

Inputs Datasets to the Global Multivariate Clustering Analysis

Global Climate Change Initiative – TNC

2 Arc min (~ 4km at equator)

Invariant topographic and soil factors

Elevation

- SRTM

Compound Topographic Index (CTI)

- CTI is a steady state wetness index. The CTI is a function of both the slope and the upstream contributing area per unit width orthogonal to the flow direction. CTI was designed for hillslope catenas. CTI is highly correlated with several soil attributes such as horizon depth ($r=0.55$), silt percentage ($r=0.61$), organic matter content ($r=0.57$), phosphorus ($r=0.53$) (Moore et al. 1993).

Solarflux

- Incoming solar radiation based on surface orientation (slope and aspect), solar angle (azimuth and zenith) as it shifts over time, shadows caused by topographic features, and atmospheric conditions. (Rich et al. 1994)

Potential or Profile Available Water Capacity

- Holding capacity of soil to a given depth below the surface (1 meter in this dataset). (Global Soil Data Task 2000)

Bulk Density

- g/cm³ Soil bulk density is defined as the ratio of the mass of dry solids to the bulk volume of the soil occupied by those dry solids. The bulk volume includes the volume of the solids and the pore space. Bulk density is needed for converting water percentage by weight to content by volume, for calculating porosity and void ratio when the particle density is known, and for estimating the weight of a volume of soil too large to weigh conveniently. (Global Soil Data Task 2000)

Total Soil Carbon

- g C/m² to a given depth below the surface (1 meter in this dataset). The total soil organic carbon. (Global Soil Data Task 2000)

Total Soil Nitrogen

- g C/m² to a given depth below the surface (1 meter in this dataset). The total soil organic nitrogen. (Global Soil Data Task 2000)

Abiotic factors (derived)

Bio-temperature

- Average month bio-temperature (degrees C) - refers to all temperatures above freezing (0°C) and above 30°C , with all temperatures below freezing and above 30°C adjusted to 0°C . The assumption was that, from the perspective of plant physiology, there is no real difference between 0°C and temperatures less than zero: plants are dormant.

Diurnal Temperature Range

- The difference between maximum and minimum temperature over a period of 24 hours.

Moisture Stress

- Ratio of Annual Precipitation (precip) and Potential Evapotranspiration (ETo) (precip/Eto) (unitless). Evapotranspiration is the combination of water that is evaporated and transpired by plants as a part of their metabolic processes. Moisture stress affects most of the physiological processes involved in plant growth.

Precipitation of the Driest Quarter

- The driest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.

Precipitation of the Wettest Quarter

- The wettest quarter of the year is determined (to the nearest month), and the total precipitation over this period is calculated.

Temperature of the Coolest Quarter

- The coldest quarter of the year is determined (to the nearest month), and the mean temperature of this period is calculated.

Temperature of the Warmest Quarter

- The warmest quarter of the year is determined (to the nearest month), and the mean temperature of this period is calculated.