# Wind resource maps for WASA domain, South Africa

## Metadata and further information

## May 2013

| METADATA | |
|---|---|
| Data set name | Wind resource maps for WASA domain, South Africa |
| Data set date | May 2013 |
| Data provider | SANEDI |
| Data type | Raster data sets with a grid cell size of 0.0025° |
| Data format | ArcGIS ASC |
| File name(s) | <province identifier> <resolution> <parameter>.asc |
| Data origin | Raster data sets with grid cell sizes of 250 m for NC, WC and EC |

| DATA PARAMETERS | |
|---|---|
| Mean wind speed | Mean wind speed $U$ [$ms^{-1}$] @ 100 m above ground level |
| Mean power density | Mean power density $P$ [$Wm^{-2}$] @ 100 m above ground level |
| Terrain elevation | Elevation of modelling site in [m] above mean sea level |
| Ruggedness index RIX | Site RIX value calculated by WAsP (standard parameter setup) |

| COORDINATE SYSTEM | |
|---|---|
| Projection | Unprojected longitude and latitude |
| Zone number | n/a |
| Datum | World Geodetic System 1984 (WGS 84) |

| TECHNOLOGY | |
|---|---|
| Calculation software | Frogfoot system with WAsP engine version 10.2 |
| Wind-climatological input | First Verified Numerical Wind Atlas for South Africa (VNWA) |
| Elevation data input | 20-m height contours from 1:50,000 SA topographical map sheets |
| Roughness data input | 1-km resolution GLCC data, vectorized by DTU Wind Energy |
| Air density input | Site air density approximation using elevation only |

**DETAILED NOTES**

**Purpose**

This data set was created for the WASA project and the Department of Energy, South Africa. The wind resource maps were designed specifically for inclusion in GIS-based strategic environmental assessments (SEA) for wind power in Western Cape and parts of Northern and Eastern Cape.

**Methodology**

Reference is made to the information and documentation available from http://www.wasaproject.info

**Limitations**

The data set is limited by the operational envelopes of the wind atlas methodology and the WAsP models. The accuracy depends on a) the accuracy of the VNWA, which has been verified against the data from 10 WASA measurement masts, b) the WAsP microscale modelling and c) the input topographical data.

In complex terrain (RIX > 5%), the wind resources may be significantly over-estimated by the WAsP microscale modelling. Above and close to built-up areas like cities, towns and villages, the results are less reliable. Close to and above forested areas, the results are also less reliable and should be interpreted and used accordingly.

The data set was designed specifically for planning purposes and should be used with utmost care for design, development and detailed assessments of actual wind farms; where local, on-site measurements are strongly recommended. The wind resource maps are subject to change without notice if and when more accurate and reliable data, models and procedures become available.

**Available documentation**

The wind atlas methodology is described in the European Wind Atlas (1989); the application of WAsP in the program documentation, see www.wasp.dk. The First Verified Numerical Wind Atlas for South Africa is a product of the Wind Atlas for South Africa project and is described further on the WASA download pages http://wasadata.csir.co.za/wasa1/WASAData

**Acknowledgements**

CSIR Environmental Management Services for providing height contour data for Eastern Cape and Northern Cape. MetroGIS (Pty) Ltd. for providing height contour data for Western Cape in WAsP-compatible format. WASA Implementation team: UCT (CSAG), CSIR, SAWS, DTU Wind Energy and World in a Box Oy for Frogfoot development.

**DISCLAIMER**

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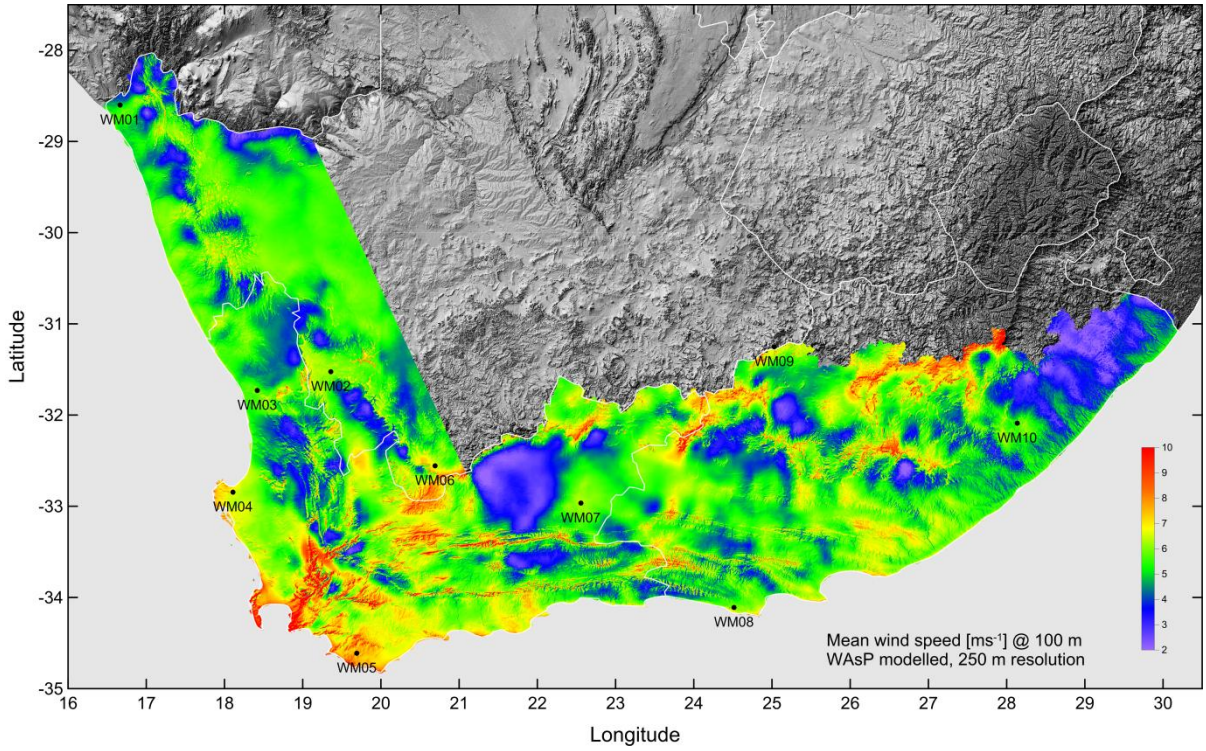
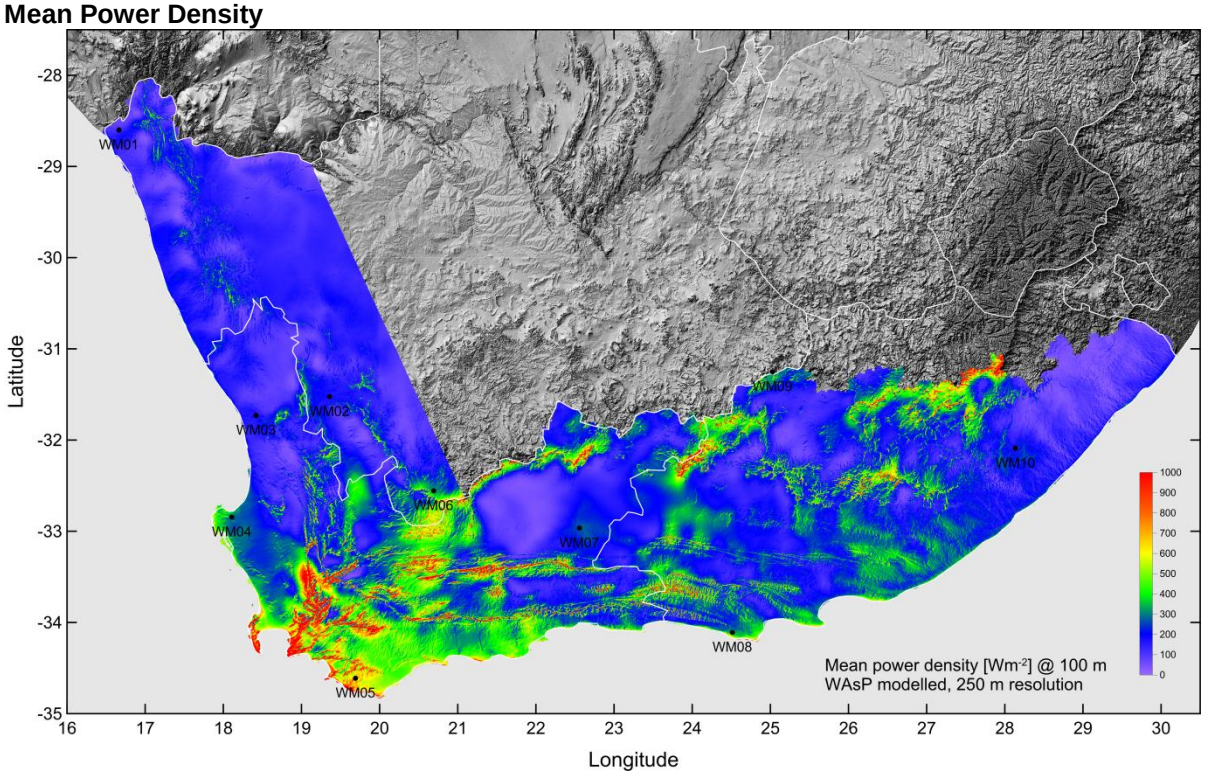
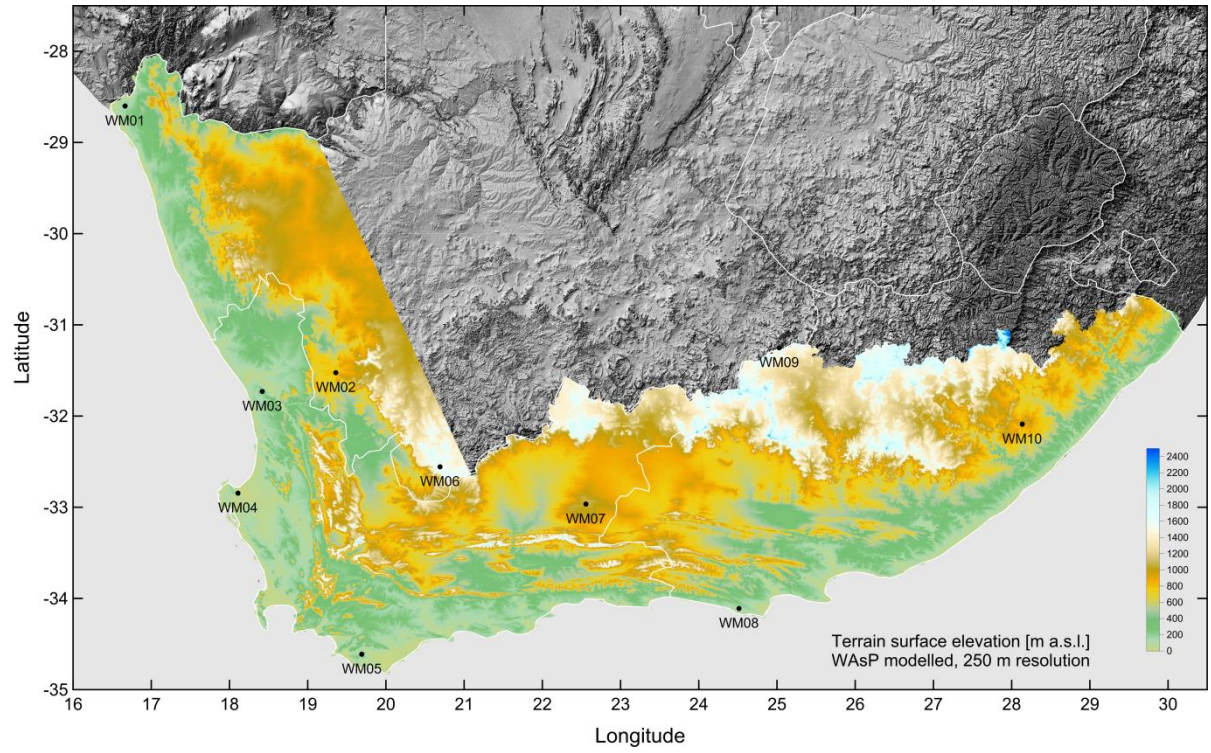
## Mean wind speed



**Mean Power Density**




**Terrain elevation**



**Ruggedness index**