http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy

**High-resolution Wind Resource Maps of Alaska**

Metadata also available as - [[Parseable text](http://akenergyinventory.org/metadata/WND2006-1A.txt)] - [[XML](http://akenergyinventory.org/metadata/WND2006-1A.xml)]

**Frequently-anticipated questions:**

* [What does this data set describe?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what)
  1. [How should this data set be cited?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.1)
  2. [What geographic area does the data set cover?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.2)
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  4. [Does the data set describe conditions during a particular time period?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.4)
  5. [What is the general form of this data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.5)
  6. [How does the data set represent geographic features?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.6)
  7. [How does the data set describe geographic features?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#what.7)
* [Who produced the data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#who)
  1. [Who are the originators of the data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#who.1)
  2. [Who also contributed to the data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#who.2)
  3. [To whom should users address questions about the data?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#who.3)
* [Why was the data set created?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#why)
* [How was the data set created?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#how)
  1. [From what previous works were the data drawn?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#how.1)
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  3. [What similar or related data should the user be aware of?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#how.3)
* [How reliable are the data; what problems remain in the data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality)
  1. [How well have the observations been checked?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality.1)
  2. [How accurate are the geographic locations?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality.2)
  3. [How accurate are the heights or depths?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality.3)
  4. [Where are the gaps in the data? What is missing?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality.4)
  5. [How consistent are the relationships among the data, including topology?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#quality.5)
* [How can someone get a copy of the data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy)
  1. [Are there legal restrictions on access or use of the data?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy.0)
  2. [Who distributes the data?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy.1)
  3. [What's the catalog number I need to order this data set?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy.2)
  4. [What legal disclaimers am I supposed to read?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy.3)
  5. [How can I download or order the data?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#getacopy.4)
* [Who wrote the metadata?](http://akenergyinventory.org/metadata/WND2006-1A.faq.html#metaref)

**What does this data set describe?**

*Title:* High-resolution Wind Resource Maps of Alaska

*Abstract:*

This file was created using the MesoMap system which consists of an integrated set of atmospheric simulation models, databases, and computers and storage systems. At the core of MesoMap is MASS (Mesoscale Atmospheric Simulation System), a numerical weather model, which simulates the physics of the atmosphere. MASS is coupled to a simpler wind flow model, WindMap, which is used to refine the spatial resolution of MASS and account for simple localized effects of terrain and surface roughness. MASS simulates weather conditions over a region for 366 historical days randomly selected from a 15-year period. When the runs are finished, the results are input into WindMap. Truewind subsequently validates the wind maps. The final product is a grid of cells each containing a single value of average wind speed (m/s) at a hub height of 30, 50, 70, and 100 meters and wind power (W/m^2) density at a hub height of 50 meters for a 40,000 square meter area.

*Supplemental\_Information:*

The layers listed below are available as raster GeoTIF files and in Google Earth format. Attribute information for the following layers (entities) is included in this metadata file under the "Entity\_and\_Attribute\_Information" section. Each layer is listed and described in detail under its own heading starting "Entity\_Type\_Label." Layers include:

AK\_spd30m average wind speed (m/s) at a hub height of 30m AK\_spd50m average wind speed (m/s) at a hub height of 50m AK\_spd70m average wind speed (m/s) at a hub height of 70m AK\_spd100m average wind speed (m/s) at a hub height of 100m AK\_pwr50m wind power (W/m^2) density at a hub height of 50m

1. **How should this data set be cited?**

AWS Truewind, LLC, and Authority, Alaska Energy , 2006, High-resolution Wind Resource Maps of Alaska: Wind Energy WND 2006-1A, State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority, Anchorage, AK.

Online Links:

* + [<http://akenergyinventory.org/data>](http://akenergyinventory.org/data)

1. **What geographic area does the data set cover?**

*West\_Bounding\_Coordinate:* -171.536124

*East\_Bounding\_Coordinate:* -134.528559

*North\_Bounding\_Coordinate:* 69.233511

*South\_Bounding\_Coordinate:* 56.660441

1. **What does it look like?**
2. **Does the data set describe conditions during a particular time period?**

Calendar\_Date: 2006

*Currentness\_Reference:* publication date

1. **What is the general form of this data set?**

*Geospatial\_Data\_Presentation\_Form:* raster digital data

1. **How does the data set represent geographic features?**
   * **How are geographic features stored in the data set?**

This is a Raster data set. It contains the following raster data types:

* + - Dimensions 10506 x 18721 x 1, type Pixel
  + **What coordinate system is used to represent geographic features?**

*Grid\_Coordinate\_System\_Name:* Universal Transverse Mercator

*Universal\_Transverse\_Mercator:*

*UTM\_Zone\_Number:* 4

*Transverse\_Mercator:*

*Scale\_Factor\_at\_Central\_Meridian:* 0.999600

*Longitude\_of\_Central\_Meridian:* 159.000000

*Latitude\_of\_Projection\_Origin:* 0.000000

*False\_Easting:* 500000.000000

*False\_Northing:* 0.000000

Planar coordinates are encoded using row and column  
Abscissae (x-coordinates) are specified to the nearest 200.000000  
Ordinates (y-coordinates) are specified to the nearest 200.000000  
Planar coordinates are specified in meters

The horizontal datum used is D\_WGS\_1984.  
The ellipsoid used is WGS\_1984.  
The semi-major axis of the ellipsoid used is 6378137.000000.  
The flattening of the ellipsoid used is 1/298.257224.

1. **How does the data set describe geographic features?**

**AK\_spd30m.tif**

Object type is raster, describing average wind speed (m/s) at a hub height of 30m (Source: State of Alaska, AEA)

**File Type**

The file format of the image (Source: State of Alaska, AEA)

*TIFF, 32-bit grey scale*

**File Size**

The file size of the video (Source: State of Alaska, AEA)

*750.3 Mb*

**Line (row)**

The number of lines or rows in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 10506 |
| **Units:** | pixels |

**Sample (column)**

The number of samples or columns in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 18721 |
| **Units:** | pixels |

**AK\_spd50m.tif**

Object type is raster, describing average wind speed (m/s) at a hub height of 50m (Source: State of Alaska, AEA)

**File Type**

The file format of the image (Source: State of Alaska, AEA)

*TIFF, 32-bit grey scale*

**File Size**

The file size of the video (Source: State of Alaska, AEA)

*750.3 Mb*

**Line (row)**

The number of lines or rows in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 10506 |
| **Units:** | pixels |

**Sample (column)**

The number of samples or columns in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 18721 |
| **Units:** | pixels |

**AK\_spd70m.tif**

Object type is raster, describing average wind speed (m/s) at a hub height of 70m (Source: State of Alaska, AEA)

**File Type**

The file format of the image (Source: State of Alaska, AEA)

*TIFF, 32-bit grey scale*

**File Size**

The file size of the video (Source: State of Alaska, AEA)

*750.3 Mb*

**Line (row)**

The number of lines or rows in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 10506 |
| **Units:** | pixels |

**Sample (column)**

The number of samples or columns in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 18721 |
| **Units:** | pixels |

**AK\_spd100m.tif**

Object type is raster, describing average wind speed (m/s) at a hub height of 100m (Source: State of Alaska, AEA)

**File Type**

The file format of the image (Source: State of Alaska, AEA)

*TIFF, 32-bit grey scale*

**File Size**

The file size of the video (Source: State of Alaska, AEA)

*750.3 Mb*

**Line (row)**

The number of lines or rows in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 10506 |
| **Units:** | pixels |

**Sample (column)**

The number of samples or columns in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 18721 |
| **Units:** | pixels |

**AK\_pwr50m.tif**

Object type is raster, describing wind power (W/m^2) density at a hub height of 50m (Source: State of Alaska, AEA)

**File Type**

The file format of the image (Source: State of Alaska, AEA)

*TIFF, 32-bit grey scale*

**File Size**

The file size of the video (Source: State of Alaska, AEA)

*750.3 Mb*

**Line (row)**

The number of lines or rows in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 10506 |
| **Units:** | pixels |

**Sample (column)**

The number of samples or columns in the image (Source: State of Alaska, AEA)

|  |  |
| --- | --- |
| **Range of values** | |
| **Minimum:** | 1 |
| **Maximum:** | 18721 |
| **Units:** | pixels |

**Who produced the data set?**

1. **Who are the originators of the data set?** (may include formal authors, digital compilers, and editors)
   * AWS Truewind, LLC
   * Alaska Energy Authority
2. **Who also contributed to the data set?**

AWS Truewind, LLC

1. **To whom should users address questions about the data?**

AWS Truewind  
c/o Michael Brower  
463 New Karner Road  
Albany, New York 12205  
United States

(518) 213-0044 (voice)

**Why was the data set created?**

The purpose of creating this file was to use MesoMap to create high-resolution wind resource maps of the state and to provide wind resource data in a format enabling the assessment potential wind development sites in a GIS. By combining a sophisticated numerical weather model capable of simulating large-scale wind patterns with a microscale wind flow model responsive to local terrain and surface conditions, they enable the mapping of wind resources with much greater accuracy than has been possible in the past. In addition, they do not require surface wind data to make accurate predictions. While on-site measurements will be required to confirm the predicted wind resource at any particular location, mesoscale-microscale modeling can greatly reduce the time and cost required to identify and evaluate potential wind project sites.

**How was the data set created?**

1. **From what previous works were the data drawn?**
2. **How were the data generated, processed, and modified?**

Date: 2006 (process 1 of 5)

The MesoMap system creates a wind resource map in several steps. First, the MASS model simulates weather conditions over 366 days selected from a 15-year period. The days are chosen through a stratified random sampling scheme so that each month and season is represented equally in the sample; only the year is randomized. Each simulation generates wind and other weather variables (including temperature, pressure, moisture, turbulent kinetic energy, and heat flux) in three dimensions throughout the model domain, and the information is stored at hourly intervals. When the runs are finished, the results are compiled into summary data files, which are then input into the WindMap program for the final mapping stage. The two main products are usually (1) color-coded maps of mean wind speed and power density at various heights above ground and (2) data files containing wind speed and direction frequency distribution parameters. For the standard MesoMap configuration MASS is run on the following nested grids: First (outer) grid level: 30 km, Second (intermediate) grid level: 8 km, Third (inner) grid level: 2.5 km.

Person who carried out this activity:

Brower, Michael  
AWS Truewind, LLC  
Principal  
463 New Karner Road  
Albany, New York 12205  
United States

(518) 213-0044 (voice)

Date: 2006 (process 2 of 5)

Metadata imported.

Date: 2006 (process 3 of 5)

Written summary of the data processing procedures that are performed on the raw measured data in order to create an annual dataset of "typical" wind speeds, which could then be used to calculate potential power production from wind turbines. There are various methods and reasons for adjusting the raw data, so the purpose of these notes is to document what is typically done in AEA reports. See the associated PDF file, <<http://akenergyinventory.org/metadata/WND2006_process.pdf>> for more information.

Person who carried out this activity:

Jensen, James  
AEA  
Project Manager  
813 W. Northern Lights Blvd.  
Anchorage, AK, Alaska 99503  
United States

(907) 771-3043 (voice)

Date: 2009 (process 4 of 5)

The raw, raster grid filed were converted to GeoTIF (K.R. Papp, AEA, 18-Jun, 2009) via ArcGIS 9.3 software. The dataset will be viewable/distributed online via the Alaska Energy Data Inventory ([<http://akenergyinventory.org>](http://akenergyinventory.org/)) project through a WMS (Web Mapping Service) feed provided by the Geographic Information Network of Alaska, a partner of the Alaska Energy Data Inventory project.

Date: 2009 (process 5 of 5)

Formal FGDC metadata (this document) was rewritten for the entire AK wind dataset (K.R. Papp, AEA, 18-Jun, 2009). The original 2006 metadata, each describing an individual layer, have been combined into this single dataset (i.e. all wind speed heights and power). The dataset will be viewable/distributed online via the Alaska Energy Data Inventory ([<http://akenergyinventory.org>](http://akenergyinventory.org/)) project.

1. **What similar or related data should the user be aware of?**

AWS Truewind, LLC, and Authority, Alaska Energy , 2006, Gridded Wind Parameters of Alaska: Wind Energy WND 2006-1B, State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority, Anchorage, AK.

Online Links:

* + [<http://akenergyinventory.org/data>](http://akenergyinventory.org/data)

AWS Truewind, LLC, and Authority, Alaska Energy , 2006, High-resolution Wind Resource Maps of Southeast Alaska: Wind Energy WND 2006-2A, State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority, Anchorage, AK.

Online Links:

* + [<http://akenergyinventory.org/data>](http://akenergyinventory.org/data)

AWS Truewind, LLC, and Authority, Alaska Energy , 2006, Gridded Wind Parameters of Southeast Alaska: Wind Energy WND 2006-2B, State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority, Anchorage, AK.

Online Links:

* + [<http://akenergyinventory.org/data>](http://akenergyinventory.org/data)

**How reliable are the data; what problems remain in the data set?**

1. **How well have the observations been checked?**

Raster cell values of the average wind speed (m/s) and wind power (W/m^2) density were computed from the MASS (Mesoscale Atmospheric Simulation System), a numerical weather model, which simulates the physics of the atmosphere. The maps and data can then be compared with land and ocean surface wind measurements, and if significant discrepancies are observed, adjustments to the wind maps can be made. The usual geophysical and meteorological inputs were used. The WindMap program adjusted the wind resource estimates to reflect local topography and surface roughness changes on a grid spacing of 200 m. For the topographical data, we used the National Elevation Dataset, a digital terrain model produced on a 30 m grid by the US Geological Survey (USGS). For the land cover, we used the National Land Cover Dataset, which is derived from Landsat imagery. It was also produced by the USGS on a 30 m grid. In converting from land cover to surface roughness, certain roughness length values were assumed to be typical of conditions in the region. The displacement height is defined as the height at which the wind speed becomes zero in the logarithmic shear formula. For this project, we assumed that the displacement height was 10 times the surface roughness length, which was in turn defined to be approximately 7.5% of the vegetation height. For deciduous forests with a roughness length of 0.9 m, this resulted in a displacement height of 9 m.

1. **How accurate are the geographic locations?**

The WindMap program adjusted the wind resource estimates to reflect local topography and surface roughness changes on a grid spacing of 200 m. For the topographical data, we used the National Elevation Dataset, a digital terrain model produced on a 30 m grid by the US Geological Survey (USGS). For the land cover, we used the National Land Cover Dataset, which is derived from Landsat imagery. It was also produced by the USGS on a 30 m grid.

1. **How accurate are the heights or depths?**
2. **Where are the gaps in the data? What is missing?**

The shaded raster images display the average wind speed (m/s) and wind power (W/m^2) density for a large portion of mainland Alaska (North Slope and the Aleutians not included).

1. **How consistent are the relationships among the observations, including topology?**

MASS is coupled to a simpler wind flow model, WindMap, which is used to refine the spatial resolution of MASS and account for simple localized effects of terrain and surface roughness. MASS simulates weather conditions over a region for 366 historical days randomly selected from a 15-year period. When the runs are finished, the results are input into WindMap. Truewind subsequently validates the wind maps.

**How can someone get a copy of the data set?**

**Are there legal restrictions on access or use of the data?**

*Access\_Constraints:*

This report, map, and/or data set have been published as part of the Alaska Energy Data Inventory (AEDI) project. The rasters layers described in this dataset are currently viewable as read-only base layers through the AEDI website. The vector layers, however, may be accessed and downloaded at the user's convenience. All of the data are available directly from AWS Truewind, LLC.

*Use\_Constraints:*

This map was created by AWS Truewind using the MesoMap system and historical weather data. Although it is believed to represent an accurate overall picture of the wind energy resource, estimates at any location should be confirmed by measurement. Please site AWS Truewind, LLC when using this data.

1. **Who distributes the data set?** (Distributor 1 of 1)

State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority  
Wind Program Manager  
813 W. Northern Lights Blvd.  
Anchorage, AK 99504  
USA

907-771-3043 (voice)  
907-771-3044 (FAX)  
jjensen@aidea.org

*Hours\_of\_Service:* 8 am to 4:30 pm, Monday through Friday, except State holidays

*Contact\_Instructions:*

Please view our web site ([<http://akenergyinventory.org>](http://akenergyinventory.org/)) for the latest information on available data. Please contact us using the e-mail address provided above when possible.

1. **What's the catalog number I need to order this data set?**

Wind Energy 2006-1A

1. **What legal disclaimers am I supposed to read?**

The State of Alaska makes no express or implied warranties (including warranties of merchantability and fitness) with respect to the character, function, or capabilities of the electronic services or products or their appropriateness for any user's purposes. In no event will the State of Alaska be liable for any incidental, indirect, special, consequential, or other damages suffered by the user or any other person or entity whether from the use of the electronic services or products, any failure thereof, or otherwise, and in no event will the State of Alaska's liability to the requester or anyone else exceed the fee paid for the electronic service or product.

1. **How can I download or order the data?**
   * **Availability in digital form:**

|  |  |
| --- | --- |
| **Data format:** | Google Earth KML (version KML Version 2.2) |
| **Network links:** | [<http://akenergyinventory.org/data>](http://akenergyinventory.org/data) |

|  |  |
| --- | --- |
| **Data format:** | TIFF |
| **Network links:** | [<http://www.awstruewind.com/>](http://www.awstruewind.com/) |
| **Media you can order:** | DVD-ROM (format Joliet) |

* + **Cost to order the data:**

Digital files on DVD-ROM are available upon request from AWS Truewind, LLC.

* + **Special instructions:**

Requests may be made by phone (518) 213-0044 or fax (518) 213-0045.

* + **How long will it take to get the data?**

Offline DVD-ROMs: Approximately 1-2 weeks

1. **What hardware or software do I need in order to use the data set?**

Geospatial software is required to view and manipulate this raster dataset, such as ENVI <<http://www.ittvis.com/envi/>>, ER Mapper <<http://www.ermapper.com/>> or ESRI ArcGIS <<http://www.esri.com/software/arcgis/index.html>>. Free versions of the software listed may be available to simply view the data. The Google Earth KMZ file contains network links to the WMS (Web Mapping Service) feed provided by the Geographic Information Network of Alaska, a partner of the Alaska Energy Data Inventory project.

**Who wrote the metadata?**

Dates:

Last modified: 23-Jun-2009  
Last Reviewed: 23-Jun-2009  
To be reviewed: 23-Jun-2011

Metadata author:

State of Alaska, Department of Commerce, Community & Economic Development, Alaska Energy Authority  
Energy Data Project Manager  
813 W. Northern Lights Blvd.  
Anchorage, AK 99504  
USA

907-771-3049 (voice)  
907-451-5050 (FAX)  
kpapp@aidea.org

*Hours\_of\_Service:* 8 am to 4:30 pm, Monday through Friday, except State holidays.

*Contact\_Instructions:*

Please contact us through the e-mail address above whenever possible.

Metadata standard:

FGDC Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998)

Generated by [mp](http://geology.usgs.gov/tools/metadata/tools/doc/mp.html) version 2.9.8 on Wed Jun 24 20:26:00 2009