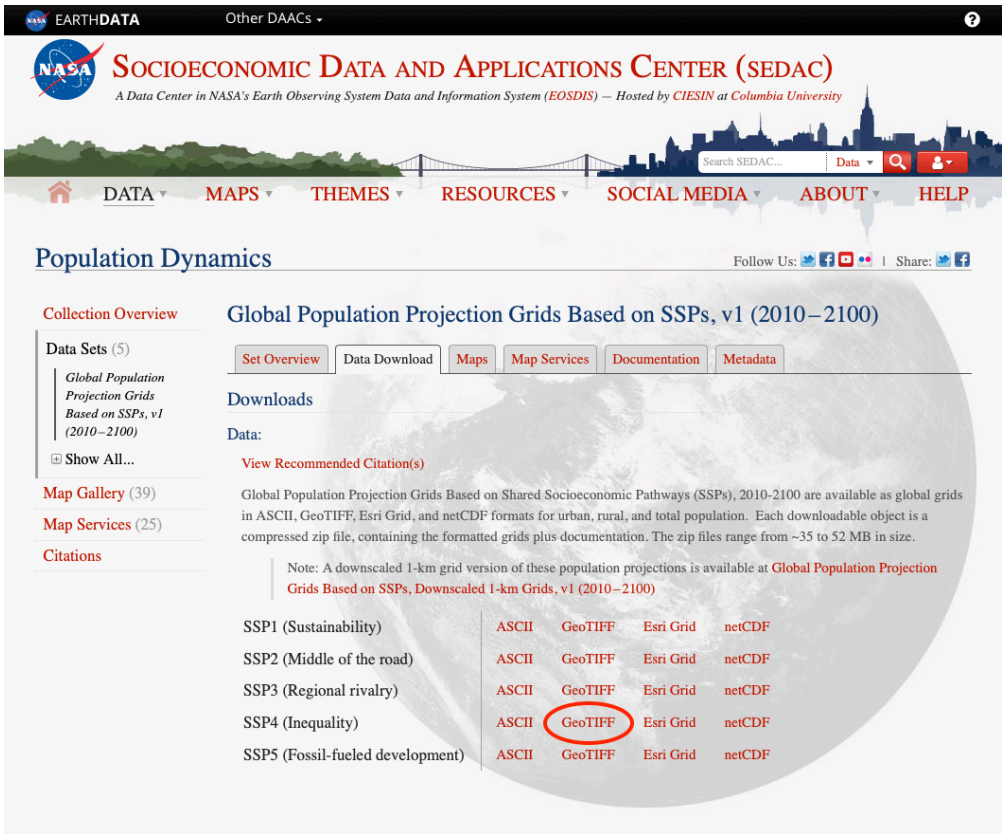
Final Assignment

Your task for the final assignment is to create a Jupyter Notebook that performs several of the analysis steps we have introduced during the course:

Preparation

1. Download the Global Population Projection Grid for SSP4 (Inequality) in GeoTIFF format from Columbia University's Socioeconomic Data and Applications Center (SEDAC). You will need to create a free login for the website to start the download.



2. Read the paper enclosed in the ZIP file to understand what the data represents and what the SSPs are.
3. Create a new Jupyter Notebook that you will perform the following analysis and mapping steps in. Every one of the following steps should be reflected in the notebook as a combination of at least one code block – you can also use

multiple blocks of code and/or text if necessary – plus output (plots, maps, numbers etc.) and explanatory text.

Raster analysis

1. Write a function that plots the projected total and urban population from 2010 to 2100 for a selected country as a line chart. The attached `countries.tif` contains the country ID for each cell; this list shows which ID is which country.
2. Generate a global raster that shows *only* the cells that are projected to lose population, and indicates how much the population in those cells is projected to decline between 2010 and 2100.

Spatial autocorrelation

1. Download a shapefile of the world from `naturalearthdata.com` and perform a left join with the attached `under5mortality.csv`[1], which contains child mortality rates for each country in the world. The join should be done on the `ISO_A3` column in the shapefile and the `ISO` column in the CSV, respectively.
2. Calculate the spatial weights matrix for the world based on border neighborhood and use the weights to calculate Moran's I for child mortality.

Publication and submission

1. Familiarize yourself with mybinder.org.
2. Include the *launch binder* button and a dependency file in your GitHub repository and make sure that the notebook correctly launches on mybinder.org.
3. In the assignment on moodle, just submit the link to your GitHub repository.

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1. The data comes from UNICEF and has been extracted from https://data.unicef.org/topic/child-survival/under-five-mortality/