Applied Climate Data Processing Using *R*

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Keywords: Climatology, Reanalysis, MERRA, NetCDF

This paper presents a series of climate data processing procedures written in *R*. The workflows presented show that *R* can be used as a powerful and flexible tool for climate data analysis. Hourly reanalysis temperature from NASA's Modern Era Retrospective-analysis for Research and Applications (MERRA) were used. MERRA data are individual daily data file in network common data form (NetCDF) with hourly temperature time series. Daily maximum and minimum temperatures were extracted from the individual NetCDF files, and then daily temperature ranges (DTR) were computed. The outputs were concatenated to obtain one single DTR file at daily time scale and written as a new NetCDF. The results were interpolated and compared to actual observations at specific locations. Also standard climatology procedures like cosine weighted time series anomalies, linear trends, spatial and temporal patterns (with user-defined thresholds) and computations of mean temperatures over time for each grid location were carried out. The outputs are written in NetCDF format or GIS-ready ASCII file with geographic coordinates for further statistical analysis or advanced Geographical Information System (GIS) mapping. The results and interpretation of these procedures applied to the reanalysis data, along with the R scripts used to implement them are also presented.

References

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