Although the ECOMS-UDG provides a web interface to explore and access the datasets (shown in this section), it is strongly recommented the use of OPeNDAP client libraries to remotely access the data from scientific computing environments (see the ?R package or the ?Python and Matlab functions). Note that the different datasets are stored in ECOMS-UDG in its original format, with their particular conventions and temporal aggregations for the variables. The above packages allow accessing the different datasets in an homogeneous form, using a single table of variables.

Any of the datasets included in the UDG can be explored via Web by clicking in the corresponding name (e.g. ?System4_annual_15):

Dataset: SYSTEM4DATASETS/System4 15 members Annual range Dataset

- *Data format:* GRIB-1
- *Data size:* 994.8 Gbytes
- *Data type:* GRID
- *ID:* system4/System4_Annual_15Members.ncml

Access:

1. **OPENDAP:** /tds5/dodsC/system4/System4_Annual_15Members.ncml
2. **WCS:** /tds5/wcs/system4/System4_Annual_15Members.ncml
3. **WMS:** /tds5/wms/system4/System4_Annual_15Members.ncml
4. **NetcdfSubset:** /tds5/ncss/grid/system4/System4_Annual_15Members.ncml

Dates:

- 2013-01-17T20:45:24Z **(modified)**

Variables:

- *Vocabulary* [GRIB-1]:
  - **Maximum_temperature_at_2_metres_since_last_24_hours_surface (K)** = *Maximum temperature at 2 metres since last 24 hours @ Ground or water surface* = VAR_98-0-128-51_L1
  - **Minimum_temperature_at_2_metres_since_last_24_hours_surface (K)** = *Minimum temperature at 2 metres since last 24 hours @ Ground or water surface* = VAR_98-0-128-52_L1
  - **Total_precipitation_surface (m)** = *Total precipitation @ Ground or water surface* = VAR_98-0-128-228_L1

GeospatialCoverage:

- *Global*
- *Longitude:* 0.0 to 359.25 degrees_east
- *Latitude:* -90.0 to 90.0 degrees_north
- *Names:*
  - global

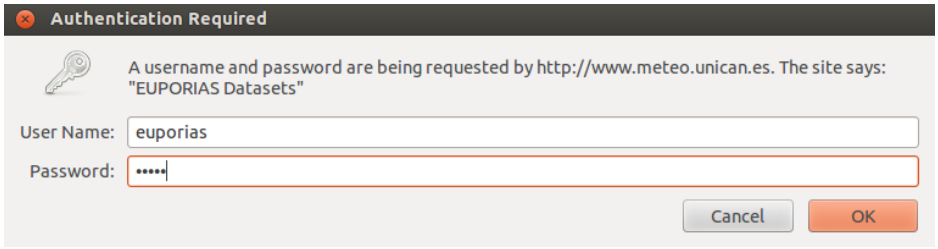
TimeCoverage:

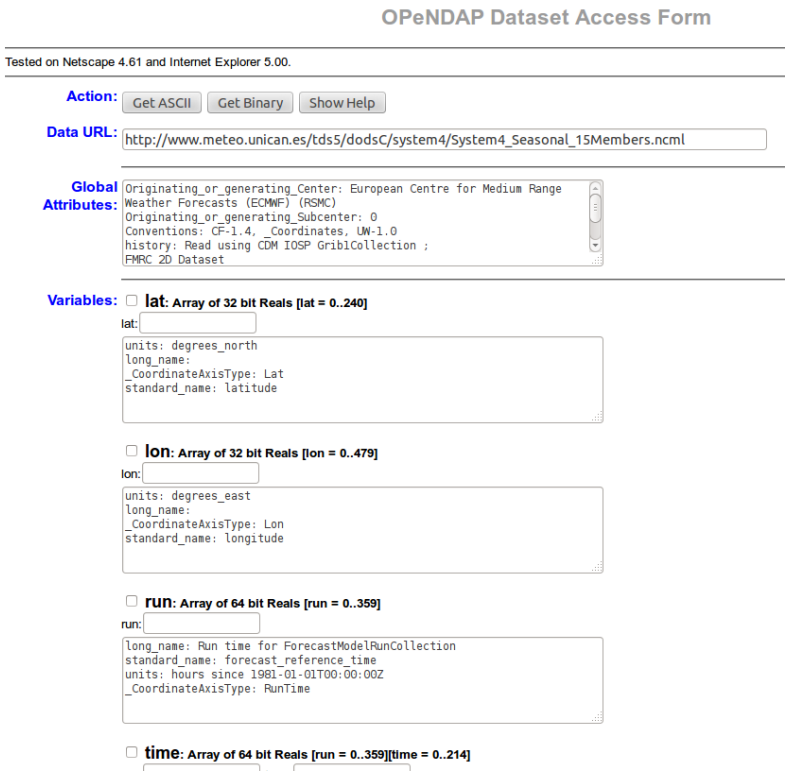
- *Start:* 1981-01-01T00:00:00Z
- *End:* 2011-07-04T00:00:00Z

Viewers:

- Godiva2 (browser-based)
- NetCDF-Java ToolsUI (webstart)
- Integrated Data Viewer (IDV) (webstart)

Currently, only the OPeNDAP access service is fully operative. Therefore, in this example, we will illustrate the use of this service, which allows selecting time/spatial data slices from the OPeNDAP data access form and downloading the resulting data in both *ASCII* and *Binary* formats. First of all, an authentication dialog will request a valid user name and password (see user registration for details).





Note that the variables provided (e.g. minimum temperature) are stored as gridsets. Thus, in addition to these variables, also auxiliary coordinate variables (lat, lon, run, time, member) should be handled for geo-temporal data referencing. Moreover, three time coordinates are included as referece for different grid variables because they are defined for different forecast times (one extra time for precipitation and different temporal resolution for mean sea level pressure). Note that this highly complicates the direct analysis of the data and, hence, this options is only recommend for data exploration.

In the following we show how to use this service to explore the structure of the datasets and to obtain simple pieces of information in `ASCII format`.

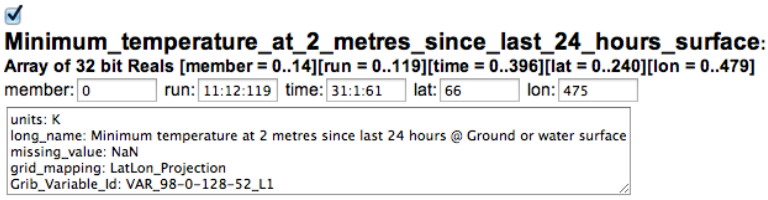
By default, if no specifications are given in the different subsetting boxes of the OpenDAP form, the whole data on the whole spatio/temporal and member ranges of the dataset would be accessed. However, this option will raise an error due to the large size of the request (the maximum size of a single request has been set to 100 Mbytes for the sake of multi-connection efficiency). The basic steps to retrieve subsets of data are the following:

1. Select a variable click on the checkbox to its left.
2. Constrain the variable: Edit the information that appears in the text boxes below the variable. This is a vector of integers indicating index positions of length three, with the following order: `[start:stride:end]`.
3. To get *ASCII* or *binary* values for the selected variables, click on the *Get ASCII* or *Get Binary* buttons of the *Action* field. Note that the URL displayed in the *Data URL* field is updated as you select and/or constrain variables. The URL in this field can be cut and pasted in various `OPeNDAP` clients.

The main disadvantage of the `OPeNDAP` service from the end-user point of view is that the specifications for subsetting dimensions are not given in their original magnitudes (i.e., latitudes and longitudes are not given in decimal degrees), but by the indexes of their position along their respective axes (note that first index value is always 0). Thus, to find out the indexes for the desired selection, we need to dump and analyze the particular values defined in the coordinate variable. For instance, this figure shows the 241 values defined for the `lat` (latitude) coordinate, as provided by the *Get ASCII* option (selecting the corresponding check-box).

```
Dataset {
    Float32 lat[lat = 241];
    Float32 lon[lon = 480];
} system4/System4_Annual_15Members.ncml;
---------------------------------------------
lat[241]
90.0, 89.25, 88.5, 87.75, 87.0, 86.25, 85.5, 84.75, 84.0, 83.25, 82.5, 81.75, 81.0, 80.25, 79.5, 78.75,
78.0, 77.25, 76.5, 75.75, 75.0, 74.25, 73.5, 72.75, 72.0, 71.25, 70.5, 69.75, 69.0, 68.25, 67.5, 66.75,
66.0, 65.25, 64.5, 63.749996, 62.999996, 62.249996, 61.499996, 60.749996, 59.999996, 59.249996, 58.499996,
57.749996, 56.999996, 56.249996, 55.499996, 54.749996, 53.999996, 53.249996, 52.499996, 51.749996,
50.999996, 50.249996, 49.499996, 48.749996, 47.999996, 47.249996, 46.499996, 45.749996, 44.999996,
44.249996, 43.499996, 42.749996, 41.999996, 41.249996, 40.499996, 39.749996, 38.999996, 38.249996,
37.499996, 36.749996, 35.999996, 35.249996, 34.499996, 33.749996, 32.999996, 32.249996, 31.499996,
30.749996, 29.999996, 29.249994, 28.499994, 27.749994, 26.999994, 26.249994, 25.499994, 24.749994,
23.999994, 23.249994, 22.499994, 21.749994, 20.999994, 20.249994, 19.499994, 18.749994, 17.999994,
17.249994, 16.499994, 15.749994, 14.999994, 14.249994, 13.499994, 12.749994, 11.999994, 11.249993,
10.499993, 9.749993, 8.999993, 8.249993, 7.4999933, 6.7499933, 5.9999933, 5.2499933, 4.4999933, 3.749993,
2.999993, 2.249993, 1.499993, 0.7499929, -7.1525574E-6, -0.7500072, -1.5000073, -2.2500074, -3.0000074,
-3.7500074, -4.5000076, -5.2500076, -6.0000076, -6.7500076, -7.5000076, -8.250008, -9.000008, -9.750008,
-10.500008, -11.250008, -12.000008, -12.750009, -13.500009, -14.250009, -15.000009, -15.750009, -16.500008,
-17.250008, -18.000008, -18.75001, -19.50001, -20.25001, -21.00001, -21.75001, -22.50001, -23.25001,
-24.00001, -24.75001, -25.50001, -26.25001, -27.00001, -27.75001, -28.50001, -29.25001, -30.00001,
-30.75001, -31.50001, -32.25001, -33.00001, -33.75001, -34.50001, -35.25001, -36.00001, -36.75001,
-37.50001, -38.25001, -39.00001, -39.75001, -40.50001, -41.25001, -42.00001, -42.75001, -43.50001,
-44.25001, -45.00001, -45.75001, -46.50001, -47.25001, -48.00001, -48.75001, -49.50001, -50.25001,
-51.00001, -51.75001, -52.50001, -53.25001, -54.00001, -54.75001, -55.50001, -56.25001, -57.00001,
-57.75001, -58.50001, -59.25001, -60.00001, -60.75001, -61.50001, -62.25001, -63.00001, -63.75001,
-64.500015, -65.250015, -66.000015, -66.750015, -67.500015, -68.250015, -69.000015, -69.750015, -70.500015,
-71.250015, -72.000015, -72.750015, -73.500015, -74.250015, -75.000015, -75.750015, -76.500015, -77.250015,
-78.000015, -78.750015, -79.500015, -80.250015, -81.000015, -81.750015, -82.500015, -83.250015, -84.000015,
-84.750015, -85.500015, -86.250015, -87.000015, -87.750015, -88.500015, -89.250015, -90.000015
```

Using these facilities it can be obtained after some calculations that the closest `lat` and `lon` coordinates for a particular location of interest (e.g. `Madrid`) are 66 and 475, respectively. Thus, the time series for Madrid corresponding to the example described in the previous section (minimum temperature forecasts for January with one-month lead time, i.e. from the simulations started the first of December) could be requested as shown in Figure



Note that the indexes selected for the run coordinate correspond to the December initializations (index positions 11, 23,..., and that indexes start in 0) and for the time coordinate correspond to January (positions, 31 to 62, in days after the run time). The proper use of this service requires a full understanding of the data structure and, therefore, it is only advised for data exploration.