Exercises using data from Central Asia

Window extent covering Azerbaijan (AZE), Kazakhstan (KAZ) and Turkmenistan (TKM)

Description of the data sources.

Raster data:

name	source	description	Unit
dem	GEE – CGIAR_SRTM90_V4	SRTM v4 elevation data	meter
landcover	GEE – CGLS_LC100_C3	Land cover classification	Discrete classification
Water occurrence	GEE – JRC_GSW1_3	Water Occurrence	Percentage occurrence
LST day / night	GEE – Oxford_MAP_LST_Day_5km_Monthly GEE – Oxford_MAP_LST_Night_5km_Monthly	Mean monthly temperature climatology	Degree / month
EVI	GEE - Oxford_MAP_5km_Monthly	Vegetation index climatology	0 to 1 / month
precipitation	IMERG (https://gpm.nasa.gov/data/imerg/precipitation-climatology)	Monthly precipitation climatology	Mm / month
Precipitation	Imerg_sum_20210515 – in ilwis format. Aggregated 24 hr precipitation	Daily rainfall	Mm/day
NDVI	VHP_P20210301_SMN.tif – smoothed weekly ndvi (https://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_ftp.php)	NDVI	0 to 1 / week

Vector data:

name	source	description	unit
*_country / *_name	GADM country and subdivisions	2 polygon files per country	Discrete classification
Inland rivers	ILWIS subset of river basemap, in Pseudo Mercator	Vector file covering AoI	Attribute table
Inland lakes	Natural Earth – Lakes and reservoirs, both as lat-lon and Pseudo Mercator	Inland water bodies	Attribute table
Caspian sea	Marineregions.org, in lat-lon coordinates	Caspian sea shape file	Discrete classification

Projection information:

Aoi_metric_PM: Pseudo Mercator: for DEM, pixel size 1000 m

EVI_Clim: LatLon WGS84: all other maps, pixel size 32.34 seconds, approx. 1 km

Exercises using data from Central Asia, reference to ILWIS 386 Exercises by B. Maathuis & B. Retsios, version 20-11-2019

Execute the exercises as described in the manual but now using the data from your own region. In the table below the instructions for the various exercises are provided using the local data sets prepared.

Chapter	description	data set
3.1	Review all existing data layers, including details on georeference and coordinate system. Note difference in projections used, e.g. lat-lon and pseudo Mercator	All vector and raster data sets, also ilwis service objects
3.2	Import VHP_P20210301_SMN.tif, check values, resample and clip to selected country.	VHP_P2021031_smn.tif, country vector file of AZE, KAZ or TKM
3.3	Calculate average PCP per district using daily imerg pcp “Imerg_sum_20210515”	Imerg_sum_20210515 and district vector file of selected country of AZE_name, KAZ_name or TKM_name
3.4	Create STI over DEM. To calculate slope map from DEM, resample to metric coordinate system (Pseudo Mercator). Note slope map has to be modified, if slopes are 0, assign these to 0.01, else TSI formula returns ‘0’, use: slopedeg_mod:=iff(slopedeg=0,0.01,slopedeg) Calculate Fd and Fa from DEM_hydro_optimized.	Dem Dem_hydro_optimized Vector files: Caspian_sea, lakes_area_pm, riv_pm_sub
3.5	Display as animations all the time series available, also as synchronized animations. All maps have monthly temporal interval	Map lists of: EVI_clim PCP LST_Day LST_Night
3.6	Create a new time table with time domain when displaying a Hovmöller Diagram of a time series	
3.9	Derive if there is a relation between elevation and temperature for your country. First derive the average monthly temperature. Create a grid –group fact of 20, using the number of columns of the grid maps for your country.	Dem LST_Day

additional calculations	Create a track-profile over the Aral Lake and then calculate the water occurrence at 12 % and overlay this map with lakes_area polygon map. Derive some statistics about the changes in lake dimensions / extent. Calculate the mean annual precipitation climatology Which areas have the greatest yearly mean temperature difference / amplitude When is the EVI below or above the average EVI Calculate the area cultivated for your country Clip map to your country, e.g. using the land cover map, first resample the map the Pseudo Mercator projection. Create a good quality output map, including scale bar, coordinates, grid lines, legend, etc. Under global tools add white space for legend! Use also the colour shaded map as background	