Climate Reference Metadata.

1. Introduction

Metadata was collected from a variety of sources for the Climate Reference Network (CRN) stations. The latitude and longitude datum for the stations was used to reference various GIS datasets to extract information related to the topography of the stations, the population surrounding the stations and the land cover, including data pertaining to the urbanity of the sites. The Latitude and Longitude of the stations is reported to 4 significant digits which indicates a precision of close to 10 meters at the equator. The accuracy of these datum in conjunction with the GIS data will tend to be less than this as it is dependent on the registration accuracy of the GIS data and its inherent resolution. Unless otherwise stated all projections are assumed to be WGS84, a standard Lat/lon projection. The code for processing the metadata is located at <https://github.com/stevenmosher/Ghcn_V4_Metadata> and the script for processing the data is CRNmetadata.R. Where feasible the data sources are located in github, otherwise their URL is given in the references. All data sources are open, however, some require registration to acquire. Consequently, there is no code to automate the download of the data and so the scripts do not run turnkey. The user is expected to download the data for themselves and alter the “filenames.R’ source code accordingly.

1. Filename and format.

The filename is CRN\_Metadata\_Final.csv. It is a comma separated file. It is available here: https://github.com/stevenmosher/Ghcn\_V4\_Metadata/blob/master/CRN\_Metadata\_Final.csv

1. Column names
   1. Station\_Id

Station\_Id is a unique station identifier take from the site inventory. It is an integer value that represents the WBAN of the station.

* 1. Name

The station name is a asci record of the station name with spaces replaces by underlines, for example; “Murphy\_10\_W”

* 1. Longitude

The station’s longitude in degrees to 4 significant digits. The projection is WGS84

* 1. Latitude

The station’s latitude in degrees to 4 significant digits. The projection is WGS84

* 1. Elevation

The station’s elevation in meters taken from the station inventory

* 1. DEM1km

In addition to the elevation at the station’s exact latitude and longitude, the average elevation in meters surrounding the station is supplied from a Digital Elevation Model (DEM). The DEM data is supplied for cases where the elevation data may be missing, as is the case with a small percentage of GHCN stations. In addition, the DEM data may indicate that the station is in an area where the surrounding terrain is at a higher elevation and could be subject to cold air drainage. Finally, since the data includes Bathymetry the data can be used to identify stations that are located on ships at sea, oil platforms and other ‘land’ stations that may actually be located in the ocean. The DEM data source –ETOP01-- is described here: <https://www.ngdc.noaa.gov/mgg/global/relief/>. The data source has both elevation and bathymetry at a 1 arc minute resolution, or roughly 2km at the equator. Over land the elevation supplied is the elevation at the top of the ice sheet, which is significant for those stations in Greenland and Antarctica. URL <https://www.ngdc.noaa.gov/mgg/global/relief/ETOPO1/data/ice_surface/cell_registered/georeferenced_tiff/ETOPO1_Ice_c_geotiff.zip>.

* 1. DistancetoCoast
  2. LCCOwnLabel
  3. EF\_LF\_Desc
  4. WaterArea,
  5. UrbanArea10K
  6. GPwV4\_Area
  7. GPwV4\_00
  8. GPwV4\_05
  9. GPwV4\_10
  10. GPwV4\_15
  11. GPWV4\_Area10
  12. Hyde\_Area
  13. Hyde1970
  14. Hyde1980
  15. Hyde1990
  16. Hyde2000
  17. Hyde2005
  18. GpwV4\_density00
  19. Hyde\_density00
  20. GPW10km\_15\_Density
  21. EST\_POP2000
  22. EST\_POP2000\_50K
  23. DistanceToPlace
  24. DistanceToPlace50K
  25. PopulatedPlace
  26. PopulatedPlace50K
  27. Populated\_Lon
  28. Populated\_Lat
  29. Populated\_Lon50K
  30. Populated\_Lat50K
  31. Urban\_ES00Pop
  32. UrbanArea
  33. UrbanAreaName
  34. UrbanLon
  35. UrbanLat
  36. UrbanDailyMean
  37. BufferDailyMean
  38. UrbanNightMean
  39. BufferNightMean
  40. UrbanRuralDailyDiff
  41. UrbanRuralNightDiff
  42. Airport\_Dist,
  43. Airport\_Dist2,
  44. Airport\_Name,
  45. Airport\_Name2,
  46. Airport\_Type,
  47. Airport\_Type2
  48. Airport\_Lon,
  49. Airport\_Lat,
  50. Airport\_Lon2,
  51. Airport\_Lat2,
  52. Lights

1. References
   1. DEM

Amante, C. and B.W. Eakins, 2009. ETOPO1 1 Arc-Minute Global Relief Model: Procedures, Data Sources and Analysis. NOAA Technical Memorandum NESDIS NGDC-24. National Geophysical Data Center, NOAA. doi:10.7289/V5C8276M [Access date:12/26/2016]

1. Supplementary Information