

# 01.a.descarga

October 29, 2022

## 1 Descarga de Datos GFS

Trabajaremos con el utilitario [siphon](#), que fue diseñado para tener acceso directo a al servidor [THREDDS](#)

Para utilizar el `siphon` debemos tener en consideración lo siguiente: - Python  $\geq 3.5$  - numpy  $\geq 1.8$  - pandas

Y otras informaciones que podemos encontrar en el manual de instalación de la herramienta.

### 1.1 Instalación de librerías necesarias

- Librería siphon

```
conda install -c conda-forge siphon xarray[complete] netCDF4
```

El `netCDF4` será instalado para ser utilizado como background del `siphon` a la hora de hacer los requerimientos

En este caso iremos a instalar el `xarray` para tener un control facilitado de los archivos `netcdf`

La lista completa de datos como medio grado entra en este [link](#)

```
[ ]: from siphon.catalog import TDSCatalog

# si el catalogo que se desea es de 0.5 grados
# best_gfs = TDSCatalog('http://thredds.ucar.edu/thredds/catalog/grib/NCEP/GFS/
↳Global_0p5deg/catalog.xml')

# si el catalogo que se desea es de 0.25 grados
best_gfs = TDSCatalog('http://thredds.ucar.edu/thredds/catalog/grib/NCEP/GFS/
↳Global_0p25deg/catalog.xml')

# lista de colecciones
best_gfs.datasets
```

```
[ ]: ['Full Collection (Reference / Forecast Time) Dataset', 'Best GFS Quarter Degree
Forecast Time Series', 'Latest Collection for GFS Quarter Degree Forecast']
```

## 1.2 Verificando datos disponibles

```
[ ]: best_disp = list(best_gfs.datasets.values())[0]
ncss = best_disp.subset()
query = ncss.query()
for lista in ncss.variables:
    print(lista)
```

```
Geopotential_height_maximum_wind
Ventilation_Rate_planetary_boundary
Cloud_water_entire_atmosphere_single_layer
Pressure_middle_cloud_top_Mixed_intervals_Average
Reflectivity_height_above_ground
Convective_precipitation_rate_surface
Specific_humidity_height_above_ground
u-component_of_wind_sigma
Best_4_layer_Lifted_Index_surface
Upward_Short-Wave_Radiation_Flux_atmosphere_top_Mixed_intervals_Average
v-component_of_wind_tropopause
Vertical_velocity_geometric_isobaric
Cloud_mixing_ratio_isobaric
Ozone_Mixing_Ratio_isobaric
Latent_heat_net_flux_surface_Mixed_intervals_Average
Wilting_Point_surface
Precipitable_water_entire_atmosphere_single_layer
Categorical_Snow_surface_Mixed_intervals_Average
Ice_cover_surface
Relative_humidity_sigma_layer
Vertical_Speed_Shear_potential_vorticity_surface
Maximum_temperature_height_above_ground_Mixed_intervals_Maximum
Geopotential_height_zeroDegC_isotherm
Planetary_Boundary_Layer_Height_surface
Downward_Long-Wave_Radp_Flux_surface_Mixed_intervals_Average
Volumetric_Soil_Moisture_Content_depth_below_surface_layer
Ground_Heat_Flux_surface_Mixed_intervals_Average
Zonal_Flux_of_Gravity_Wave_Stress_surface_Mixed_intervals_Average
Surface_roughness_surface
Pressure_tropopause
Rain_mixing_ratio_isobaric
Categorical_Ice_Pellets_surface
Relative_humidity_entire_atmosphere_single_layer
Geopotential_height_tropopause
u-component_of_wind_maximum_wind
Field_Capacity_surface
Total_precipitation_surface_Mixed_intervals_Accumulation
Minimum_temperature_height_above_ground_Mixed_intervals_Minimum
Relative_humidity_zeroDegC_isotherm
Apparent_temperature_height_above_ground
```

v-component\_of\_wind\_height\_above\_ground  
Pressure\_maximum\_wind  
u-component\_of\_wind\_planetary\_boundary  
u-component\_of\_wind\_altitude\_above\_msl  
Pressure\_middle\_cloud\_bottom\_Mixed\_intervals\_Average  
Plant\_Canopy\_Surface\_Water\_surface  
Momentum\_flux\_u-component\_surface\_Mixed\_intervals\_Average  
Pressure\_potential\_vorticity\_surface  
Convective\_inhibition\_pressure\_difference\_layer  
Cloud\_Work\_Function\_entire\_atmosphere\_single\_layer\_Mixed\_intervals\_Average  
Precipitation\_rate\_surface  
v-component\_of\_wind\_maximum\_wind  
Convective\_available\_potential\_energy\_surface  
Soil\_type\_surface  
Relative\_humidity\_isobaric  
u-component\_of\_wind\_height\_above\_ground  
Specific\_humidity\_isobaric  
Specific\_humidity\_pressure\_difference\_layer  
Temperature\_altitude\_above\_msl  
Snow\_mixing\_ratio\_isobaric  
u-component\_of\_wind\_tropopause  
Vertical\_velocity\_pressure\_isobaric  
ICAO\_Standard\_Atmosphere\_Reference\_Height\_maximum\_wind  
Upward\_Long-Wave\_Radp\_Flux\_atmosphere\_top\_Mixed\_intervals\_Average  
Graupel\_snow\_pellets\_hybrid  
Categorical\_Rain\_surface  
Vertical\_velocity\_pressure\_sigma  
Temperature\_low\_cloud\_top\_Mixed\_intervals\_Average  
Relative\_humidity\_pressure\_difference\_layer  
Categorical\_Ice\_Pellets\_surface\_Mixed\_intervals\_Average  
v-component\_of\_wind\_isobaric  
MSLP\_Eta\_model\_reduction\_msl  
Total\_cloud\_cover\_entire\_atmosphere  
Water\_runoff\_surface\_Mixed\_intervals\_Accumulation  
u-component\_of\_wind\_potential\_vorticity\_surface  
Low\_cloud\_cover\_low\_cloud\_Mixed\_intervals\_Average  
Haines\_index\_surface  
Vertical\_Speed\_Shear\_tropopause  
Total\_cloud\_cover\_boundary\_layer\_cloud\_Mixed\_intervals\_Average  
v-component\_of\_wind\_planetary\_boundary  
Temperature\_surface  
Temperature\_isobaric  
Ice\_water\_mixing\_ratio\_hybrid  
Convective\_available\_potential\_energy\_pressure\_difference\_layer  
Geopotential\_height\_cloud\_ceiling  
Total\_cloud\_cover\_convective\_cloud  
Pressure\_convective\_cloud\_top  
Wind\_speed\_gust\_surface

Temperature\_height\_above\_ground  
 U-Component\_Storm\_Motion\_height\_above\_ground\_layer  
 Geopotential\_height\_potential\_vorticity\_surface  
 Convective\_precipitation\_surface\_Mixed\_intervals\_Accumulation  
 Pressure\_high\_cloud\_top\_Mixed\_intervals\_Average  
 Categorical\_Snow\_surface  
 Temperature\_high\_cloud\_top\_Mixed\_intervals\_Average  
 Reflectivity\_hybrid  
 Convective\_inhibition\_surface  
 Medium\_cloud\_cover\_middle\_cloud\_Mixed\_intervals\_Average  
 Pressure\_surface  
 ICAO\_Standard\_Atmosphere\_Reference\_Height\_tropopause  
 Soil\_temperature\_depth\_below\_surface\_layer  
 Visibility\_surface  
 Pressure\_of\_level\_from\_which\_parcel\_was\_lifted\_pressure\_difference\_layer  
 Downward\_Short-Wave\_Radiation\_Flux\_surface\_Mixed\_intervals\_Average  
 Snow\_depth\_surface  
 Total\_cloud\_cover\_isobaric  
 High\_cloud\_cover\_high\_cloud  
 Ice\_water\_mixing\_ratio\_isobaric  
 Ice\_growth\_rate\_altitude\_above\_msl  
 u-component\_of\_wind\_pressure\_difference\_layer  
 Pressure\_reduced\_to\_MSL\_msl  
 v-component\_of\_wind\_pressure\_difference\_layer  
 Frictional\_Velocity\_surface  
 Low\_cloud\_cover\_low\_cloud  
 Temperature\_sigma  
 Categorical\_Rain\_surface\_Mixed\_intervals\_Average  
 Geopotential\_height\_isobaric  
 Relative\_humidity\_sigma  
 Graupel\_snow\_pellets\_isobaric  
 Temperature\_tropopause  
 Total\_ozone\_entire\_atmosphere\_single\_layer  
 Precipitation\_rate\_surface\_Mixed\_intervals\_Average  
 Pressure\_high\_cloud\_bottom\_Mixed\_intervals\_Average  
 High\_cloud\_cover\_high\_cloud\_Mixed\_intervals\_Average  
 Pressure\_low\_cloud\_top\_Mixed\_intervals\_Average  
 Temperature\_maximum\_wind  
 Water\_equivalent\_of\_accumulated\_snow\_depth\_surface  
 Sensible\_heat\_net\_flux\_surface\_Mixed\_intervals\_Average  
 Pressure\_height\_above\_ground  
 Cloud\_mixing\_ratio\_hybrid  
 Composite\_reflectivity\_entire\_atmosphere  
 Relative\_humidity\_height\_above\_ground  
 V-Component\_Storm\_Motion\_height\_above\_ground\_layer  
 Temperature\_middle\_cloud\_top\_Mixed\_intervals\_Average  
 Absolute\_vorticity\_isobaric  
 Total\_cloud\_cover\_entire\_atmosphere\_Mixed\_intervals\_Average

```

Vegetation_surface
Land_cover_0__sea_1__land_surface
Dewpoint_temperature_height_above_ground
Categorical_Freezing_Rain_surface_Mixed_intervals_Average
Temperature_potential_vorticity_surface
Temperature_pressure_difference_layer
Medium_cloud_cover_middle_cloud
Geopotential_height_surface
v-component_of_wind_altitude_above_msl
Upward_Long-Wave_Radp_Flux_surface_Mixed_intervals_Average
Ice_temperature_surface
v-component_of_wind_potential_vorticity_surface
Liquid_Volumetric_Soil_Moisture_non_Frozen_depth_below_surface_layer
Relative_humidity_highest_tropospheric_freezing
v-component_of_wind_sigma
Potential_temperature_sigma
Sunshine_Duration_surface
u-component_of_wind_isobaric
Per_cent_frozen_precipitation_surface
Convective_Precipitation_Rate_surface_Mixed_intervals_Average
Meridional_Flux_of_Gravity_Wave_Stress_surface_Mixed_intervals_Average
Storm_relative_helicity_height_above_ground_layer
Rain_mixing_ratio_hybrid
Ice_thickness_surface
Geopotential_height_highest_tropospheric_freezing
Pressure_low_cloud_bottom_Mixed_intervals_Average
Snow_mixing_ratio_hybrid
Surface_Lifted_Index_surface
Pressure_convective_cloud_bottom
Upward_Short-Wave_Radiation_Flux_surface_Mixed_intervals_Average
Potential_Evaporation_Rate_surface
Albedo_surface_Mixed_intervals_Average
Momentum_flux_v-component_surface_Mixed_intervals_Average
Categorical_Freezing_Rain_surface

```

```

[ ]: best_ds = list(best_gfs.datasets.values())[1]

# diccionario de urls disponibles con la información
best_ds.access_urls

```

```

[ ]: {'OPENDAP':
      'https://thredds.ucar.edu/thredds/dodsC/grib/NCEP/GFS/Global_0p25deg/Best',
      'CdmRemote':
      'https://thredds.ucar.edu/thredds/cdmremote/grib/NCEP/GFS/Global_0p25deg/Best',
      'JupyterNotebook':
      'https://thredds.ucar.edu/thredds/notebook/grib/NCEP/GFS/Global_0p25deg/Best',
      'NetcdfSubset':

```

```
'https://thredds.ucar.edu/thredds/ncss/grid/grib/NCEP/GFS/Global_0p25deg/Best',
'WMS':
'https://thredds.ucar.edu/thredds/wms/grib/NCEP/GFS/Global_0p25deg/Best',
'WCS':
'https://thredds.ucar.edu/thredds/wcs/grib/NCEP/GFS/Global_0p25deg/Best',
'ISO':
'https://thredds.ucar.edu/thredds/iso/grib/NCEP/GFS/Global_0p25deg/Best',
'NCML':
'https://thredds.ucar.edu/thredds/ncml/grib/NCEP/GFS/Global_0p25deg/Best',
'UDDC':
'https://thredds.ucar.edu/thredds/uddc/grib/NCEP/GFS/Global_0p25deg/Best'}
```

```
[ ]: # utilizando el servicio de netcdf-subset
```

```
from siphon.ncss import NCSS
ncss = NCSS(best_ds.access_urls['NetcdfSubset'])
```

```
[ ]: # generando un sistema de consulta en el netcdf-subset
query = ncss.query()
```

---

Localización de coordenadas geográficas normal

Como es interpretado por el siphon

---

```
[ ]: from datetime import datetime
```

```
now = datetime.utcnow()
```

```
# buscando la posición de lima
```

```
query.lonlat_box(west=270, north=0, east=300, south=-20).
```

```
    ↳vertical_level(100_000).time(now)
```

```
query.accept('netcdf4')
```

```
query.variables('Temperature_isobaric', 'Relative_humidity_isobaric')
```

```
[ ]: var=Relative_humidity_isobaric&var=Temperature_isobaric&time=2022-10-26T21%3A58%
3A01.453163&west=270&east=300&south=-20&north=0&vertCoord=100000&accept=netcdf4
```

```
[ ]: data = ncss.get_data(query)
list(data.variables.keys())
```

```
[ ]: ['time1',
'latitude',
'reftime1',
'isobaric',
'longitude',
'Relative_humidity_isobaric',
```

```
'Temperature_isobaric',  
'LatLon_721X1440-0p13S-180p00E-2']
```

```
[ ]: 100_000
```

```
[ ]: 100000
```

```
[ ]: from datetime import datetime  
print(datetime.now().month)  
print(dir(datetime))
```

```
10
```

```
['__add__', '__class__', '__delattr__', '__dir__', '__doc__', '__eq__',  
 '__format__', '__ge__', '__getattribute__', '__gt__', '__hash__', '__init__',  
 '__init_subclass__', '__le__', '__lt__', '__ne__', '__new__', '__radd__',  
 '__reduce__', '__reduce_ex__', '__repr__', '__rsub__', '__setattr__',  
 '__sizeof__', '__str__', '__sub__', '__subclasshook__', 'astimezone', 'combine',  
 'ctime', 'date', 'day', 'dst', 'fold', 'fromisocalendar', 'fromisoformat',  
 'fromordinal', 'fromtimestamp', 'hour', 'isocalendar', 'isoformat',  
 'isoweekday', 'max', 'microsecond', 'min', 'minute', 'month', 'now', 'replace',  
 'resolution', 'second', 'strftime', 'strptime', 'time', 'timestamp',  
 'timetuple', 'timetz', 'today', 'toordinal', 'tzinfo', 'tzname',  
 'utcfromtimestamp', 'utcnow', 'utcoffset', 'utctimetuple', 'weekday', 'year']
```

```
[ ]:
```