LENZ - Annual water deficit

Title

Annual water deficit - LENZ

Creator

Landcare Research Ltd

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Description

Annual water deficit data layer used in the creation of Land Environments of New Zealand (LENZ) classification. Based on a water balance model using monthly estimates of mean daily temperature, mean daily solar radiation, and mean rainfall, this layer is used as an indicator of soil dryness. The layer calculated as the sum of any deficits between rainfall and potential evaporation calculated using the method of Priestley and Taylor (1972). The resulting 100 metre layer (The temperature, solar radiation and rainfall layers were all 100m) was then interpolated to 25 metres using bilinear interpolation. The climate station data used in the development of this climate surface were derived from summaries of climate observations published by the New Zealand Meteorological Service, using data collected over the period from 1950-1980 The data layer was derived from surfaces fitted to monthly data describing daily average temperature, daily solar radiation and monthly rainfall. The rainfall surface was fitted using NZMG coordinates, elevation, and a model describing relationships between topography and westerly winds. Having derived the 36 input climate layers, an empirical model was first used to calculate the monthly potential evaporation from the monthly estimates of solar radiation and temperature. These estimates of evaporation were then compared with the monthly rainfall estimates. Where the rainfall exceeded evaporation, the monthly deficit was assumed to be zero, but where monthly evaporation exceeded monthly rainfall, the shortfall was accumulated through the year to derive an estimate of the annual water deficit. Additional details such as the climate station locations used in the creation of the layer are defined in the attached LENZ Technical Guide.

Source

All climate layers used in LENZ were derived either directly or indirectly from mathematical surfaces (thin-plate splines) that use information about the climate, location and elevation of a number of meteorological stations. Locations are described either in terms of their latitude and longitude or their coordinates on a map projection such as the New Zealand Map Grid (NZMG). Each surface is calculated using a process in which data values for each climate station are omitted in turn and its climate is predicted from the surrounding stations. This process is repeated until no further improvement can be made to the fit of the surface to the raw data. Surfaces can be simultaneously fitted to up to 12 variables, typically monthly data for various climate parameters, e.g., monthly estimates of temperature or rainfall. Additional details such as the climate station locations used in the creation of the layer and error maps for this layer are defined in the attached LENZ Technical Guide. Once the surface has been

fitted, predictions can be made for any point of known location and elevation. For example, coupling the surface with a digital elevation model, a regular grid of elevation values, allows the generation of digital climate maps as used in the creation of LENZ. Finally, maps that show the standard errors of the predicted values can be derived using results from more sophisticated analyses of the errors associated with the climate surfaces. The majority of the climate station data used in the development of our climate surfaces were derived from summaries of climate observations published by the New Zealand Meteorological Service. Temperature and rainfall data were collected over the period from 1950 to 1980, while data describing humidity and solar radiation consisted of averages of all data collected up until 1980. Some additional short-duration records of rainfall, including information from storage rain gauges, were used to describe geographic variation in high-rainfall mountainous areas of the South Island.

Coverage
  -47.505151 166.122046 -33.959618 179.601635
Format
  ESRI Binary Grid Raster Dataset
Identifier
  https://lris.scinfo.org.nz/layer/48097-lenz-annual-water-deficit/
Type
  grid
Language
  en
Subject
  Environment
Subject
  Climatology/Meteorology/Atmosphere
Subject
  LENZ
Subject
  Water demand
Subject
  Water supply
Subject
  Climate
Subject
  New Zealand
Subject
  Downloadable Data
Subject
  environment
Subject
  climatologyMeteorologyAtmosphere