



Manaaki Whenua
Landcare Research

LENZ - October vapour pressure deficit

Title

October vapour pressure deficit - LENZ

Creator

Landcare Research Ltd

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2003-01-01

Description

October vapour pressure deficit data layer used in the creation of Land Environments of New Zealand (LENZ) classification. October vapour pressure deficit, recorded in kPa, is used to estimate the effects of variation in the dryness of the air. 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. Estimates of the vapour pressure deficit for each month were derived by coupling a 100 m DEM with a thin-plate spline surface fitted to an irregular network of 287 meteorological stations, using humidity and temperature data. The resulting 100 metre layer was then interpolated to 25 metres using bilinear interpolation. Calculation of the vapour pressure deficit first required estimation of the temperature at 0900 hours, the time at which humidity measurements are made. This was calculated from the measured mean daily minimum and maximum temperatures for each month using a function that simulates the temperature course through the day. The estimated temperature at 0900 hours was then used to calculate the saturation water vapour pressure, which indicates the maximum amount of water vapour able to be held in the air given its temperature. Vapour pressure deficits in October were used in LENZ as this is the month when westerly winds are generally most persistent, resulting in strong geographic variation in vapour pressure deficits across New Zealand. Additional details such as the climate station locations used in the creation of the layer and error maps 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://iris.scinfo.org.nz/layer/48091-lenz-october-vapour-pressure-deficit/>

Type

grid

Language

en

Subject

Environment

Subject

ClimatologyMeteorologyAtmosphere

Subject

Water Supply

Subject

Water Demand

Subject

Vapour Pressure Deficit

Subject

Climate

Subject

Dryness

Subject

New Zealand

Subject

Downloadable Data

Subject

environment

Subject

climatologyMeteorologyAtmosphere