WRF Alaska Data on AWS

Weather Research and Forecasting Model Dynamically Downscaled Data for the Alaska and surrounding regions is available for anyone to use via Amazon S3. The data constitute a dynamical approach to regional downscaling of Intergovernemental Panel on Climate Change (IPCC) General Circulation Model (GCM) grids. The data are downscaled to a 20km x 20km grid at an hourly timestep, which are further temporally aggregated to daily and monthly. The coverage is Alaska, portions of Russia, and Western Canada in a WRF defined polar-stereographic coordinate reference system.

Accessing the Data on AWS

The data are organized in a directory structure based on each files model name, scenario, and variable name.
The file naming convention is as follows:
`variable_timestep_group_model_scenario_year.nc`, where:

- `variable` = name of the variable
- `timestep` = the temporal aggregation level (hourly, daily, monthly)
- `group` = the name of the downscaled data group which for these data are always `wrf`
- `model` = the name of the model
- `scenario` = the name of the scenario
- `year` = four digit year

for example: `/ERA-Interim/historical/t2/t2_hourly_wrf_ERA-Interim_historical_1979.nc` would be the ERA-Interim temperature at

2m at an hourly timestep for the year 1979.

File Structure

The data are stored in the NetCDF4 format and we attempt to make them as self-describing as is possible, following the Climate and Forecasting (CF) metadata standard, as it pertains to these dynamically downscaled data.

The files are structured such that there are spatial coordinates (xi, yi) in the WRF polar stereographic projection for this region, along with (time). We have also maintained the WRF-output longitude/latitude (lon,lat) coordinates as additional 2-Dimensional variables stored within the file, in case researchers have code that leverages these more base-level WRF output coordinates. Further, there are 3-D or 4-D arrays for the variable being examined. Some variables are simply structured as (`time`, `lat`, `lon`) whereas with others there are levels stored as (`time`, `plev`, `lat`, `lon`).

The files contain attributes at each of the sub-variables / coordinates that pertains to each of the variables they represent. The top-level attributes are:

- `creation_date`: date the initial WRF outputs were generated by the AK Climate Science Center
- `NCL_Version`: the version of the NCL library and tools used to initially restructure the data from GRIB to NetCDF
- `system`: processing system used
- `Conventions`: none
- `grib_source`: name of the root source GRIB output file from raw

WRF output
- `title`: conversion tool used.
- `reference_time`: the begin date/time of the series
- `proj_parameters`: the proj4string that describes the coordinate reference system (CRS)
- `crs_wkt`: the well-known text representation of hte coordinate reference system (CRS)
- `SNAP_VERSION`: the version of the data that was re-stacked and made more user-friendly by SNAP.
- `restacked_by`: the name of the scientist who performed the restacking procedures at SNAP.

The files also contain file attributes at the variable-level, which are:

- `units`: variable units
- `coordinates_`: the main spatial coordinates (`xc`, `yc`)
- `temporal_resampling`: description of the temporal resampling
- `long_name`: the variables long-form name – derived from original WRF outputs

Other attributes specific to `time` are also stored in the outputs, which state that all of the time data are UTC.

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