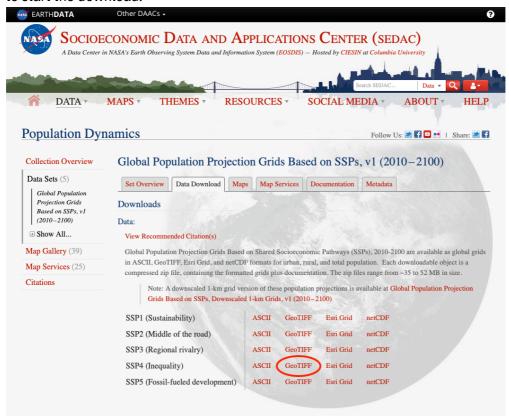
Final Assignment

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

 Download the <u>Global Population Projection Grid</u> 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 <u>shapefile of the world</u> from naturalearthdata.com and perform a <u>left join</u> with the attached under5mortality.csv¹, 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.

