Subject: Extract / interpolate in 3d atmospheric field
Posted by Dave[3] on Wed, 03 Feb 2010 13:57:44 GMT
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I have some gridded, 3d atmospheric model data (pv, temperature, etc)
and I am trying to pull some data out of the cube.

```
IDL> help, data, /str
** Structure <1fafc08>, 10 tags, length=701600, data length=701600,
refs=1:
   IDAY            LONG              25
   IMON            LONG               1
   IYEAR           LONG            2005
   LATS            LONG              73
   MERIDS          LONG              96
   LEVS            LONG              25
   XLAT            FLOAT     Array[73]
   XLON            FLOAT     Array[96]
   PRES            FLOAT     Array[25]
   DATA            FLOAT     Array[73, 96, 25]
IDL> print, data.xlat
     -90.0000     -87.5000     -85.0000     -82.5000     -80.0000
-77.5000     -75.0000     -72.5000     -70.0000
     -67.5000     -65.0000     -62.5000     -60.0000     -57.5000
-55.0000     -52.5000     -50.0000     -47.5000
     -45.0000     -42.5000     -40.0000     -37.5000     -35.0000
-32.5000     -30.0000     -27.5000     -25.0000
     -22.5000     -20.0000     -17.5000     -15.0000     -12.5000
-10.0000     -7.50000     -5.00000     -2.50000
      0.00000      2.50000      5.00000      7.50000      10.0000
12.5000      15.0000      17.5000      20.0000
      22.5000      25.0000      27.5000      30.0000      32.5000
35.0000      37.5000      40.0000      42.5000
      45.0000      47.5000      50.0000      52.5000      55.0000
57.5000      60.0000      62.5000      65.0000
      67.5000      70.0000      72.5000      75.0000      77.5000
80.0000      82.5000      85.0000      87.5000
      90.0000
IDL> print, data.xlon
      0.00000      3.75000      7.50000      11.2500      15.0000
18.7500      22.5000      26.2500      30.0000
      33.7500      37.5000      41.2500      45.0000      48.7500
52.5000      56.2500      60.0000      63.7500
      67.5000      71.2500      75.0000      78.7500      82.5000
86.2500      90.0000      93.7500      97.5000
      101.250      105.000      108.750      112.500      116.250
120.000      123.750      127.500      131.250
      135.000      138.750      142.500      146.250      150.000
```

153.750 157.500 161.250 165.000
168.750 172.500 176.250 180.000 183.750
187.500 191.250 195.000 198.750
202.500 206.250 210.000 213.750 217.500
221.250 225.000 228.750 232.500
236.250 240.000 243.750 247.500 251.250
255.000 258.750 262.500 266.250
270.000 273.750 277.500 281.250 285.000
288.750 292.500 296.250 300.000
303.750 307.500 311.250 315.000 318.750
322.500 326.250 330.000 333.750
337.500 341.250 345.000 348.750 352.500
356.250
IDL> print, data.pres
1000.00 681.292 464.159 316.228 215.443
146.780 100.000 68.1292 46.4159
31.6228 21.5443 14.6780 10.0000 6.81292
4.64159 3.16228 2.15443 1.46780
1.00000 0.681292 0.464159 0.316228 0.215443
0.146780 0.100000

I'd like to pull the 2d slice of data at a specific latitude circle
and create a contour plot where the y-axis
is pressure and the x-axis is longitude. So, when the latitude of
interest is specified in xlat, 85 N, I
can pull this array as:

IDL> print, data.xlat[70]
85.0000
IDL> help, reform(data.data[70,*,*])
<Expression> FLOAT = Array[96, 25]

Unfortunately, the latitude circle of interest isn't always exactly
specified, say 83.5 or 84 deg N.
Re-runing the model with higher grid resolution is not an option so
I'm stuck trying to interpolate
the data cube. I suspect I'm not the first person to encounter this in
atmospheric science and
was wondering if anyone had any routines or techniques they are
willing to share.

I've looked at the routine 'extract_slice' but I'm not sure it is
appropriate here and I've not been
able to get sensible results from it.

Thanks all,
Dave
