bomrang: Fetch Australian Government Bureau of Meteorology Data in R

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Summary

The Australian Bureau of Meteorology (BoM) publicly provides data via an anonymous FTP server, in XML and json files (Australian Bureau of Meteorology 2017). The files are well structured but knowledge of how to use R and parse them is required to extract the data into a data frame for use in R (R Core Team 2017) or requires external programs and scripting to import the data for use. *bomrang* provides functionality for automated retrieval and parsing of selected weather data files from BoM. Data that can be fetched include current weather at a given station, daily précis (short summaries less than 30 characters) forecasts for all Australian forecast locations, agricultural bulletins summarising weather observations useful for agriculture for each state or territory and satellite imagery in GeoTIFF file formats. A family of functions, `get_current_weather()`, `get_precis_forecast()`, `get_ag_bulletin()` and `get_weather_bulletin()`, provide the ability to easily download data from BoM, import it and create a tidy data frame (Wickham 2014) of the data. To help identify stations given a specific location, `sweep_for_station()` returns a data frame of all weather stations (in this package) sorted by distance from a user specified latitude and longitude, ascending. Two further functions, `update_forecast_towns()` and `update_station_locations()`, provide the user with the ability to update internal databases of forecast locations, station metadata and JSON URLs used by the package to interface with BoM. The package's internal databases decrease the time necessary to gather forecast information and return a data frame, while rarely changing. Functionality for automated downloading and importing of satellite imagery is provided by the `get_satellite_imagery()` function. A helper function, `get_available_imagery()`, returns values of currently available satellite imagery for download.

The data have many applications. In agriculture the data are used in several types of models, some of which include the estimation of surface moisture, crop yield estimates, crop development stages or stress or forecasting of epidemics of crop diseases or populations of insect pests [Venäläinen and Heikinheimo (2002); De Wolf, Madden, and Lipps (2003); Sparks2017]. Other areas of use include mapping potential renewable energy, *e.g.* wind or solar potential for exploration purposes (Ramachandra and Shruthi 2007). The data can also be used by decision makers for municipalities to help planning for extreme weather events, energy needs and other infrastructure (Svensson and Eliasson 2002; Alcoforado et al. 2009).

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