Dataset: **Altai\_rangeland\_dynamics\_dataset.csv**

Topic: Rangeland dynamics in the Altai Mountain region

For more details: see Yegorova et al. / Environ. Res. Lett. 14 (2019) 104017

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Description:

All the layers were reprojected to WGS84 (World Geodetic System 1984) geographic coordinate system and resampled to a common resolution of 8-km using a bilinear interpolation for continuous data and majority algorithm for categorical data.

All the geospatial information (projection, extant, exact pixel size etc) can be extracted from Pixel\_cl.tif file. The Pixel column in **Altai\_rangeland\_dynamics\_dataset.csv** corresponds to the pixel values in Pixel\_cl.tif file. To convert Altai\_rangeland\_dynamics.xls back into a raster format a join function by Pixel column and Pixel value can be used. Some pixels will be NAs because those pixels were excluded from the analysis.

MODIS Land Cover Type product (MCD12Q1 for 2001, IGBP (Type 1) classification) was used to select only the pixels which were grassland or could potentially transition to a grassland or vice versa within the 32-year-long period, excluding water, evergreen needleleaf forest, evergreen broadleaf forest, deciduous needleleaf forest, deciduous broadleaf forest, mixed forest, closed shrublands, permanent wetlands, snow and ice from the analysis (2001lctype1majority\_cl\_small.tif).

NDVI data was smoothed using a median filter with a window size of three (‘medianFilter’, library(FBN)) in R.

Variable definitions:

* NDVImean – mean NDVI value of the growing season (May to September)
* NDVImax – max NDVI value of the growing season (May to September)
* Precipmean – mean Precipitation value of the growing season (May to September)
* Temperaturemean – mean Temperature value of the growing season (May to September)
* SomonKolhozName – the name of the somon, kolhoz, county where the livestock data was collected
* SomonKolhozNumber – the number value of the somon, kolhoz, county where the livestock data was collected; corresponds to the RusAndMongAndChinaCL.shp
* Cows.and.Yaks – the total number of cows and yaks
* Sheep.and.Goats – the total number of sheep and goats
* Horses – the total number of horses
* Camels – the total number of camels
* TotalLivestock – the total number of cows, yaks, sheep, goats, horses, and camels
* LivestockArea – the km2 area of a somon/kolhoz/county for which livestock data was collected
* SheepUnits – calculated as Sheep.and.Goats+6\* Cows.and.Yaks+7\* Horses+5\* Camels
* TotalSU – sheep units per km2, calculated as SheepUnits/ LivestockArea
* NDVImeanDetrended – detrended mean NDVI value using ‘detrend’ function, ‘pracma’ package in R
* NDVIlg – the NDVImeanDetrended value of the previous year, used in calculating dNDVI
* Livelg – the TotalSU value of the previous year, used in calculating dLive
* Preciplg – the Precipmean value of the previous year, used in calculating dPrecip
* Templg – the Temperaturemean value of the previous year, used in calculating dTemp
* dNDVI – the change ratio in relation to the previous year for NDVI, calculated as ΔXt = ln (Xt/ Xt-1), where where X are the two NDVI values in one year (t) and the year immediately preceding it (t – 1)
* dLive – the change ratio in relation to the previous year for sheep units per km2 value, calculated as ΔXt = ln (Xt/ Xt-1), where X are the two sheep units per km2 values in one year (t) and the year immediately preceding it (t – 1)
* dPrecip – the change ratio in relation to the previous year for precipitation value, calculated as ΔXt = ln (Xt/ Xt-1), where X are the two precipitation values in one year (t) and the year immediately preceding it (t – 1)
* dTemp – the change ratio in relation to the previous year for temperature values, calculated as ΔXt = ln (Xt/ Xt-1), where X are the two temperature values in one year (t) and the year immediately preceding it (t – 1)