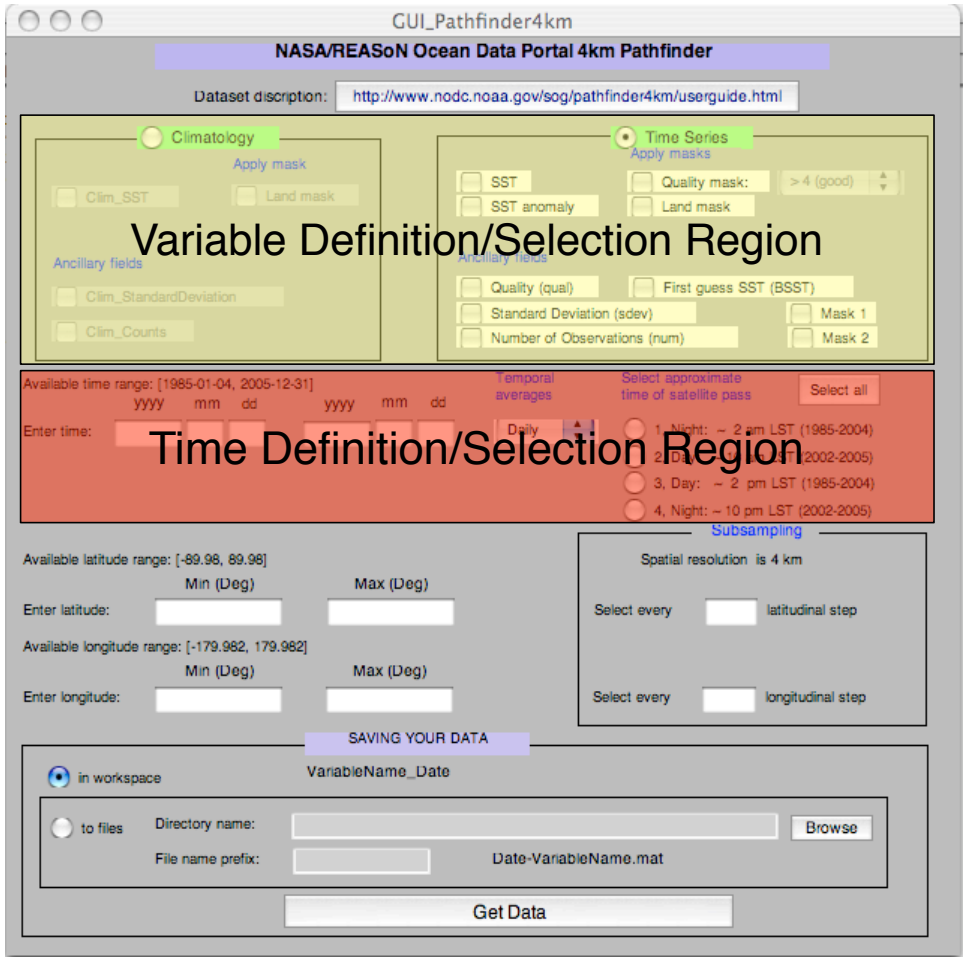

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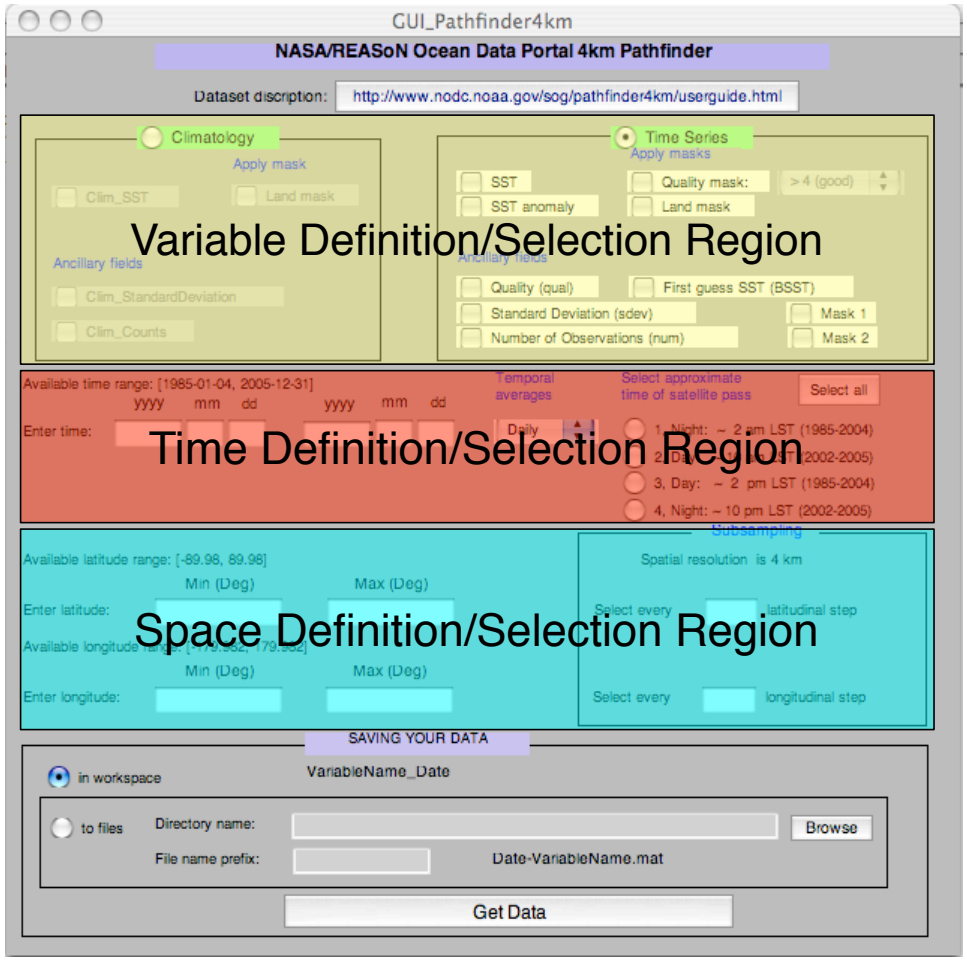

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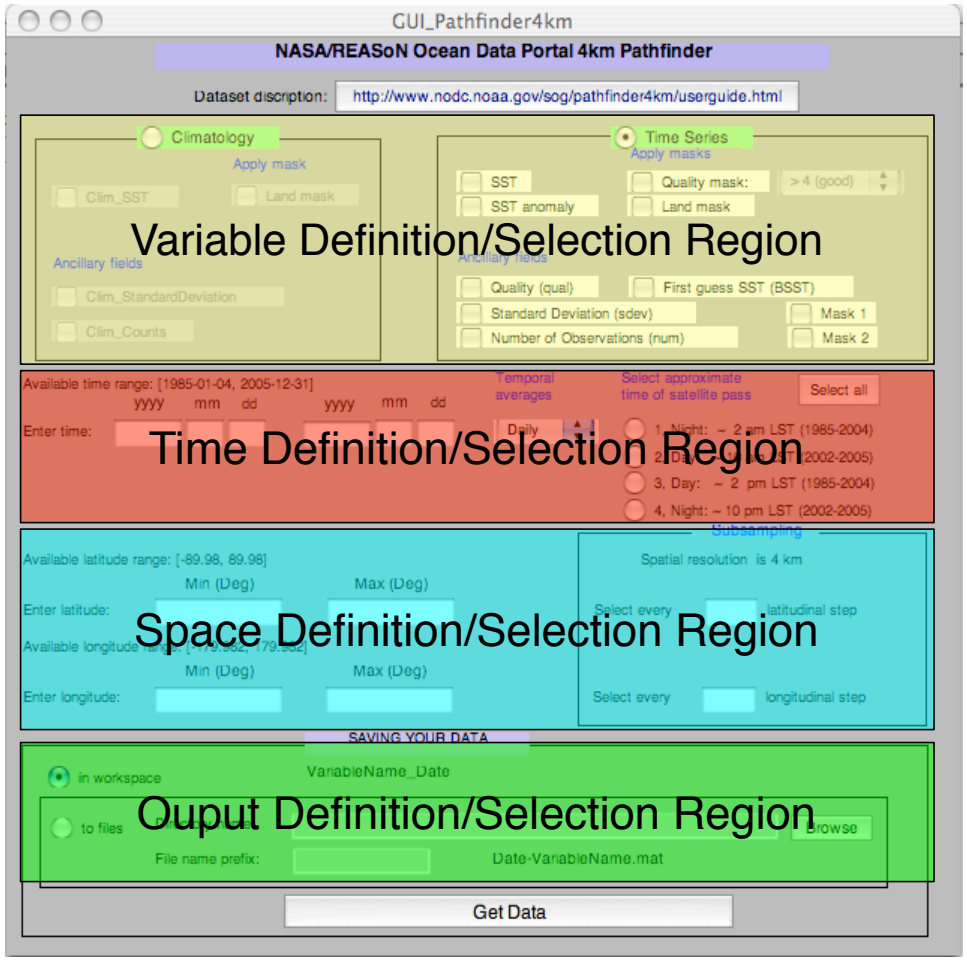

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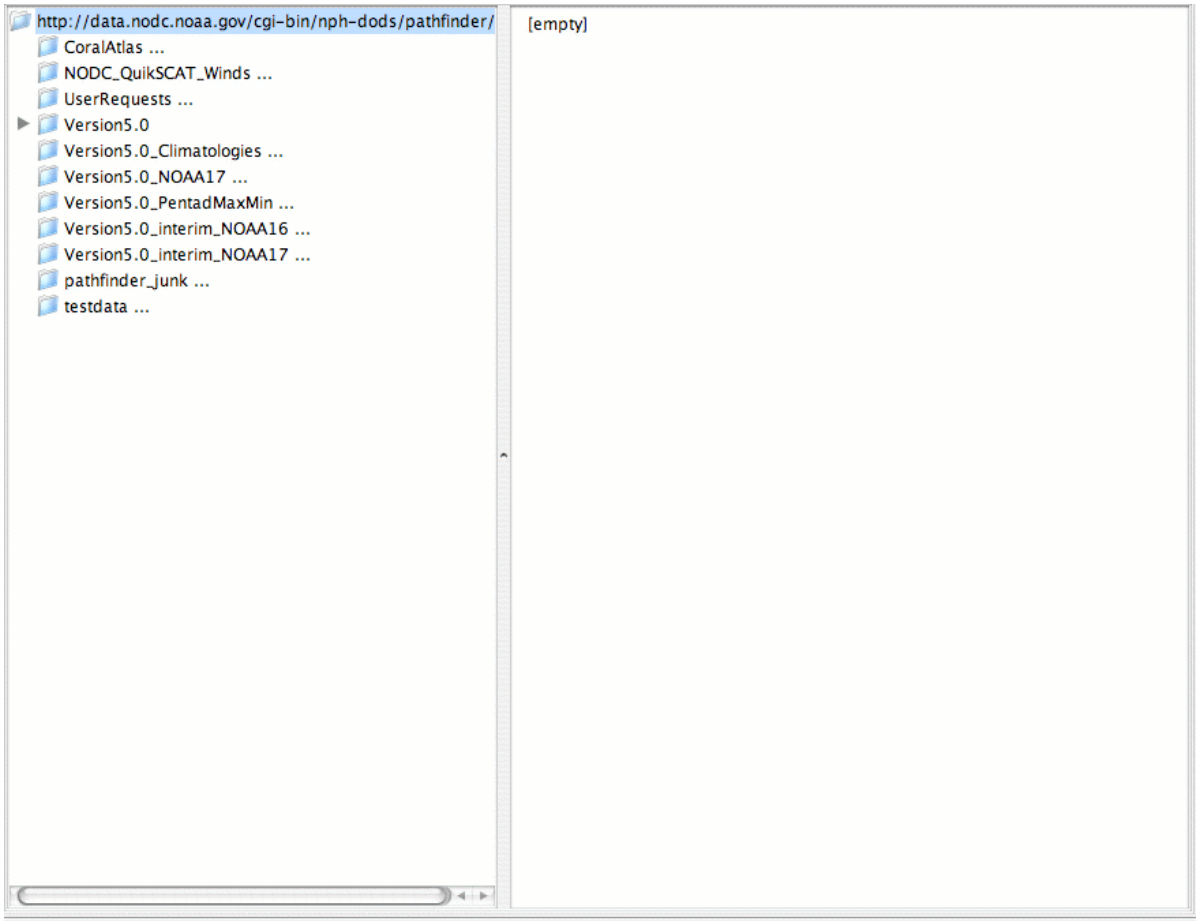

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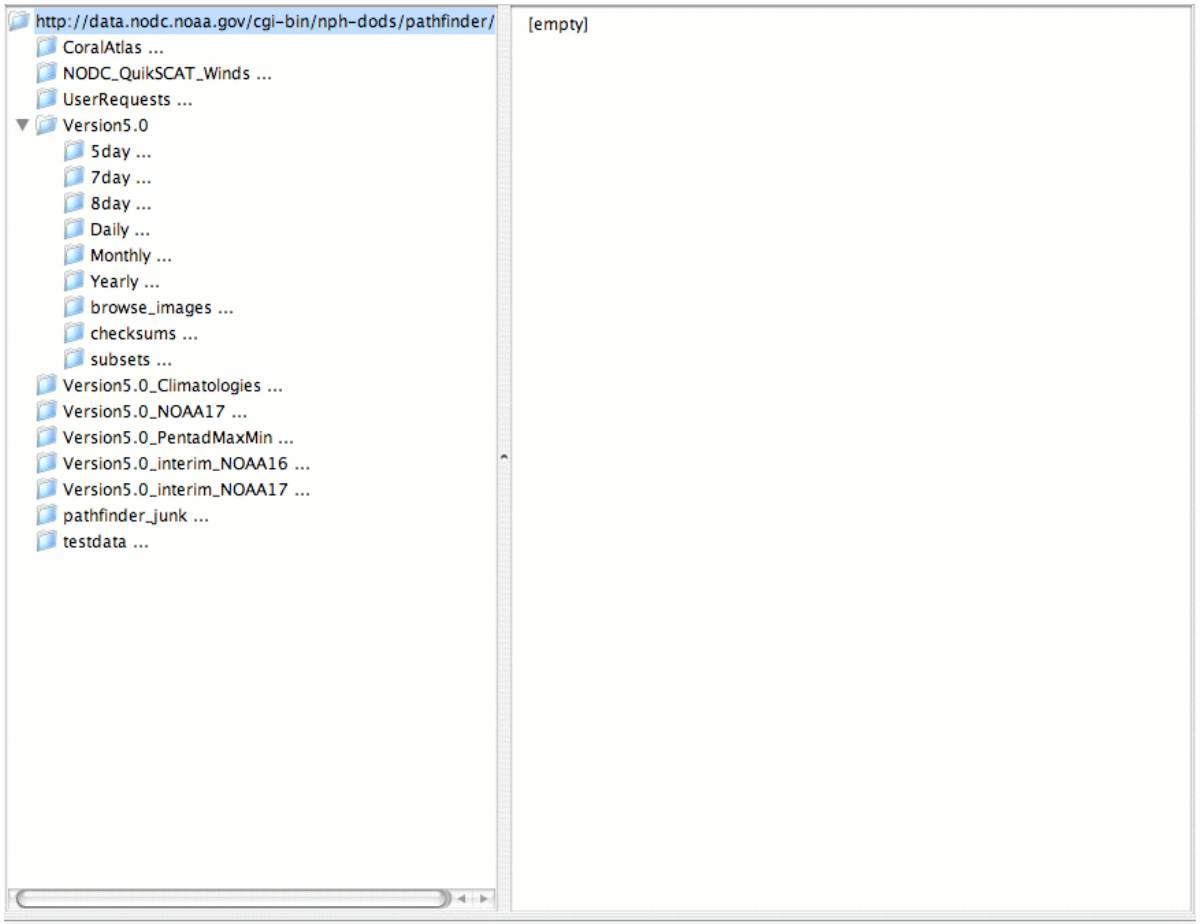

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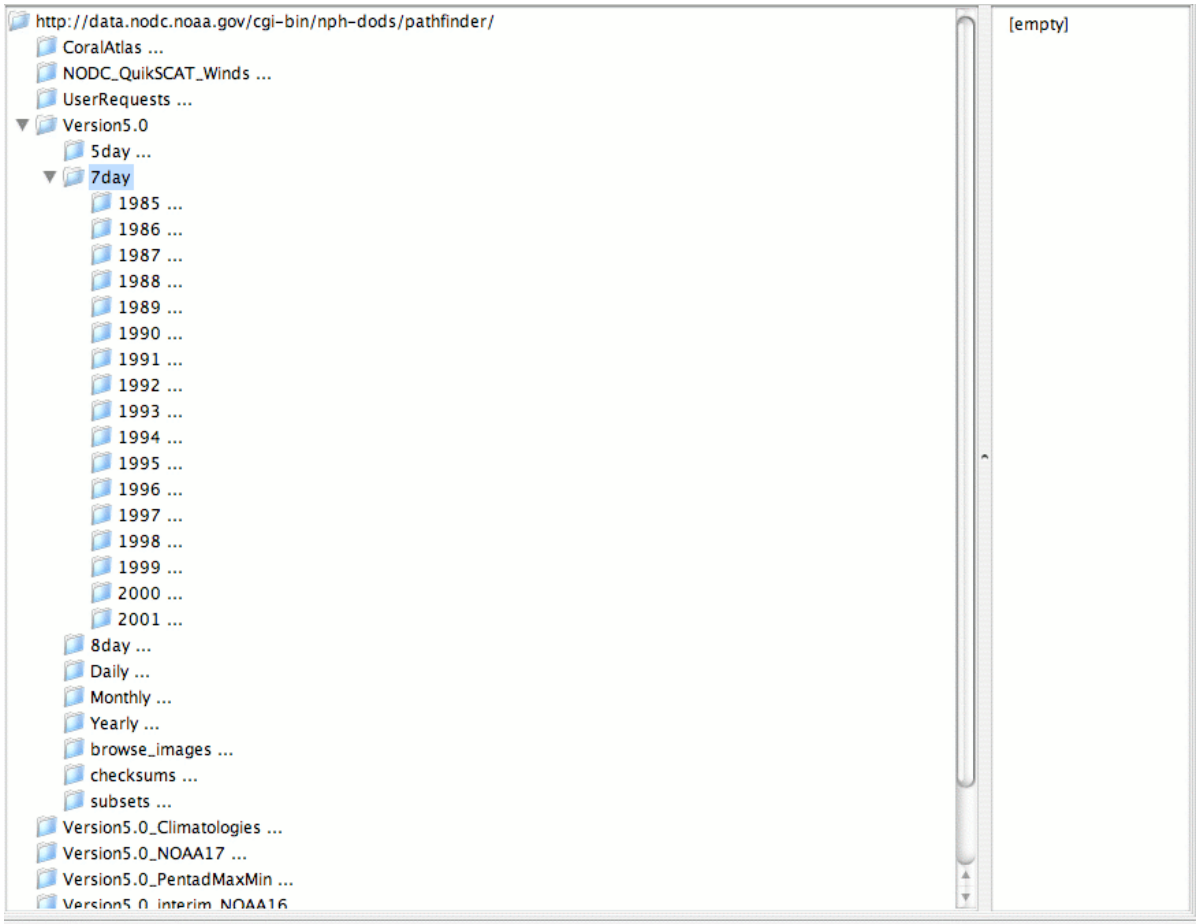

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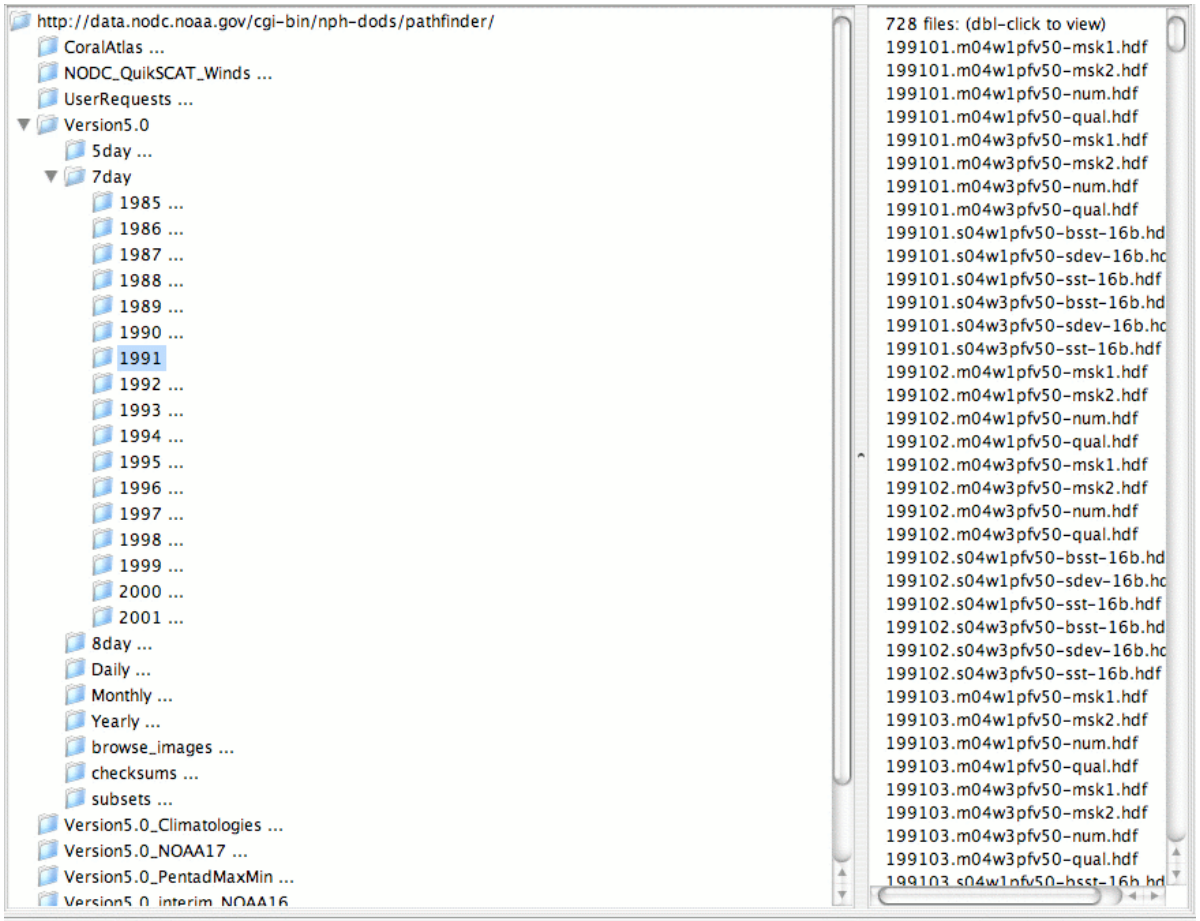

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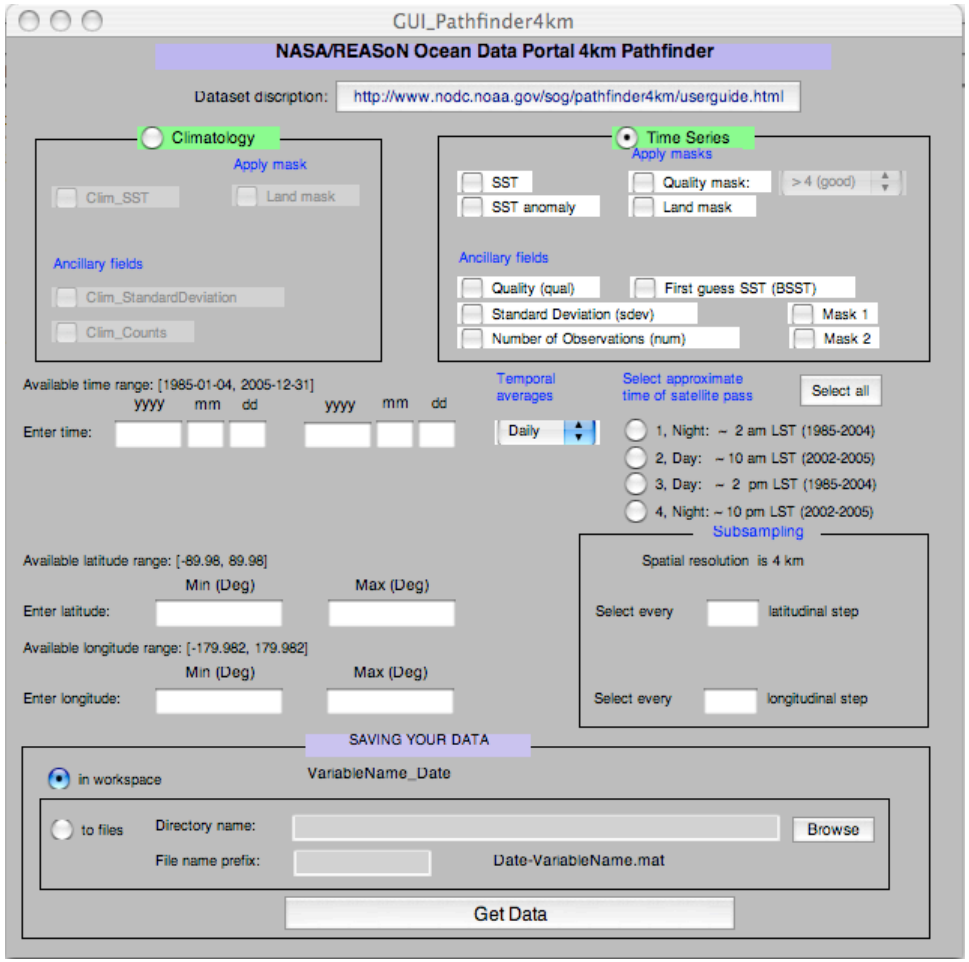

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Would Like Consistency in the Returned Data

- All of the GUIettes access multidimensional data:
  - 3D - **lon, lat, time**
    - MODIS, Pathfinder, scatterometer
  - 4D - **lon, lat, altitude (or depth), time**
    - AIRS, HYCOM
- The multidimensional nature of the data gave rise to two problems:
  - Structure name in the Matlab workspace
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$$OPeNDAP\_0001. \begin{cases} temp - [1024x2096x12x2000] \\ temp\_error - [1024x2096x12x2000] \\ temp\_count - [1024x2096x12x2000] \\ Longitude - [1024] \\ Latitude - [2096] \\ Depth - [12] \\ Time - [2000] \\ URL \\ Metadata \end{cases}$$

The Structure Name Problem

Options

- **MODIS_yyyymmdd** – A name based on date.
  - Many different date/time representations – MODIS_20040110, MODIS_2004010, . . .
  - Cumbersome for multiple passes per day; requires date and time: MODIS_200401102315
  - Subsequent request can overwrite the structure, if the data/time are the same.
  - Possibility of lots of structures – a 4x4 pixel region for 1000 days $\Rightarrow$ 1000 structures in the user's workspace.
- **OPeNDAP_rrrr** –Some generic, non-descriptive name for the structure. (rrrr is the request number and is incremented for every read.)
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- We are converting to the generic name representation plus a function to convert it to date/time
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- **OPeNDAP_rrrr** –Some generic, non-descriptive name for the structure. (rrrr is the request number and is incremented for every read.)
  - Not user friendly.
- We are converting to the generic name representation plus a function to convert it to date/time
  - Provides for a user friendly response.
  - Avoids overwriting structures
  - Allows for different date/time naming conventions.
  - Puts the work in the function not in the GUIette.

The Structure Name Problem

Options

- **MODIS_yyyymmdd** – A name based on date.
  - Many different date/time representations – MODIS_20040110, MODIS_2004010, . . .
  - Cumbersome for multiple passes per day; requires date and time: MODIS_200401102315
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The Structure of the Structure Problem

$$OPeNDAP\_0001. \begin{cases} temp - [1024x2096x12x2000] \\ temp\_error - [1024x2096x12x2000] \\ temp - [1024x2096x12x2000] \\ Longitude - [1024] \\ Latitude - [2096] \\ Depth - [12] \\ Time - [2000] \\ URL \\ Metadata \end{cases}$$

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$$nnnn = 1 : 2400 \qquad OPeNDAP\_nnnn. \begin{cases} temp - [1024x2096] \\ temp\_error - [1024x2096] \\ temp - [1024x2096] \\ Longitude - [1024] \\ Latitude - [2096] \\ Depth - 3 \\ Time - 127 \\ URL \\ Metadata \end{cases}$$

The Structure of the Structure Problem (continued)

We are leaning toward 2D fields, although another option is native

Outline

Motivation

- UCSB, URI and OPeNDAP have been funded by NSF to explore data discovery and access in a distributed environment.
  - Alexander Digital Library discover + OPeNDAP data access
- As part of this project, we are looking at:
  - The organization of geospatial data, and
  - The metadata found with OPeNDAP accessible data sets.

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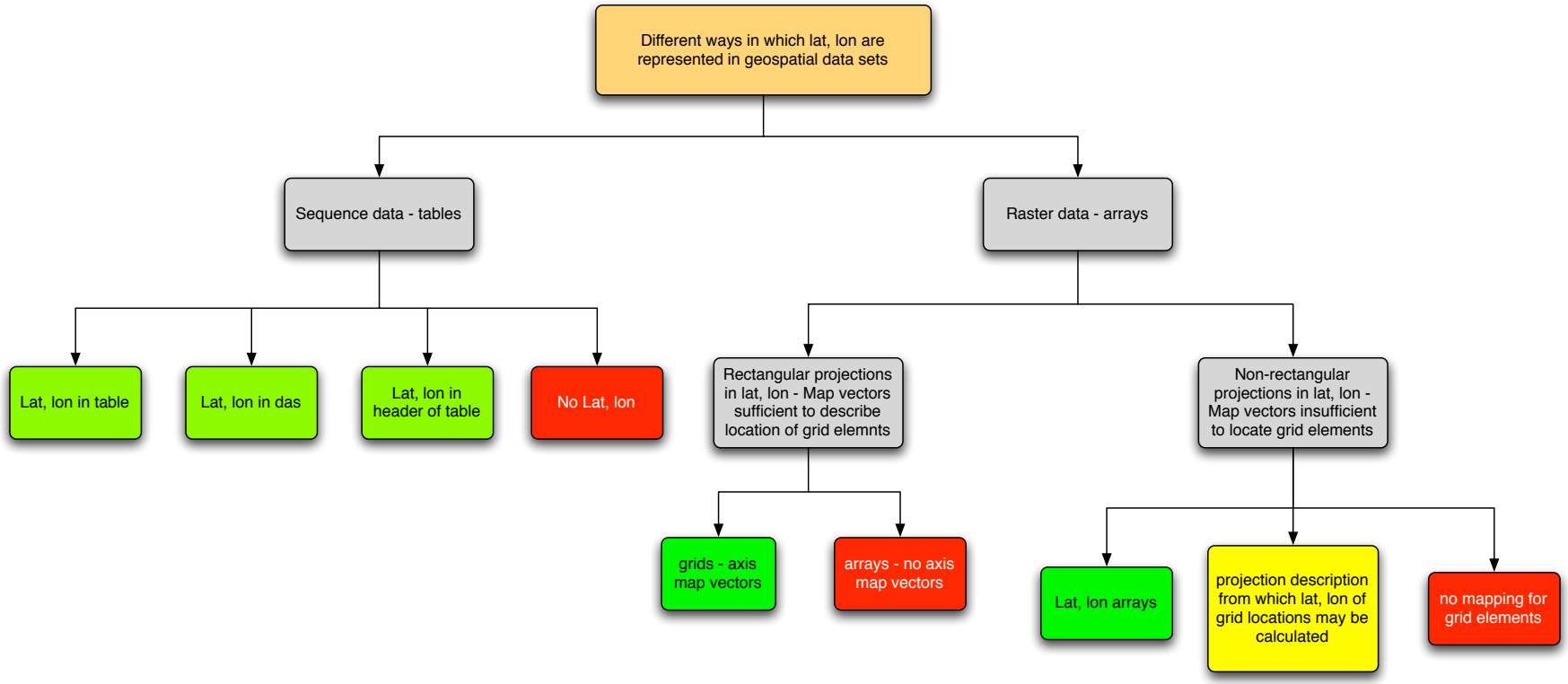
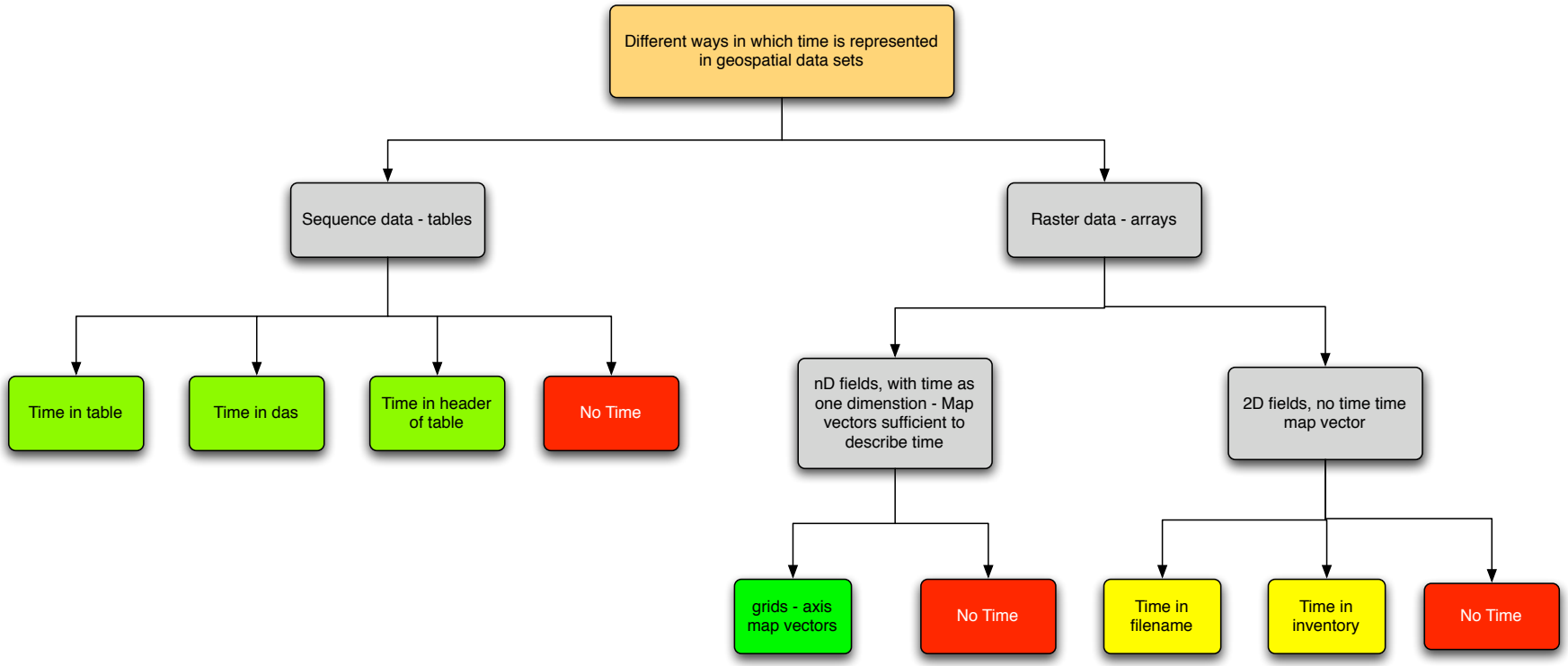
Spatial Structure of Data Sets



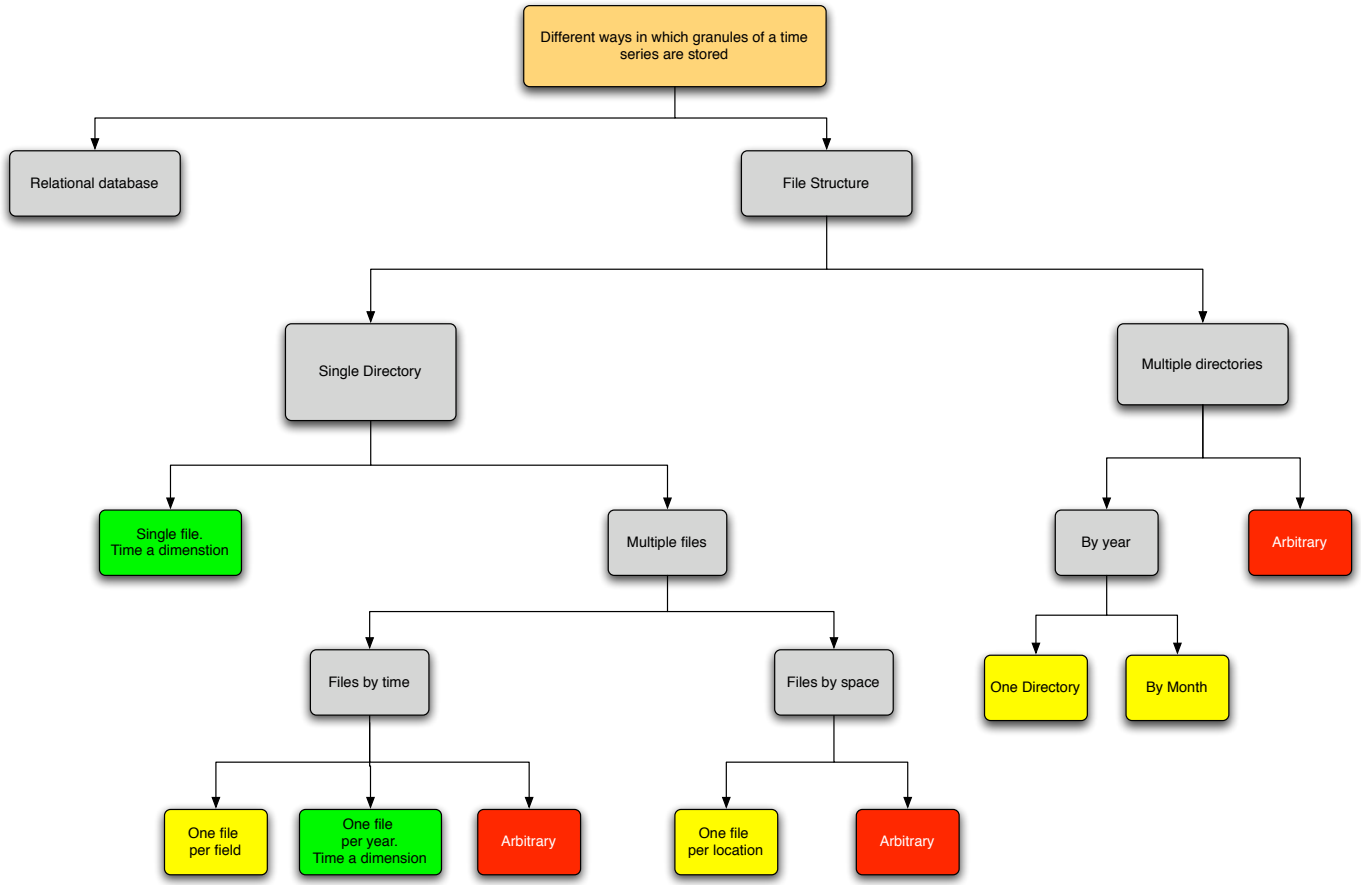
- Green rectangles mean lat, lon are readily available (assuming that one can associate them with the variable names used).
- Yellow rectangles mean that lat, lon are accessible, but require work.
- Red rectangles mean that lat, lon information is not accessible. Bad, bad, bad

Temporal Structure of Data Sets



- Green rectangles mean time is readily available (assuming that one can associate time with the variable name used).
- Yellow rectangles mean that time is accessible, but requires work.
- Red rectangles mean that time information is not accessible. Bad, bad, bad

Organizational Structure of Geospatial Data Sets



- Green rectangles mean the structure is very easy to parse.
- Yellow rectangles mean mean the structure is pretty simple to parse.
- Red rectangles mean that the structure is impossible to parse. Bad, bad, bad

Feedback

I'd appreciate any feedback on the structures (spatial, temporal or archive) that I have presented.