

## Wind Speed (m/s at 100m)



### Tags

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

### Summary

Annual average wind speed at 100m 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 100m 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 100m)

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

### CONTACT INFORMATION

PHONE  
VOICE 630-252-6206

### ADDRESS

TYPE physical  
DELIVERY POINT 9700 S. Cass Ave.  
CITY Darien  
ADMINISTRATIVE AREA IL  
POSTAL CODE 60439  
E-MAIL ADDRESS [jkuiper@anl.gov](mailto:jkuiper@anl.gov)

## 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

### ARC GIS ITEM PROPERTIES

\* NAME wind\_annual\_speed\_100m

## 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

#### TEMPORAL EXTENT

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**

ORGANIZATION'S NAME **Argonne National Laboratory**

CONTACT'S ROLE **processor**

### CONTACT INFORMATION

#### PHONE

VOICE **630-252-6206**

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TYPE **physical**

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## Metadata Maintenance

### MAINTENANCE

UPDATE FREQUENCY **as needed**