

# The Ecological Relevance of Parameter Choice in Describing Climate

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Climate is an important factor in determining the broad patterns of species distribution and potential vegetation. But when similar or adjacent sites with similar soils are compared, it is not clear what if any difference in climate is responsible for differences in site potential. Ecological site descriptions commonly feature monthly and annual precipitation and temperature in climate descriptions and graphs. However, there is wide overlap among these parameters even where temperature and moisture are the primary drivers for the differences among vegetation types.

I propose several different climate parameters which have a better relationship to vegetation differences. Available moisture can only be determined when the timing of the inputs of precipitation and the outputs of potential evapotranspiration (PET) are considered with respect to growing season. Temperature can be understood both in terms of optimal physiological activity, and lethal tissue limitations. The proposed parameters retain a connection to real world measurement units and are not obscure unitless indices derived from complex relationships between seemingly unrelated numbers. A Shiny application was developed to illustrate alternative graphs with which to compare different regions of the country. Maps were produced to illustrate the distribution of climate classified according to these parameters at recommended intervals.

Seven climate indices were calculated to provide a base for an alternative climate classification, and are intended to be physiologically informative for plant distribution modeling. The indices retain in real world units that can be directly related to climate change. The larger categories of the classification approximate major vegetation formations, but the indices can be subdivided into smaller, regular increments.

## MLRA Climate Browser

