

Comparison of Bureau of Meteorology and SILO climate datasets

Historical climate datasets for Australia are available from two primary sources: the Australian Government [Bureau of Meteorology](#) (the Bureau) and Queensland Government [SILO](#). This page outlines the products offered by SILO and the Bureau, and highlights their main differences.

Products Offered

The Bureau of Meteorology provides two (2) products:

- **Observational Point Datasets** – Daily observational data at point locations for 16 variables. These data may contain missing values if observational records are not available. Data for a given station are only available for the period that the station reported data.
- **Gridded Datasets** – Continental-scale daily climate surfaces derived by interpolating the observed point data. Gridded datasets are available for six variables (rainfall, maximum and minimum temperature, vapour pressure, solar exposure and normalized difference vegetation index) through the Australian Water Availability Project (AWAP). The grid resolution is 0.05° latitude by 0.05° longitude (approximately 5 km × 5 km). Data are available for the periods: 1900-present (rainfall), 1911-present (maximum and minimum temperature), 1971-present (vapour pressure), 1990-present (solar exposure) and 1992-present (normalized difference vegetation index).

SILO provides three (3) products:

- **Gridded Datasets** – Continental-scale daily climate surfaces derived by interpolating observational data from the Bureau. Gridded datasets are available for 18 variables (daily and monthly rainfall, maximum and minimum temperature, vapour pressure, vapour pressure deficit, mean sea level pressure, evaporation (class A pan, synthetic and Morton’s lake), radiation, relative humidity at the times of maximum and minimum temperatures, and evapotranspiration (FAO56 short crop, ASCE tall crop and Morton’s actual, potential and wet)). The grid resolution is 0.05° latitude by 0.05° longitude (approximately 5 km × 5 km).
- **Point Datasets at station locations** – Continuous daily time series at point locations. Missing observational data are “patched” using interpolated estimates. Datasets are available for 19 variables at approximately 18,900 Bureau of Meteorology recording stations around Australia.
- **Point Datasets at pixel locations** - Daily time series of data consisting entirely of interpolated estimates. These data are taken from the Gridded Datasets and are available at any grid point over the land area of Australia, including some islands.

SILO products are derived from observational data provided by the Bureau. All datasets are available for the period 1889 – present, however data quality declines significantly in the years prior to the 1960’s. Daily data for evaporation and mean sea level pressure are not provided for the years 1889-1969 and 1889-1956 respectively, due to limitations of the observational data; long term means are provided for this period.

Gridded Datasets

SILO and Bureau gridded datasets are generated using similar interpolation methods. The method affects, for example, how topographic impacts are incorporated, how smooth the gridded surface is, and whether the surface matches the observational data exactly at stations.

	Bureau of Meteorology	SILO
Interpolation method	<ul style="list-style-type: none"> • A hybrid technique that combines empirical interpolation with function fitting interpolation. 	<ul style="list-style-type: none"> • Ordinary kriging for daily and monthly rainfall • Thin plate smoothing spline for all other variables • For data prior to 1957, an anomaly interpolation scheme is used.
References	AWAP Documentation	SILO Publications

A comparison study of the gridded daily rainfall datasets provided by the Bureau and SILO (Beesley, 2009) found the following:

- Error statistics for both datasets are similar
- Both datasets contain a small positive bias on dry days (days with zero rainfall), and a negative bias on wet days
- The number of wet days is overestimated in both datasets, however this is more pronounced in the Bureau’s datasets

- The Bureau datasets exhibit marginally higher errors along the densely populated fringe on the east coast.

The interpolation technique used to construct SILO surfaces exactly reproduces the observational data. In contrast, the technique used by the Bureau may impose some data smoothing to achieve a better representation of the grid cell average. Consequently the Bureau surface for a given day may be smoother than the corresponding SILO surface. To illustrate the differences, the Bureau and SILO daily rainfall surfaces for 25 January 2014 are shown in Figure 1. The choice of smoothness represents a trade-off between fitting known data and maximising the predictive power of the dataset for withheld data.

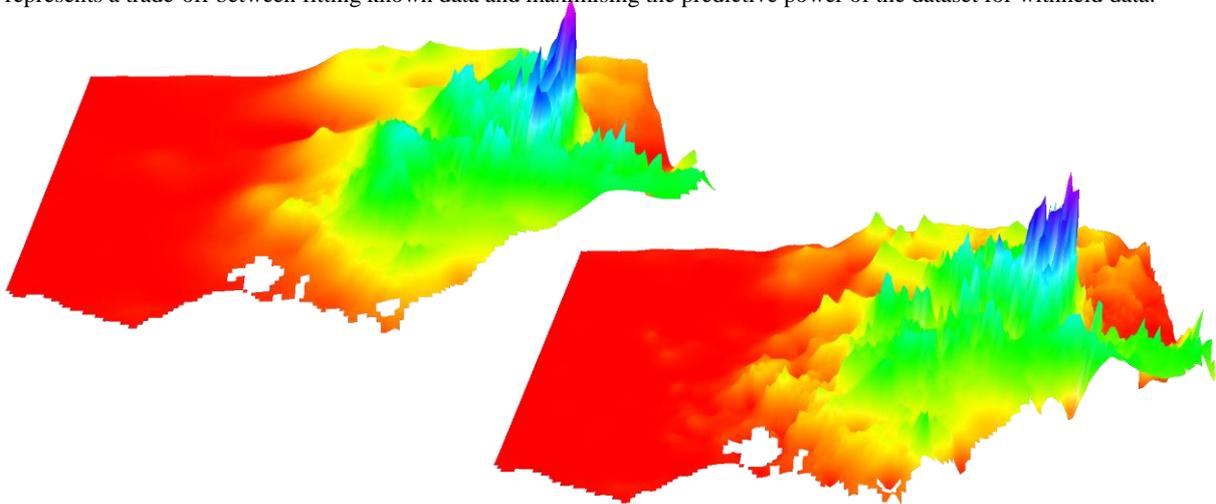


Figure 1. Comparison of the Bureau (left) and SILO (right) daily rainfall surfaces for south-eastern Victoria. The surfaces are for 25 January 2014.

Data Access and Pricing

There are several ways to access the datasets provided by SILO or the Bureau.

	Bureau of Meteorology	SILO
Access method	<ul style="list-style-type: none"> • Online datasets can be downloaded • Datasets which are not online are delivered via FTP, USB or Hard Disk. 	<ul style="list-style-type: none"> • Point datasets can be downloaded via the web or API • Gridded datasets can be downloaded from AWS Public Data.
Pricing	<ul style="list-style-type: none"> • Online datasets are free • Charges apply for datasets obtained by special request. 	<ul style="list-style-type: none"> • All SILO datasets are freely available • Data are licenced under the Creative Commons Attribution 4.0 license.

For more information please refer to the [SILO](#) and [Bureau](#)'s web pages.

References

Beesley, C.A., Frost, A.J., & Zajackowski, J. (2009). A comparison of the BAWAP and SILO spatially interpolated daily rainfall datasets. In *18th World IMACS/MODSIM Congress*, (pp. 3886-3892). <http://www.mssanz.org.au/modsim09/I13/beesley.pdf>