Vector, line and significance plots

cfp.vect - vector plots

In [1]:

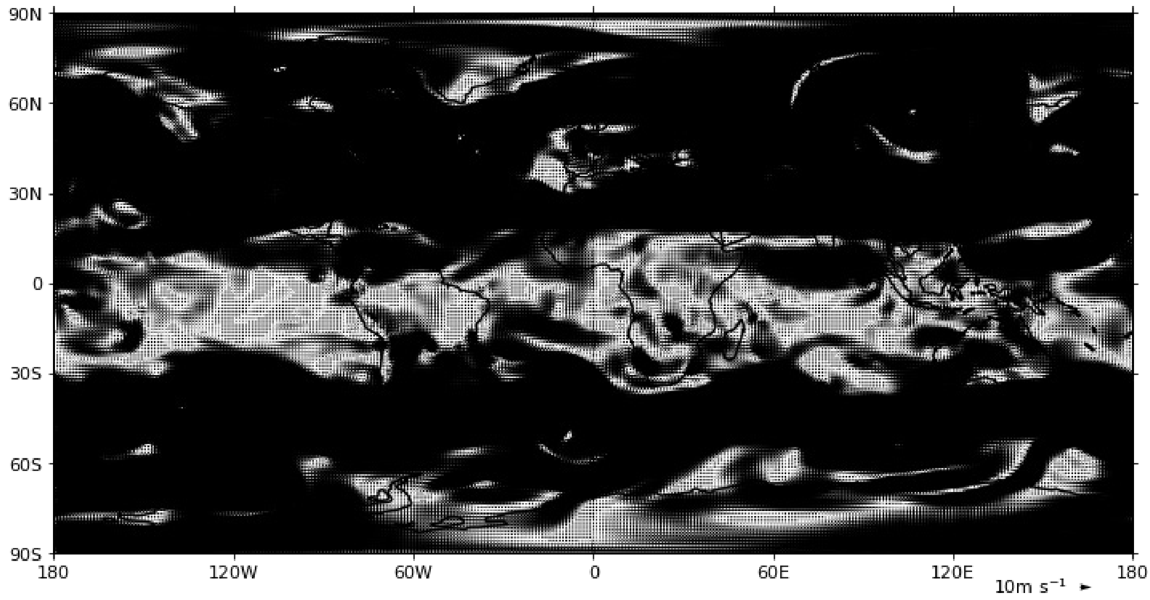
```
# Inline images in Ipython Notebook - not needed in Python
%matplotlib inline

# Turn off warnings
import warnings
warnings.filterwarnings("ignore")

# Import cf-python and cf-plot packages
import cf
import cfplot as cfp
```

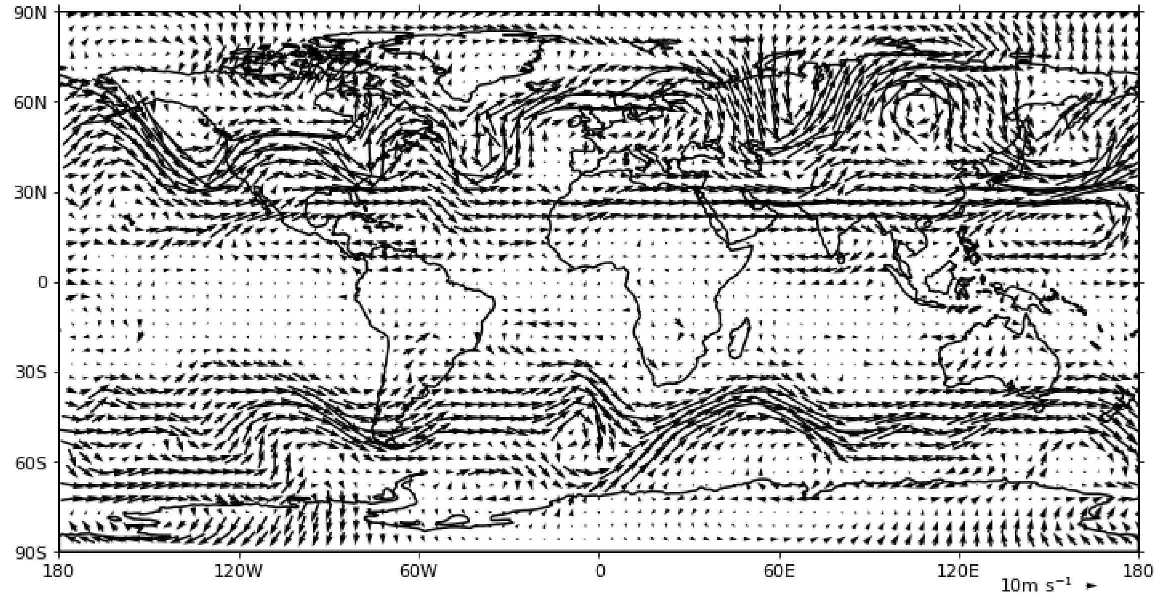
In [2]:

```
# Select u and v wind components at 500mb and make a vector plot
f=cf.read('ncas_data/data1.nc')
u=f[7].subspace(pressure=500)
v=f[8].subspace(pressure=500)
cfp.mapset(0, 360, -90, 90)
cfp.mapset()
cfp.vect(u=u, v=v, key_length=10, scale=100)
```



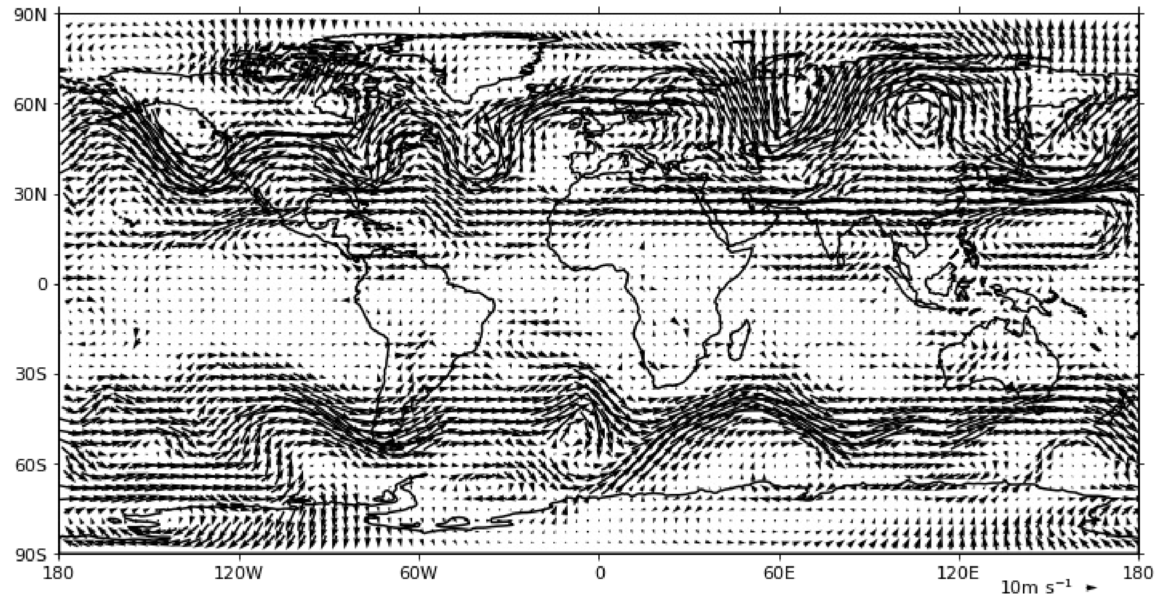
In [3]:

```
# In the example above we have too many points for the vectors to be discernable
# We can use a stride of 4 in plotting the vectors to thin out the vectors
cfp.vect(u=u, v=v, key_length=10, scale=100, stride=4)
```



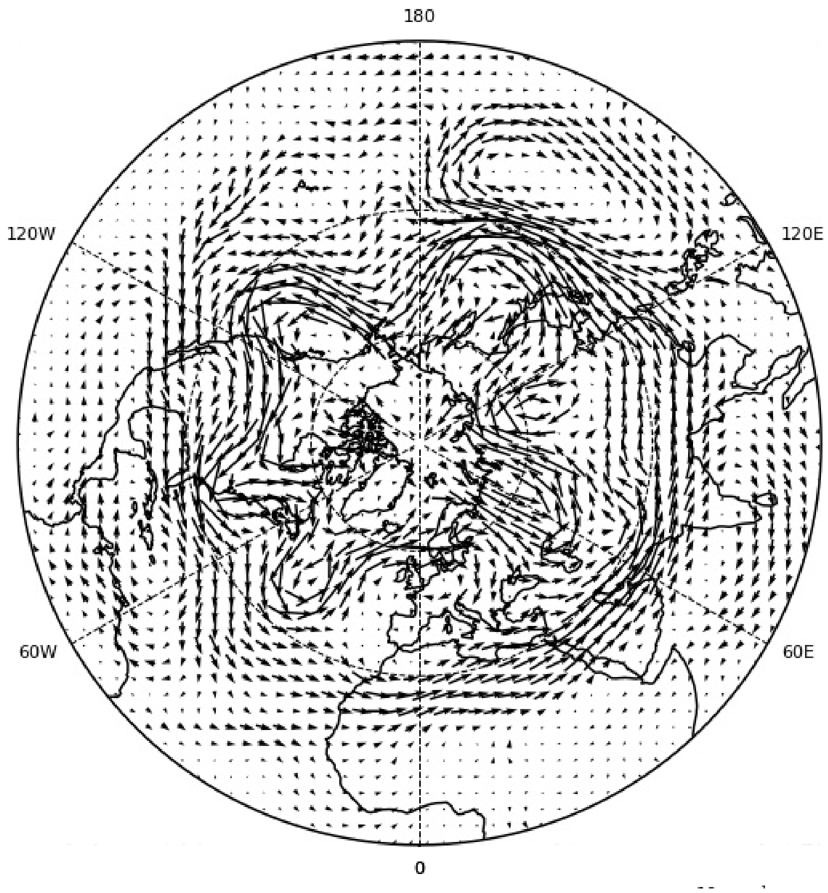
In [4]:

```
# The pts parameter controls the interpolation of the vectors to a new grid
# One value will give the same number of points in both directions
cfp.vect(u=u, v=v, key_length=10, scale=100, pts=50)
```



In [5]:

```
# When making polar stereographic plots use the pts keyword to cfp.vect
# to specify the number of interpolated points in x and y
cfp.mapset(proj='npstere')
cfp.vect(u=u, v=v, key_length=10, scale=100, pts=50)
```

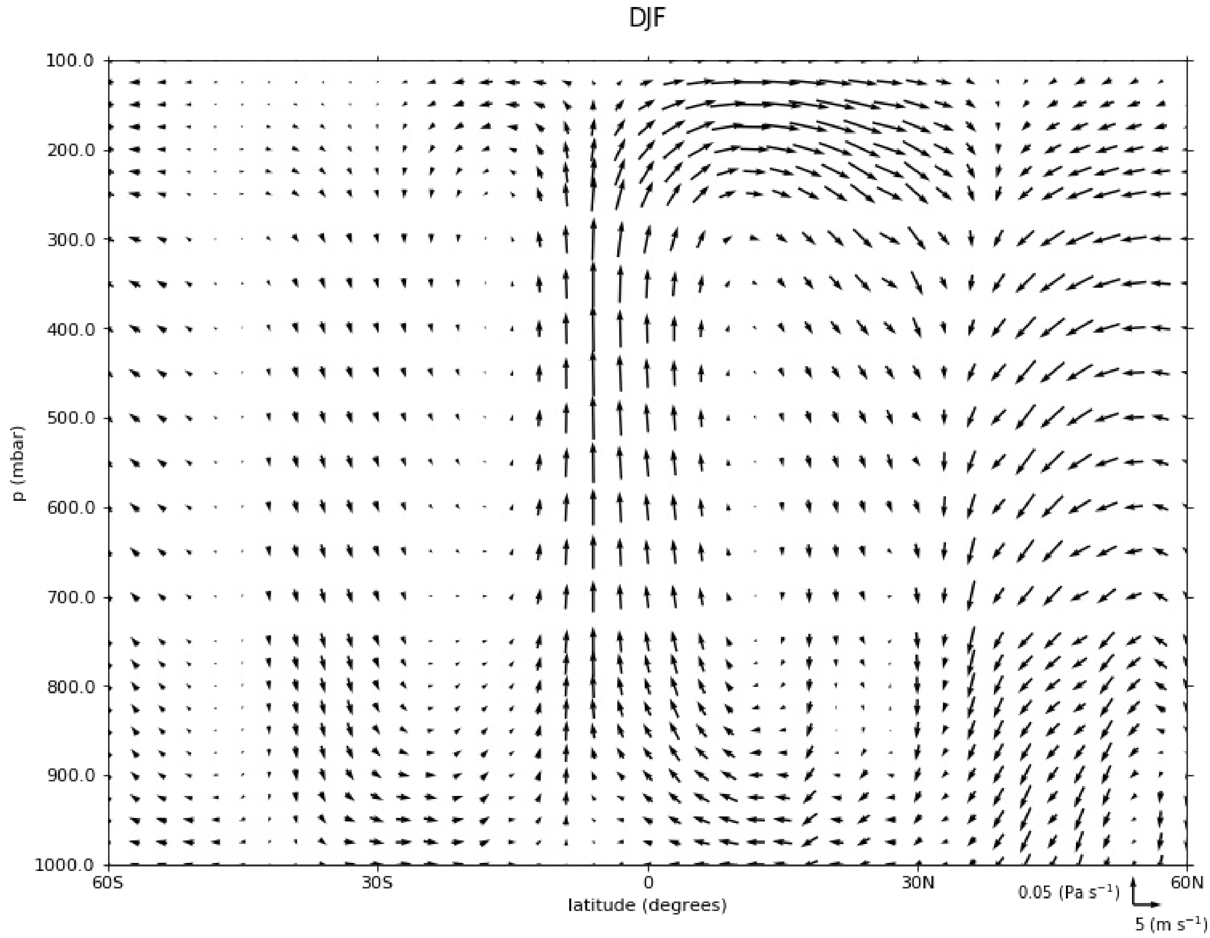


In [6]:

```
# Vectors can have different lengths and scales as in the example below
c=cf.read('ncas_data/vaAMIPlcd_DJF.nc')[0]
c=c.subspace(Y=cf.wi(-60,60))
c=c.subspace(X=cf.wi(80,160))
c=c.collapse('T: mean X: mean')

g=cf.read('ncas_data/wapAMIPlcd_DJF.nc')[0]
g=g.subspace(Y=cf.wi(-60,60))
g=g.subspace(X=cf.wi(80,160))
g=g.collapse('T: mean X: mean')

cfp.vect(u=c, v=-g, key_length=[5, 0.05], scale=[20,0.2], title='DJF', key_location=[0.95, -0.05])
```

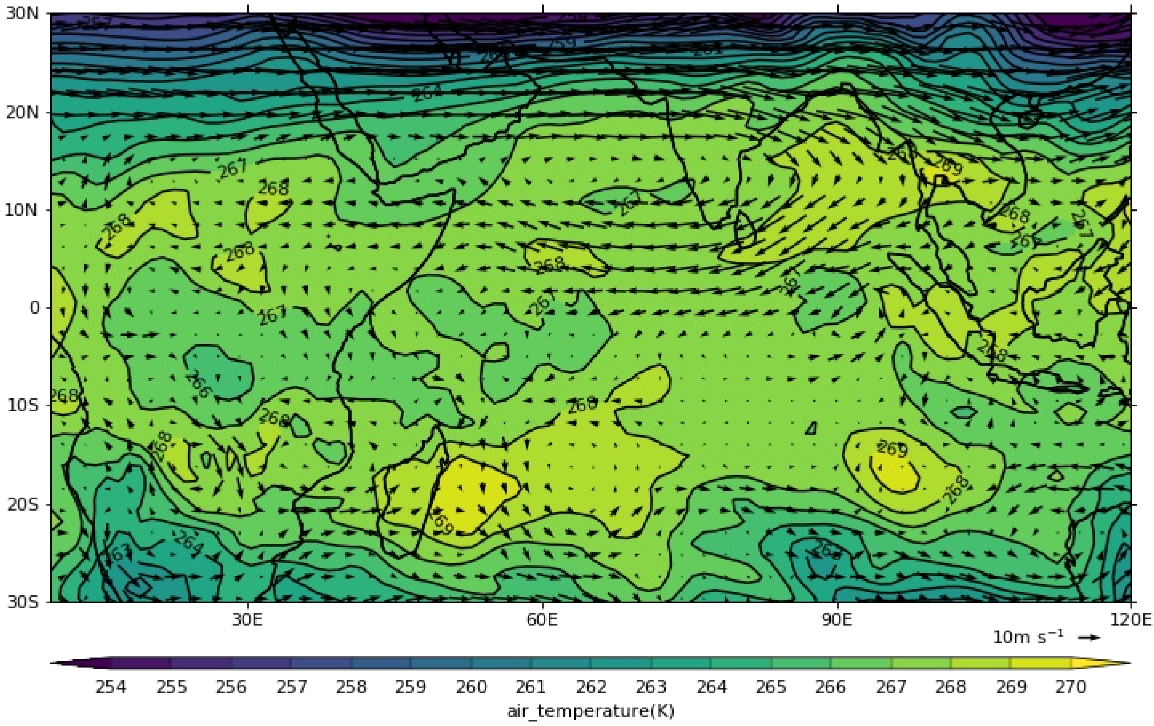


In [7]:

```
# Making overlaying plots
# In this case we will make a vector plot overlaying a contour plot
# Plots overlaying each other or multiple plots on a page need to be
# enclosed within a cfp.gopen() cfp.gclose() pair.  See additional
# material on multiple plots in the cf-plot directory.

import cf, cfplot as cfp
f=cf.read('ncas_data/data1.nc')
u=f[7].subspace(pressure=500)
v=f[8].subspace(pressure=500)
t=f[6].subspace(pressure=500)


cfp.gopen()
cfp.mapset(lonmin=10, lonmax=120, latmin=-30, latmax=30)
cfp.levs(min=254, max=270, step=1)
cfp.con(t)
cfp.vect(u=u, v=v, key_length=10, scale=50, stride=2)
cfp.gclose()
```



cfp-lineplot - making line plots

In [8]:

```
# Read in some temperature data and convert to Celsius
f = cf.read('ncas_data/data1.nc')[6]
f = f.collapse('mean','longitude')
f.Units -= 273.15
```

In [9]:

```
# Reset the plotting limits
cfp.gset()
```

In [10]:

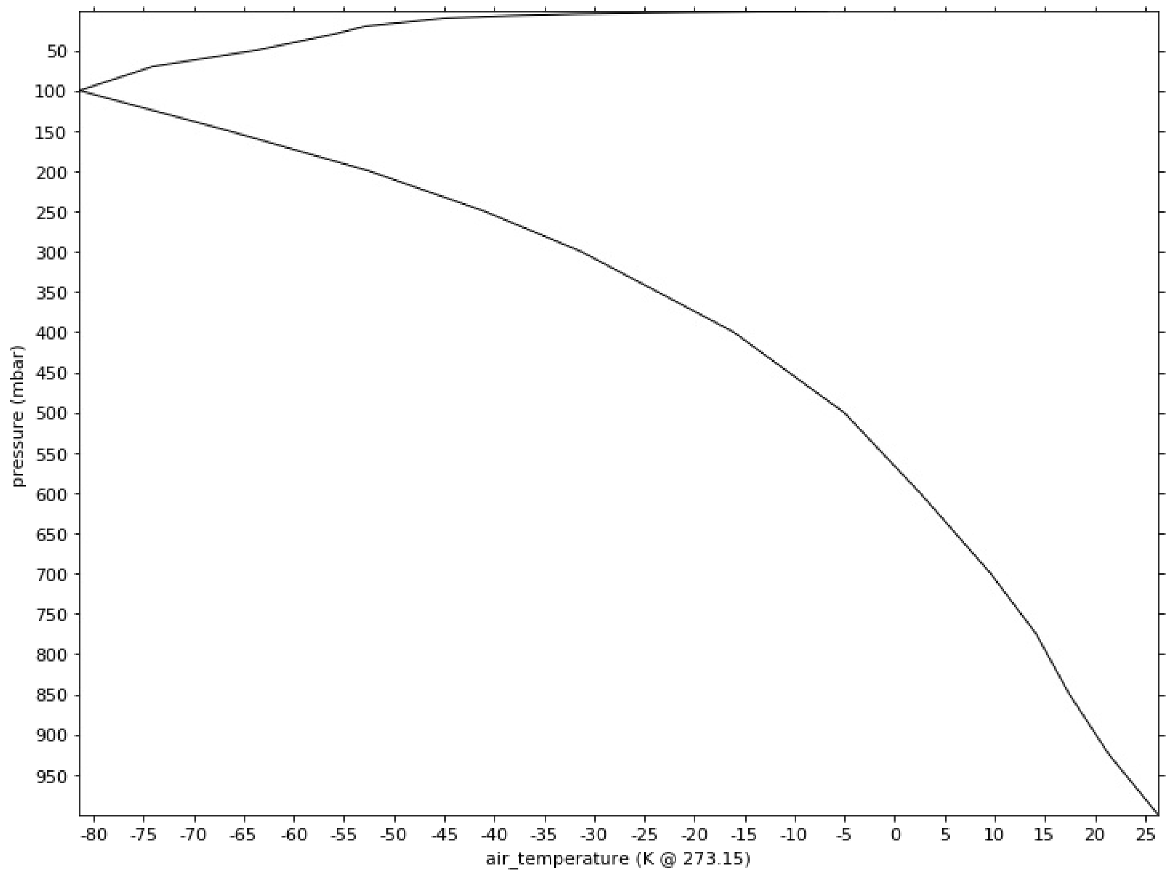
```
f.item('latitude').array
```

Out[10]:

```
array([ 89.14152   ,  88.02943   ,  86.910774  ,  85.79063   ,
        84.66992   ,  83.54895   ,  82.42782   ,  81.306595  ,
        80.18531   ,  79.06398   ,  77.94263   ,  76.82124   ,
        75.699844  ,  74.57843   ,  73.45701   ,  72.33558   ,
        71.214134  ,  70.09269   ,  68.97124   ,  67.849785  ,
        66.728325  ,  65.606865  ,  64.4854    ,  63.363934  ,
        62.242462  ,  61.12099   ,  59.99952   ,  58.878044  ,
        57.75657   ,  56.635094  ,  55.513615  ,  54.392136  ,
        53.270657  ,  52.149174  ,  51.027695  ,  49.90621   ,
        48.78473   ,  47.663246  ,  46.541763  ,  45.42028   ,
        44.298794  ,  43.17731   ,  42.055824  ,  40.934338  ,
        39.81285   ,  38.691364  ,  37.56988   ,  36.44839   ,
        35.326904  ,  34.205418  ,  33.08393   ,  31.962444  ,
        30.840956  ,  29.719467  ,  28.597979  ,  27.47649   ,
        26.355003  ,  25.233515  ,  24.112024  ,  22.990536  ,
        21.869047  ,  20.747559  ,  19.62607   ,  18.50458   ,
        17.383091  ,  16.2616    ,  15.140112  ,  14.018622  ,
        12.897133  ,  11.775643  ,  10.654153  ,   9.532663  ,
         8.411174  ,   7.2896843 ,   6.1681943 ,   5.0467043 ,
         3.9252145 ,   2.8037248 ,   1.6822349 ,   0.56074494,
        -0.56074494,  -1.6822349 ,  -2.8037248 ,  -3.9252145 ,
        -5.0467043 ,  -6.1681943 ,  -7.2896843 ,  -8.411174  ,
        -9.532663  , -10.654153  , -11.775643  , -12.897133  ,
       -14.018622  , -15.140112  , -16.2616    , -17.383091  ,
       -18.50458   , -19.62607   , -20.747559  , -21.869047  ,
       -22.990536  , -24.112024  , -25.233515  , -26.355003  ,
       -27.47649   , -28.597979  , -29.719467  , -30.840956  ,
       -31.962444  , -33.08393   , -34.205418  , -35.326904  ,
       -36.44839   , -37.56988   , -38.691364  , -39.81285   ,
       -40.934338  , -42.055824  , -43.17731   , -44.298794  ,
       -45.42028   , -46.541763  , -47.663246  , -48.78473   ,
       -49.90621   , -51.027695  , -52.149174  , -53.270657  ,
       -54.392136  , -55.513615  , -56.635094  , -57.75657   ,
       -58.878044  , -59.99952   , -61.12099   , -62.242462  ,
       -63.363934  , -64.4854    , -65.606865  , -66.728325  ,
       -67.849785  , -68.97124   , -70.09269   , -71.214134  ,
       -72.33558   , -73.45701   , -74.57843   , -75.699844  ,
       -76.82124   , -77.94263   , -79.06398   , -80.18531   ,
       -81.306595  , -82.42782   , -83.54895   , -84.66992   ,
       -85.79063   , -86.910774  , -88.02943   , -89.14152   ],
      dtype=float32)
```

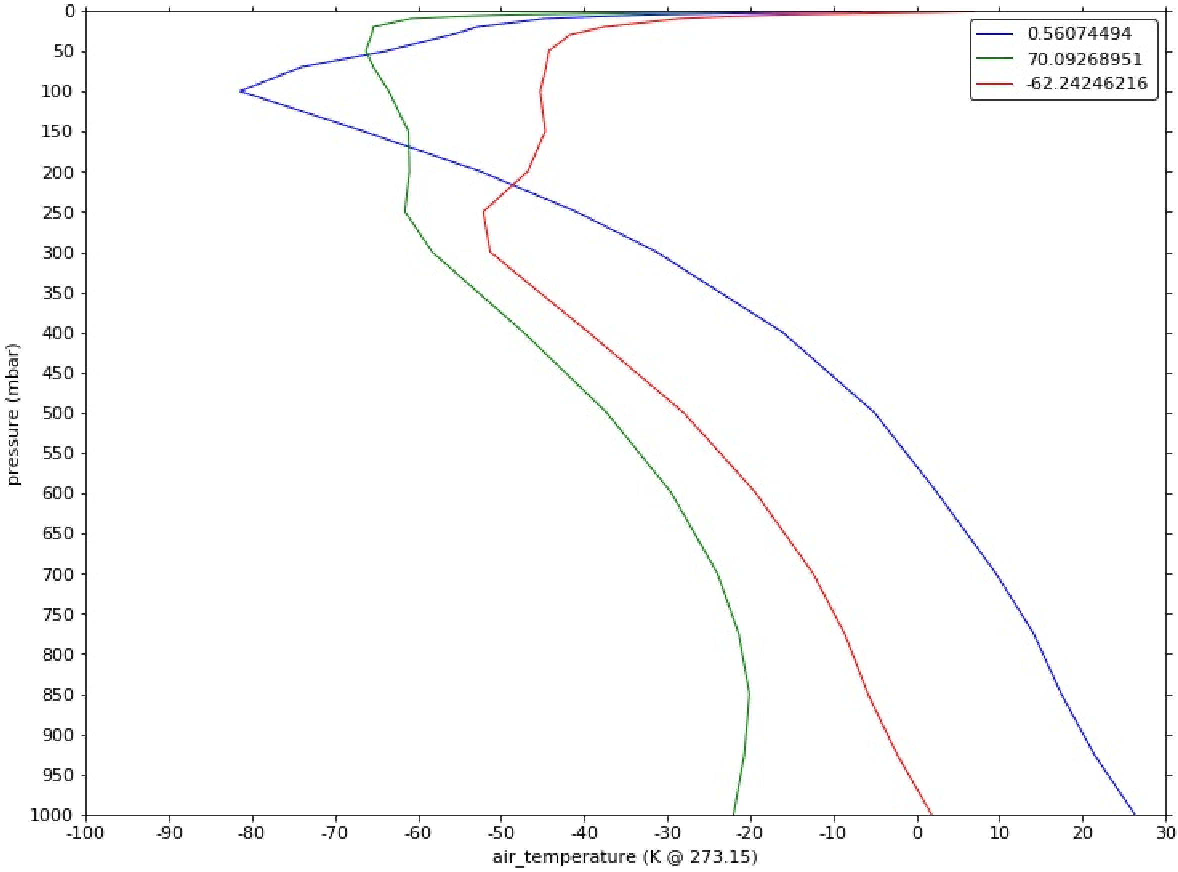
In [11]:

```
# Make a lineplot near to the equator
g=f.subspace(latitude=0.56074494)
cfp.lineplot(g)
```



In [12]:

```
cfp.gopen()
cfp.gset(xmin=-100,xmax=30, ymin=1000, ymax=0)
yticks=[1000, 900,800,700, 600,500,400,300,200,100,0]
cfp.lineplot(f.subspace(latitude=0.56074494), label='0.56074494', color='b')
cfp.lineplot(f.subspace(latitude=70.09268951), label='70.09268951', color='g', yticks=yticks)
cfp.lineplot(f.subspace(latitude=-62.24246216), label='-62.24246216', color='r')
cfp.gclose()
```

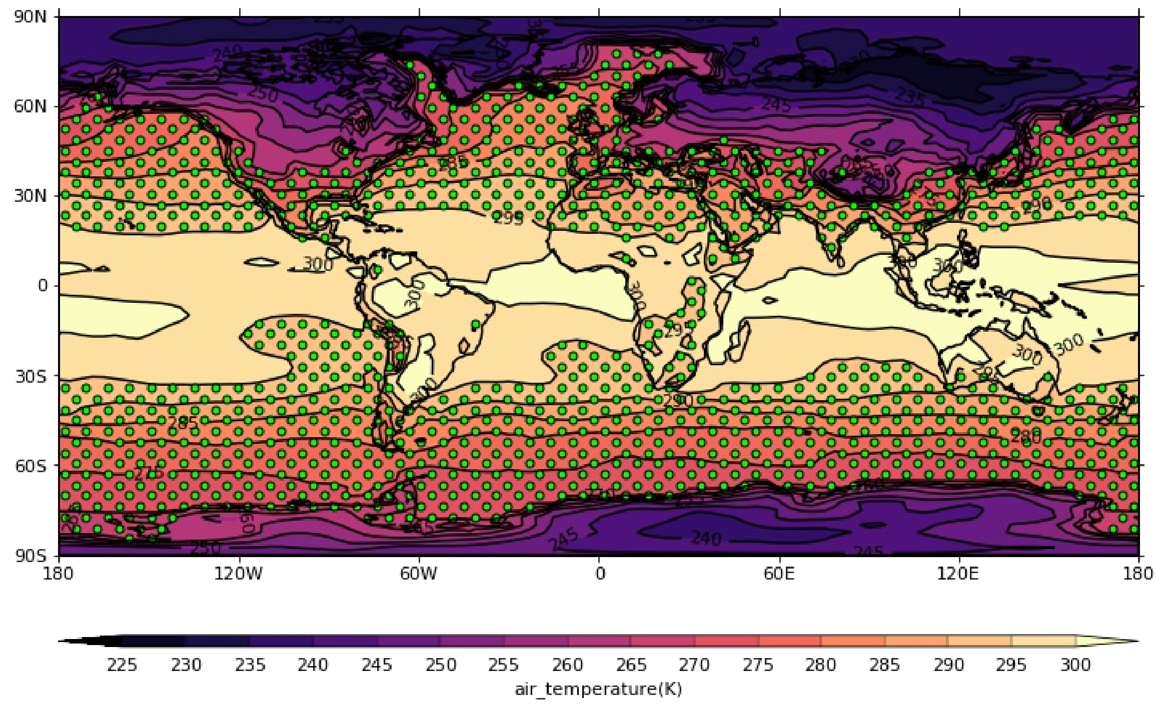


cfp.stipple - Significance plots

plotting areas of significance with coloured symbols

In [13]:

```
cfp.mapset()
cfp.levs()
f=cf.read('ncas_data/data4.nc')[0]
g=f.subspace(time=15)
cfp.gopen()
cfp.cscale('magma')
cfp.con(g)
cfp.stipple(f=g, min=265, max=295, size=100, color='#00ff00')
cfp.gclose()
```



In [14]:

```
cfp.gopen()
cfp.cscale()
cfp.mapset(proj='npstere')
cfp.con(g)
cfp.stipple(f=g, min=200, max=285, size=100, color='grey')
cfp.gclose()
```