SNAP Dataset User Guide

Historical and Projected Hourly Wind Data for Alaskan Communities, 1980-2099

This dataset consists of two distinct subdatasets:

1. ASOS/AWOS hourly wind speed and direction data that has been cleaned and adjusted to account for potential unknown changes in observing location/height

2. bias-corrected dynamically-downscaled historical and projected hourly wind speed and direction data

Both datasets contain data from the same 67 locations in Alaska. The ASOS/AWOS data covers a time period of 1980-01-01 to 2015-01-01, and the downscaled data covers a time period of 1980-01-01 to 2099-12-31.

Attribute Description

ASOS/AWOS data (`asos/` subfolder)
ts: timestamp (YYYY-mm-dd HH:MM:SS) (UTC)
ws: wind speed (mph)
wd: wind direction (degrees from north)

filenames are coded as follows: `wind_hourly_asos_<IACO station identifier>_1980-2019.csv`

WRF-downscaled data (`wrf/` subfolder)
ts: timestamp (YYYY-mm-dd HH:MM:SS) (UTC)
ws: wind speed (mph)
wd: wind direction (degrees from true north)

filenames are coded as follows:

```
wind_hourly_wrf_<model>_<scenario>_<IACO station identifier>_2015-2099.csv
wind_hourly_wrf_era_interim_<IACO station identifier>_1980-2014.csv
```

IACO station identifiers used for locations are provided alongside this dataset and can also be found at the FAA's website.

Methodology

All hourly ASOS/AWOS wind data (speed and direction) available via the Iowa Environmental Mesonet AK ASOS network were accessed and assessed for completeness, and 67 of those stations were determined to be sufficiently complete for climatological analysis. Those data were cleaned to produce regular hourly data, and adjusted via a combination of changepoint analysis and quantile mapping to correct for potential changes in sensor location and height. Subdataset (1) above is the result of this process.

ERA-Interim reanalysis, along with GFDL-CM3 and NCAR-CCSM4 CMIP5 model output, were downscaled using the Weather Research and Forecasting (WRF) model, and the resulting data (available in SNAP's data holdings) were subsequently extracted at the grid cells intersecting the point locations of the same 67 stations chosen in the efforts above. These extracted data were then bias-corrected via quantile mapping with the aforementioned cleaned/adjusted hourly ASOS/AWOS station wind data taken as truth, producing subdataset (2) above.

Note - Wind direction data in both datasets have not been altered, only the wind speeds.

Larger Work Citations

J. Walsh, K. Redilla, B. Crevensten, T. Kurkowski. Alaska Community Wind Tool. 2019 (revised 2020) [online tool] Alaska Center for Climate Assessment and Policy, University of Alaska Fairbanks http://windtool.accap.uaf.edu

Redilla, K., Pearl, S.T., Bieniek, P.A. and Walsh, J.E. (2019) Wind Climatology for Alaska: Historical and Future. Atmospheric and Climate Sciences, 9, 683-702. https://doi.org/10.4236/acs.2019.94042