

Using arcpy for advanced map algebra application

Aims:

- automate the download of multiple raster images from Earth Data (<https://earthdata.nasa.gov/>) requiring login information.
- handle .HDF file format and automate extraction of subdataset layers in .tif format.
- apply cell statistics on multiple rasters
- apply Raster Calculator on multiple rasters
- write a Python script to automate the processing and application of different map algebra tools on multiple rasters

Tasks:

1. Download the Aqua (MYD11A2) and Terra (MOD11A2) datasets for the period January 2018 to December 2020 for the individual study area specified in the excel file. If your study area is covered by more than one scene, then please work with the one that covers largest part of the country. (1 mark)
2. Extract the subdataset for daytime and night-time temperature from both the Aqua and Terra .HDF files in .tif format in separate folders. For example, Terra_D, Terra_N, Aqua_D and Aqua_N. (1 mark)
3. Create mean of daily daytime and night-time observations separately for Aqua and Terra observations. For example, Terra_mean and Aqua_mean. (2 marks)
4. Create mean of daily land surface temperature using all the four layers extracted in Task 2. (2 marks)
5. Apply raster calculator to convert the pixel values to degree Celsius. (2 marks)
6. Apply different statistics (on daytime raster or night-time raster or the daily mean) using Cell Statistics to analyse the variation in land surface temperature in the study area. You will need to be creative in terms of applying your understanding of different statistical parameters to represent change in an area over a period of time. (6 marks)
7. Create a standalone Python script (in .py format) for the all the tasks enlisted above. Please include comments to specify the different steps in the script. (4 marks)
8. A short writeup (less than 1000 words) in the prescribed template. (4 marks)

Deliverables:

1. For submission of the writeup, please use the template (in MS word) given and upload it using the Turnitin link in MyAberdeen.
2. Create a zipped file archiving the raster(s) created after application of different statistics in Task 6 in MyAberdeen using the 'Raster upload'.
3. Send the standalone script (.py file) created in Task 7 in MyAberdeen using the 'Python code'.

All the deliverables must be submitted before 12 Noon, Friday 18 March 2022. This is an individual piece of work and any sign of group work or consultation among students will be treated as plagiarism.