Aula 24

Input de dados ascii e xls

Mais exemplos de cartografia cartopy

Esta semana

Notas do projeto A (quinta?)

Exame tipo mo moodle: data/hora a confirmar

Dados climáticos GISS (NASA)

https://www.giss.nasa.gov/

NASA — National Aeronautics and Space Administration
Goddard Institute for Space Studies

Global
Resolução 2°
180×90 pontos
1 ficheiro por mês

	nite2.py		ledatasxls.py		GISS_T_Ano_Feb2018.dat	readGISS_ca
1	1	1	-179.00	-89.00	-1.6145	
2	2	1	-177.00	-89.00	-1.6145	
3	3	1	-175.00	-89.00	-1.6145	
4	4	1	-173.00	-89.00	-1.6145	
5	5	1	-171.00	-89.00	-1.6145	
6	6	1	-169.00	-89.00	-1.6145	
7	7	1	-167.00	-89.00	-1.6145	
8	8	1	-165.00	-89.00	-1.6145	
9	9	1	-163.00	-89.00	-1.6145	
10	10	1	-161.00	-89.00	-1.6145	
11	11	1	-159.00	-89.00	-1.6145	
12	12	1	-157.00	-89.00	-1.6145	
13	13	1	-155.00	-89.00	-1.6145	
14	14	1	-153.00	-89.00	-1.6145	
15	15	1	-151.00	-89.00	-1.6145	
16	16	1	-149.00	-89.00	-1.6145	
17	17	1	-147.00	-89.00	-1.6145	
18	18	1	-145.00	-89.00	-1.6145	
19	19	1	-143.00	-89.00	-1.6145	
20	20	1	-141.00	-89.00	-1.6145	
21	21	1	-139.00	-89.00	-1.6145	
22	22	1	-137.00	-89.00	-1.6145	
23	23	1	-135.00	-89.00	-1.6145	
24	24	1	-133.00	-89.00	-1.6145	
25	25	1	-131.00	-89.00	-1.6145	

```python
import numpy as np
import matplotlib.pyplot as plt
import cartopy.crs as ccrs
GISS=np.loadtxt('GISS_T_Ano_Feb2018.dat')
nx=180;ny=90
lon=np.zeros((ny,nx),dtype=float)
lat=np.copy(lon)
Ta=np.copy(lon)
for k in range(len(GISS)):
    ix=int(GISS[k,0])-1
    iy=int(GISS[k,1])-1
    lon[iy,ix]=GISS[k,2]
    lat[iy,ix]=GISS[k,3]
    Ta[iy,ix]=GISS[k,4]
```

hite2.py	ledatasxls.py	GISS_T_Ano_Feb2018.dat	readGISS_ca
1	1	1 -179.00 -89.00	-1.6145
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6	6	1 -169.00 -89.00	-1.6145
7	7	1 -167.00 -89.00	-1.6145
8	8	1 -165.00 -89.00	-1.6145
9	9	1 -163.00 -89.00	-1.6145
10	10	1 -161.00 -89.00	-1.6145
11	11	1 -159.00 -89.00	-1.6145
12	12	1 -157.00 -89.00	-1.6145
13	13	1 -155.00 -89.00	-1.6145
14	14	1 -153.00 -89.00	-1.6145
15	15	1 -151.00 -89.00	-1.6145

Orthographic

$\lambda = 0, \phi = f\text{-}90$

$\lambda = 0, \phi = f\,90$

GISS_Ortho1.png   *GISS_Ortho2.png*

```python
#plt.figure(figsize=(6, 6))
k=0
for clat in[-90,90]:
    k=k+1
    plt.figure()
    projection =ccrs.Orthographic(central_longitude=0,\
              central_latitude=clat,globe=None)
    ax = plt.axes(projection=projection)
    ax.set_global()
    ax.coastlines()
    data_crs=ccrs.PlateCarree()
    ax.contourf(lon,lat,Ta,cmap='jet',transform=data_crs)
    plt.title(r"$\lambda=0,\phi=f$" + "%3.0f" % (clat))
    plt.show()
    plt.savefig('GISS_Ortho'+str(k)+'.png')
```
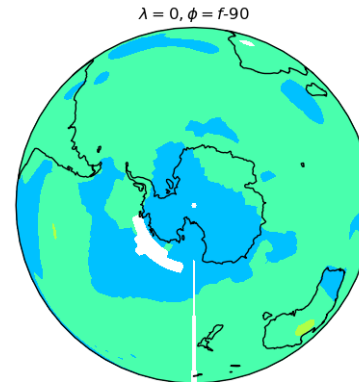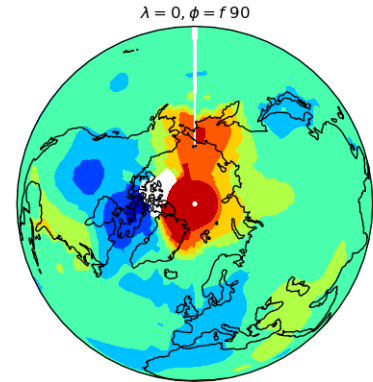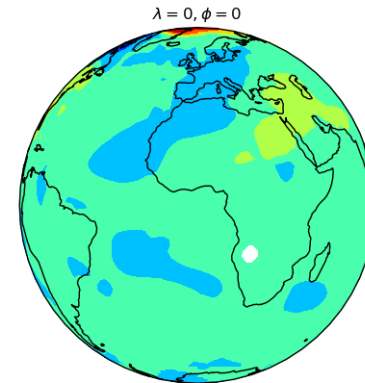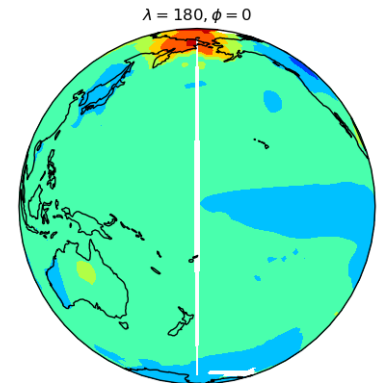
Orthographic

GISS_Ortho3.png   **GISS_Ortho4.png**

```python
for clon in[0,180]:
    k=k+1
    plt.figure()
    projection =ccrs.Orthographic(central_longitude\
        =clon,central_latitude=0,globe=None)
    ax = plt.axes(projection=projection)
    ax.set_global()
    ax.coastlines()
    data_crs=ccrs.PlateCarree()
    ax.contourf(lon,lat,Ta,cmap='jet',\
                transform=data_crs )
    plt.title(r"$\lambda=%3.0f,\phi=0$" % (clon))
    plt.show()
    plt.savefig('GISS_Ortho'+str(k)+'.png')
```
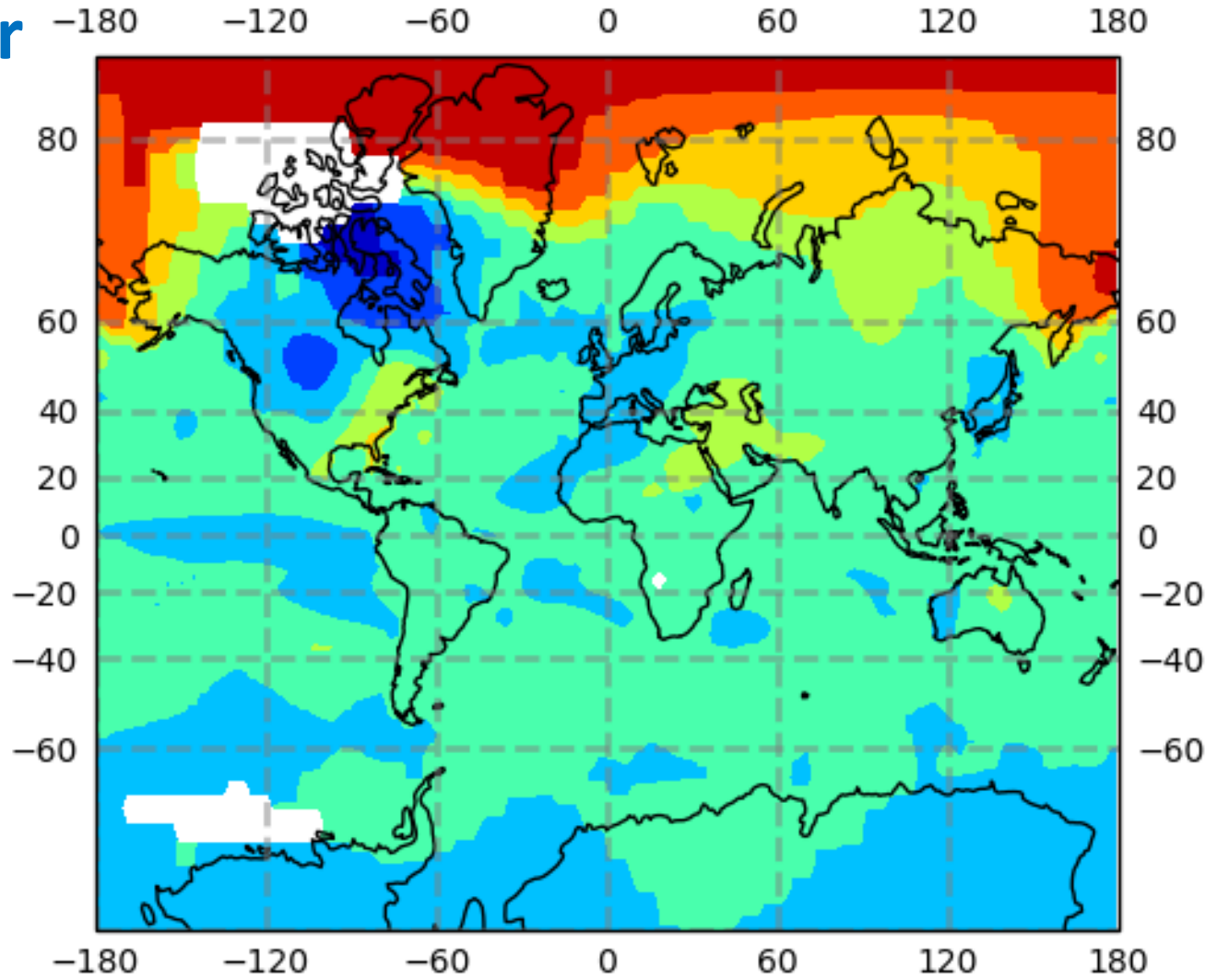
Mercator

```python
plt.figure()
projection =ccrs.Mercator(\
              central_longitude=0,globe=None)
ax = plt.axes(projection=projection)
ax.set_global();ax.coastlines()
gl = ax.gridlines(crs=ccrs.PlateCarree(),\
     draw_labels=True,linewidth=2,\
     color='gray', alpha=0.5, linestyle='--')
data_crs=ccrs.PlateCarree()
ax.contourf(lon,lat,Ta,cmap='jet',\
              transform=data_crs )
plt.show()
plt.savefig('GISS_Mercator.png')
```
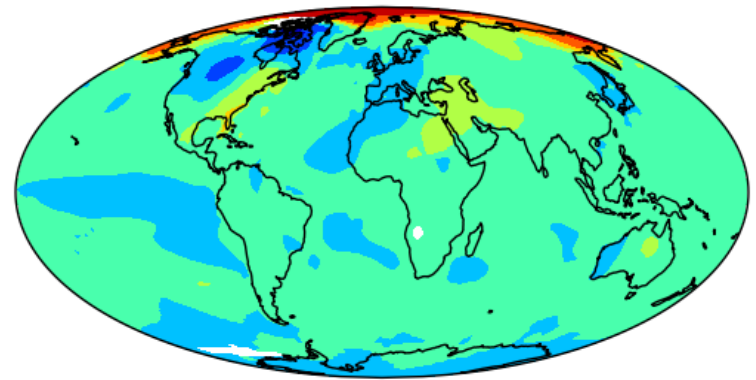
Mercator
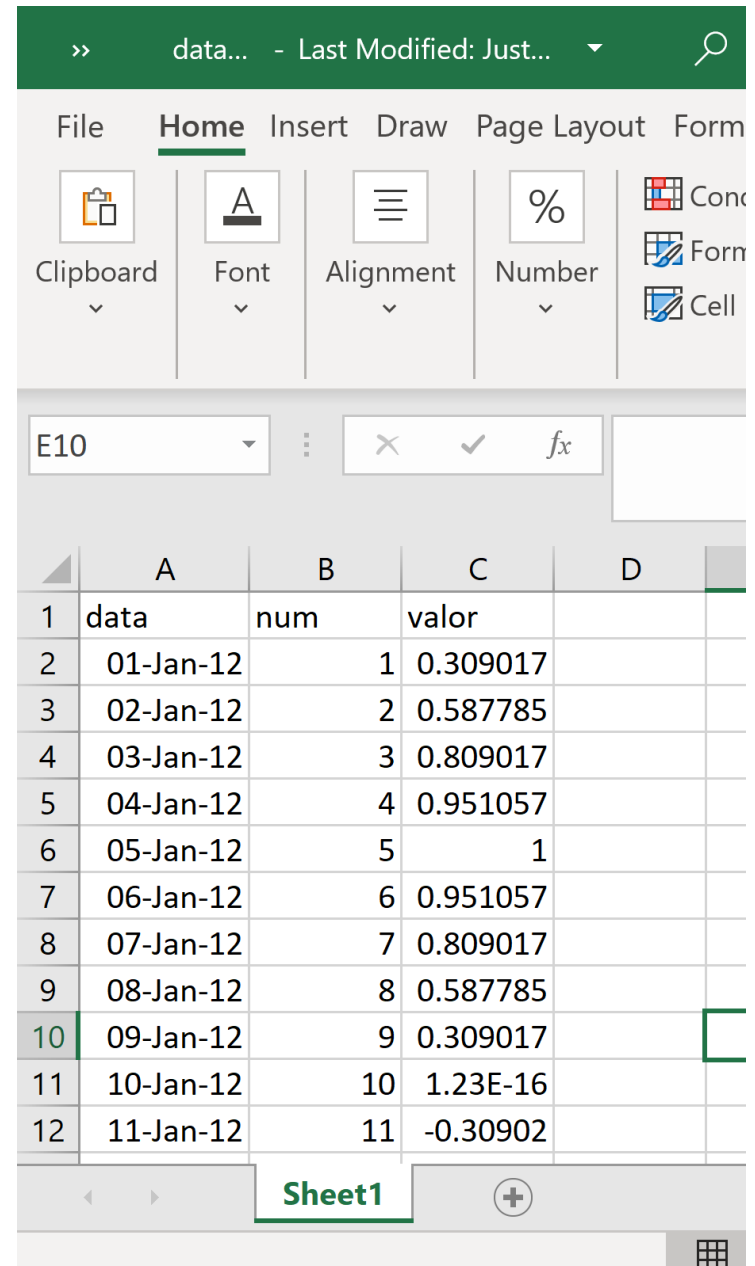

'GISS_Mercator.png

Mollweide


```python
plt.figure()
projection =ccrs.Mollweide(central_longitude=0,
       globe=None, false_easting=None,
       false_northing=None)
ax = plt.axes(projection=projection)
ax.set_global()
ax.coastlines()
ax.contourf(lon,lat,Ta,cmap='jet',\
          transform=data_crs )
plt.show()
plt.savefig('GISS_Mollweide.png')
```

Ler dados excel

```python
import numpy as np
import datetime
import openpyxl as pyxl
import matplotlib.pyplot as plt

wb=pyxl.load_workbook(\
  'data_xls.xlsx',data_only=True)
ws=wb['Sheet1']
rows=ws.max_row
```


	A	B	C	D
1	data	num	valor	
2	01-Jan-12	1	0.309017	
3	02-Jan-12	2	0.587785	
4	03-Jan-12	3	0.809017	
5	04-Jan-12	4	0.951057	
6	05-Jan-12	5	1	
7	06-Jan-12	6	0.951057	
8	07-Jan-12	7	0.809017	
9	08-Jan-12	8	0.587785	
10	09-Jan-12	9	0.309017	
11	10-Jan-12	10	1.23E-16	
12	11-Jan-12	11	-0.30902	

Ler dados excel

Linhas e colunas excel 1:n

	A	B	C	D
1	data	num	valor	
2	01-Jan-12	1	0.309017	=SIN(B2*PI()/10)
3	02-Jan-12	2	0.587785	

```
…
rows=ws.max_row
datas=[]
valor=np.zeros((rows-1))
for r in range(2,rows+1):
    datas.append(ws.cell(row=r,column=1).value)
    valor[r-2]=ws.cell(row=r,column=3).value
plt.plot(datas,valor)
```

Esta semana

Notas do projeto A (quinta?)

Exame tipo mo moodle: data/hora a confirmar