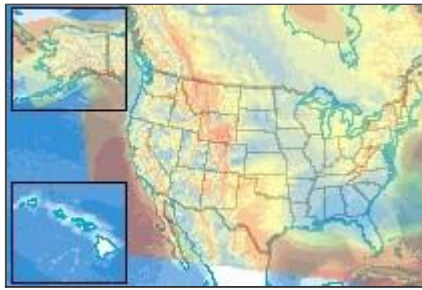# Wind Speed (m/s at 80m)

Tags
Annual, Speed, Wind, Advanced Research WRF Model Version 3.7, Weather Research and Forecasting Model, Climate

Summary

Annual average wind speed at 80m in m/s (2000-2004) derived from 12-mile resolution results from the Advanced Research WRF (ARW) Version 3.7 modeling system.

Description

Annual average wind speed at 80m in m/s (2000-2004) derived from 12-mile resolution results from the Advanced Research WRF (ARW) Version 3.7 modeling system. Source data are from WRF model computations from Argonne National Laboratory which include dynamic downscaling, and validation against historical data. Simulations were computed on MIRA, a supercomputer at Argonne. Publications about the work include:

- Wang, Jiali; Han, Yuefeng; Stein, Michael; Kotamarthi, Veerabhadra R.; Huang, Whitney, "Evaluation of dynamically downscaled extreme temperature using a generalized extreme value (GEV) model", Climate Dynamics, 2016.
- Wang, Jiali; Kotamarthi, Veerabhadra R., "High-resolution Dynamically Downscaled Projections of Precipitation in the mid and late 21st Century over North America", Earth's Future, 2015.
- Wang, Jiali; FNU, Swati; Stein, Michael; Kotamarthi, Veerabhadra R., "Model performance in spatio-temporal patterns of precipitation: New methods for identifying value added by a regional climate model", Journal of Geophysical Research: Atmospheres, 2015- Wang, Jiali; Kotamarthi, Veerabhadra R., "Downscaling with a Nested Regional Climate Model in Near-Surface Fields over the Contiguous United States", Journal of Geophysical Research: Atmospheres, 2014.

Use limitations
There are no access and use limitations for this item.

Extent
West	-179.621502	East	-30.752693
North	72.851851	South	17.467453

Scale Range
Maximum (zoomed in)   1:500,000
Minimum (zoomed out)   1:150,000,000

Topics and Keywords

THEMES OR CATEGORIES OF THE RESOURCE   climatology Meteorology Atmosphere, environment, geoscientific Information, oceans

* CONTENT TYPE   Downloadable Data
　　EXPORT TO FGDC CSDGM XML FORMAT AS RESOURCE DESCRIPTION No

Citation

TITLE Wind Speed (m/s at 80m)

PRESENTATION FORMATS   digital map
FGDC GEOSPATIAL PRESENTATION FORMAT   raster digital data

Citation Contacts

RESPONSIBLE PARTY
　　INDIVIDUAL'S NAME Jim Kuiper
　　ORGANIZATION'S NAME Argonne National Laboratory
　　CONTACT'S ROLE   processor

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Resource Details

DATASET LANGUAGES   * English (UNITED STATES)
DATASET CHARACTER SET   utf8 - 8 bit UCS Transfer Format

SPATIAL REPRESENTATION TYPE   * grid

* PROCESSING ENVIRONMENT Microsoft Windows 7 Version 6.1 (Build 7601) Service Pack 1; Esri ArcGIS 10.3.0.4322

ARCGIS ITEM PROPERTIES
　　* NAME wind_annual_speed_80m

Extents

EXTENT
　　DESCRIPTION
　　　　North America
　　GEOGRAPHIC extent
　　　　BOUNDING RECTANGLE
　　　　　　EXTENT TYPE   Extent used for searching
　　　　　　* WEST LONGITUDE -179.621502
　　　　　　* EAST LONGITUDE -30.752693
　　　　　　* NORTH LATITUDE 72.851851
　　　　　　* SOUTH LATITUDE 17.467453
　　　　　　* EXTENT CONTAINS THE RESOURCE Yes

BEGINNING DATE 2000-01-01 00:00:00
ENDING DATE 2004-12-31 00:00:00

EXTENT IN THE ITEM'S COORDINATE SYSTEM
* WEST LONGITUDE -19995374.153300
* EAST LONGITUDE -3423374.153300
* SOUTH LATITUDE 1975307.934400
* NORTH LATITUDE 12067307.934400
* EXTENT CONTAINS THE RESOURCE Yes

Resource Maintenance

RESOURCE MAINTENANCE
UPDATE FREQUENCY   as needed

Spatial Reference

ARCGIS COORDINATE SYSTEM
* TYPE Projected
* GEOGRAPHIC COORDINATE REFERENCE GCS_WGS_1984
* PROJECTION WGS_1984_Web_Mercator_Auxiliary_Sphere
* COORDINATE REFERENCE DETAILS
PROJECTED COORDINATE SYSTEM
WELL-KNOWN IDENTIFIER 102100
X ORIGIN -20037700
Y ORIGIN -30241100
XY SCALE 148923141.92838538
Z ORIGIN -100000
Z SCALE 10000
M ORIGIN -100000
M SCALE 10000
XY TOLERANCE 0.001
Z TOLERANCE 0.001
M TOLERANCE 0.001
HIGH PRECISION true
LATEST WELL-KNOWN IDENTIFIER 3857
WELL-KNOWN TEXT PROJCS["WGS_1984_Web_Mercator_Auxiliary_Sphere",GEOGCS
["GCS_WGS_1984",DATUM["D_WGS_1984",SPHEROID
["WGS_1984",6378137.0,298.257223563]],PRIMEM["Greenwich",0.0],UNIT
["Degree",0.0174532925199433]],PROJECTION["Mercator_Auxiliary_Sphere"],PARAMETER
["False_Easting",0.0],PARAMETER["False_Northing",0.0],PARAMETER
["Central_Meridian",0.0],PARAMETER["Standard_Parallel_1",0.0],PARAMETER
["Auxiliary_Sphere_Type",0.0],UNIT["Meter",1.0],AUTHORITY["EPSG",3857]]

REFERENCE SYSTEM IDENTIFIER
* VALUE 3857
* CODESPACE EPSG
* VERSION 8.2.6

Lineage
LINEAGE STATEMENT
Processing steps:
1) Annual wind speeds, specified as u and v vectors, for 80m and 100m heights were
extracted for 2000-2004 from WRF model outputs, and stored in NetCDF format.
In ArcGIS:
2) Table views were created, for each file: arcpy.MakeNetCDFTableView_md
(in_netCDF_file=infile, variable="lon;lat;u;v", out_table_view=table,
row_dimension="ij;ix", dimension_values="", value_selection_method="BY_VALUE")
3) Point layers were created: arcpy.MakeXYEventLayer_management(table=table,
in_x_field="lon", in_y_field="lat", out_layer=table+"_xy", spatial_reference=sr_geo,
in_z_field="")
4) Points were projected to web Mercator: arcpy.Project_management
(in_dataset=table+"_xy", out_dataset=fc, out_coor_system=sr_web_merc)

5) A wind speed field was added: arcpy.AddField_management
(fc, "WindSpeed_mps", "DOUBLE", "20", "2", "", "", "NULLABLE","NON_REQUIRED", "")
6) Wind speeds were computed: arcpy.CalculateField_management
(fc, "WindSpeed_mps", "(!u! * !u! + !v! * !v!) ** 0.5", "PYTHON", "")
7) Points were converted to raster: arcpy.PointToRaster_conversion(in_features=fc,
value_field="WindSpeed_mps", out_rasterdataset=tempraster, cell_assignment="MEAN",
priority_field="NONE", cellsize="12000")
8) Data gaps due to the projection change were filled using the average value of the 3x3
adjacent cells in two steps: filled1 = arcpy.sa.Con(arcpy.sa.IsNull(tempraster),
arcpy.sa.FocalStatistics(tempraster, arcpy.sa.NbrRectangle(3,3,"CELL"), "MEAN"),
tempraster)
9) Second step for a small number of remaining gaps: filled2 = arcpy.sa.Con(arcpy.sa.IsNull
(filled1), arcpy.sa.FocalStatistics(filled1, arcpy.sa.NbrRectangle(3,3,"CELL"), "MEAN"),
filled1)
10) Images were clipped to the area of interest: arcpy.Clip_management
(in_raster=filledrast, rectangle="-19994262.3303 1976235.1632 -3431312.5378
12056880.3245", out_raster=finalraster, in_template_dataset="ClipExtent",
nodata_value="-1.797693e+308", clipping_geometry="ClippingGeometry",
maintain_clipping_extent="NO_MAINTAIN_EXTENT")
11) Final images for 80m and 100m were computed as the average of the 5 years for each.

Distribution

DISTRIBUTION FORMAT
* NAME File Geodatabase Raster Dataset

Fields

DETAILS FOR OBJECT   Value
DEFINITION
Average annual wind speed in meters/second from 2000-2004.

DEFINITION SOURCE
Argonne National Laboratory

Metadata Details

* METADATA LANGUAGE English (UNITED STATES)
* METADATA CHARACTER SET   utf8 - 8 bit UCS Transfer Format

SCOPE OF THE DATA DESCRIBED BY THE METADATA   * dataset
SCOPE NAME   * dataset

* LAST UPDATE 2016-02-29

ARCGIS METADATA PROPERTIES
METADATA FORMAT ArcGIS 1.0
METADATA STYLE FGDC CSDGM Metadata
STANDARD OR PROFILE USED TO EDIT METADATA FGDC

CREATED IN ARCGIS FOR THE ITEM 2016-02-26 13:29:30
LAST MODIFIED IN ARCGIS FOR THE ITEM 2016-02-29 16:57:54

AUTOMATIC UPDATES
HAVE BEEN PERFORMED Yes
LAST UPDATE 2016-02-26 13:29:30

Metadata Contacts

METADATA CONTACT
INDIVIDUAL'S NAME Jim Kuiper
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CONTACT'S ROLE processor

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Metadata Maintenance

MAINTENANCE
UPDATE FREQUENCY as needed