RTOFS File Description for NOMADS

For the RTOFS data set in NOMADS, there are two metadata descriptions - two ways to access the data set:
1) The URL data you are using:

http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_DODS_atl

points to the GRIB file raw output, with out any interpolation, so the GRIB contents are accessed "as is" on the RTOFS curvilinear rotated grid. This means that the values are not interpolated form the (I,J) RTOFS irregular grid and GDS queries will return the raw RTOFS values but not contain the correct labeled lon/lat locations.

2) A URL pointer

http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_PLOT_atl

points to a metadata description which includes a projection definition (pdef) that interpolates from the RTOFS curvilinear rotated grid to a lat/lon equally spaced cylindrical projection for plotting or getting values at lon/lats. This means an interpolation is done between the model grids and displays will be correct according to continental boundaries. GDS queries will return interpolated values from the nearest curvilinear points but the returned lon/lat locations will be correct.

Lets take this opportunity to look at how we used GDS/OPENDAP to allow both plotting of interpolated values from the irregular RTOFS grid and
accessing the raw GRIB values when needed or displaying the data on a lon/lat regular grid.

Adding a ".info" onto either address above shows the NOMADS OPENDAP(DODS)/GDS metadata descriptions of these two approaches.

For 1), a "DODS" metadata description of the raw data files excerpt is shown below:

  GrADS Data Server - info for
  /rtofs/daily/rtofs20070621/rtofs_DODS_atl : dds

<http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_DODS_atl.dds> das

<http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_DODS_atl.das>

Description:
   Real-time Ocean Forecast System - Altantic Sector Native GRID Beta Version
Documentation: (none provided)
Longitude: -105.032°E to 67.624°E
   (1200 points, avg. res. 0.144°)
Latitude: -25.4°N to 77.263°N
   (1684 points, avg. res. 0.061°)
Altitude: 6000 to 0
   (40 points, avg. res. 153.846)
Time: 00Z21JUN2007 to 00Z26JUN2007
   (6 points, avg. res. 1.0 days)
Variables:
   (total of 13)

  dzdtdsl
  ** (profile) geometric vertical velocity [m/s]

  mixhtsfc
  ** surface mixed layer depth [m]

  salindsl
  ** (profile) salinity [psu]

  sshgsfc
  ** surface sea surface height relative to geoid [m]

  uogrddsl
  ** (profile) u of current [m/s]

  vogrddsl
  ** (profile) v of current [m/s]

  wtmpdsl
  ** (profile) temperature [k]

  var188sfc
  ** surface undefined

  .
  .

.

For 2), "PLOT", we show the interpolated metadata description access excerpt used for plotting:

  GrADS Data Server - info for
  /rtofs/daily/rtofs20070621/rtofs_PLOT_atl : dds

<http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_PLOT_atl.dds
> das

<http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_PLOT_atl.das
>

OPeNDAP/DODS Data URL:
http://nomads6.ncdc.noaa.gov:9090/dods/rtofs/daily/rtofs20070621/rtofs_PLOT_atl

Description:
   Real-time Ocean Forecast System - Altantic Sector Native GRID Beta Version
Documentation: (none provided)
Longitude: -105.04°E to 67.0775°E
    (1300 points, avg. res. 0.132°)
Latitude: -25.2°N to 76.4322°N
    (1500 points, avg. res. 0.068°)
Altitude: 6000 to 0
    (40 points, avg. res. 153.846)
Time: 00Z21JUN2007 to 00Z26JUN2007
    (6 points, avg. res. 1.0 days)
Variables:
   (total of 13)

   dzdtdsl
   ** (profile) geometric vertical velocity [m/s]

   mixhtsfc
   ** surface mixed layer depth [m]

   salindsl
   ** (profile) salinity [psu]

   sshgsfc
   ** surface sea surface height relative to geoid [m]

uogrddsl
** (profile) u of current [m/s]

vogrddsl
** (profile) v of current [m/s]

wtmpdsl
** (profile) temperature [k]

var188sfc
** surface undefined

In the raw data case or "DODS" case, 1), the array of points is as posted by RTOFS as a 1200, 1684 irregular grid.
In the "PLOT" case, 2), the interpolated equally spaced grid encompasses the RTOFS grid with a 1300, 1500 point lon/lat grid close to the same information content of the original raw RTOFS GRIB file.

If one uses Grads (gradsdods) or MATLAB clients to display "DODS" data there will be a distortion of the irregular grid when displayed upon a lon/lat map, and the display will plot the ocean points over land. But if one uses the "PLOT" type data set then the display will be correct on the lon/lat projection. There is only one RTOFS data set but two ways to look at it.