Wind Anomalies

First Half 2015

South Africa

By: VORTEX

CONTEXT :

How much did your wind farm produce last year?
How much can be explained by wind resource inter-annual variability?
Year-to-year variability of wind resource is a main driver of uncertainty during the pre-construction stage. Once a wind farm is in operation, monitoring wind condition departures from climatology (anomalies) provides the context for wind farm performance assessments.

This report aims to provide a regional overview of wind speed climate variability for South Africa during the first six months of 2015.

DATA:

This report shows first half 2015 wind speed anomalies for South Africa, computed with reference to the baseline 1995-2014 climatology period. Annual wind speed time series were obtained using global MERRA reanalysis data. Anomaly fields were computed as a percentage of deviation from climatology.

Data for eight met towers from the WASA (Wind Atlas for South Africa) project provided by CSIR (Council for Scientific and Industrial Research) were employed in the preliminary assessment of the modeled data's representativity of inter annual variability.

More information on the met towers can be found on the WASA project webpage: http://www.wasaproject.info/

Wind met-mast data covered the period 2011-2015.

A comparison of first half (January to June) anomaly time series for the main reanalysis products and observed data was computed and is shown in Figures below. The anomalies were calculated with reference to the observed data available for the period to maintain a consistent climatology definition. The anomalies departures are therefore only representative of the five-year retained period.

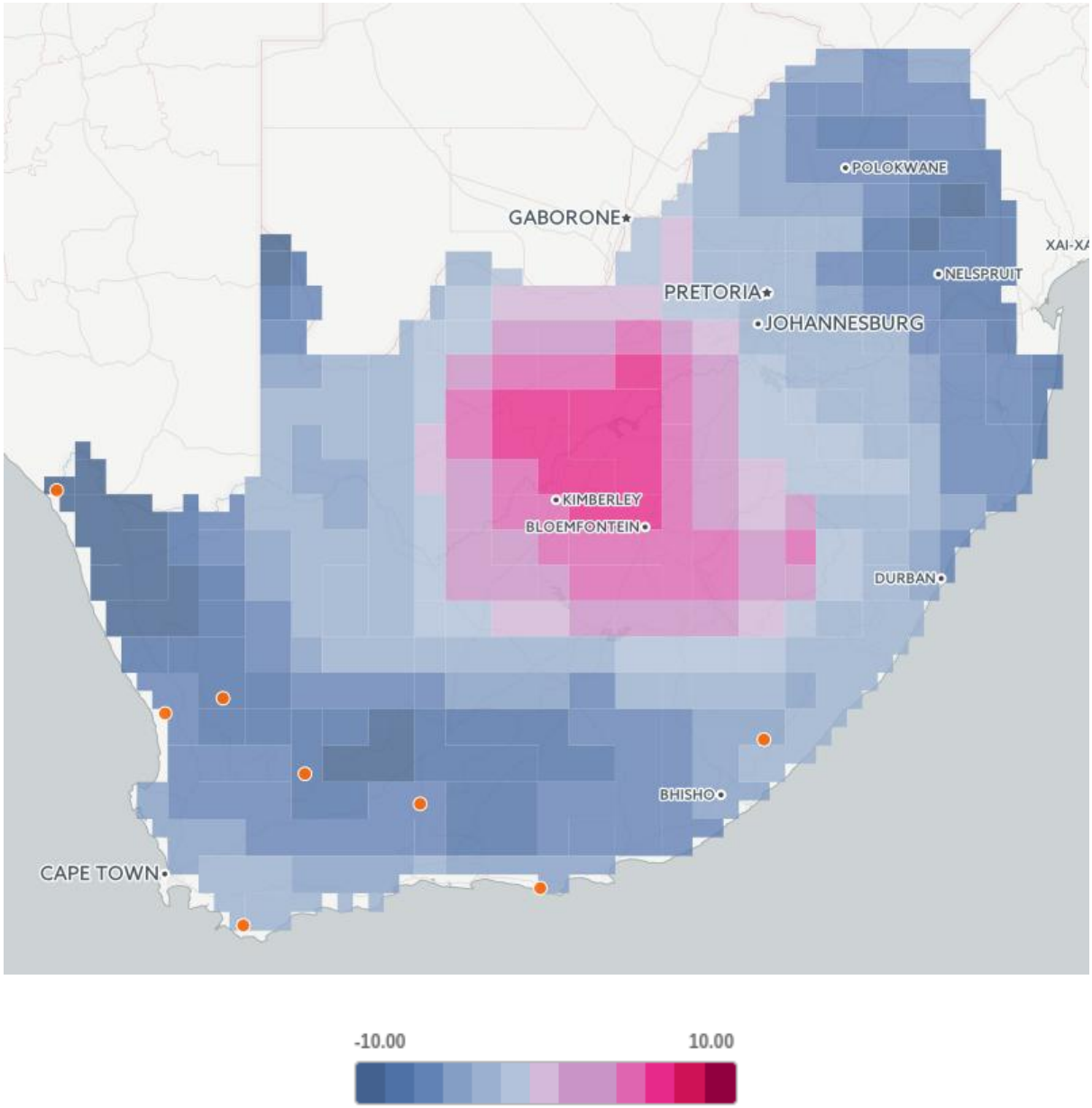
Results show a consistent pattern with a typical MAE range of 1.0-1.6 [%]. Square correlation coefficients over this short period (only five samples) are in the order of 0.8.

LIMITATIONS:

The final anomalies map provides general indications about annual wind condition departures at a regional scale.
No site-specific variability impact information can be extracted due to the model's resolution.
Higher resolution downscaled products are required in combination with bias correction techniques, such as Vortex Remodeling, to obtain an accurate characterization of wind conditions anomaly values for wind farm project scale.

1H15 wind speed anomalies (%) for South Africa, based on MERRA re-analysis data

Reference period: 1995-2014



Orange points indicate the locations of the WASA project sites employed in the preliminary validations.

WASA project information: http://www.wasaproject.info/

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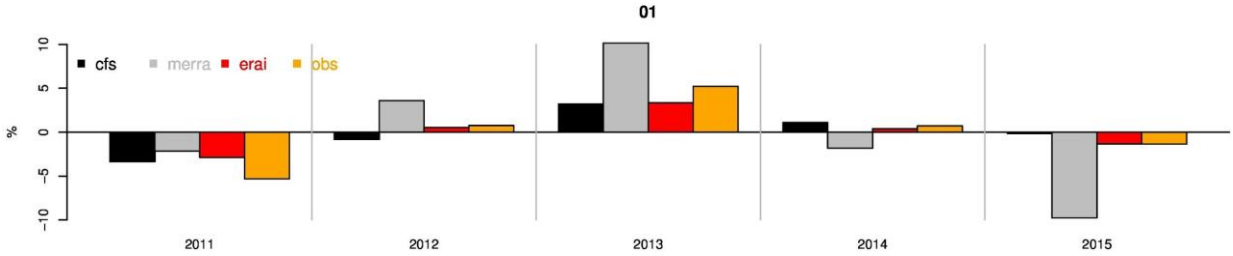
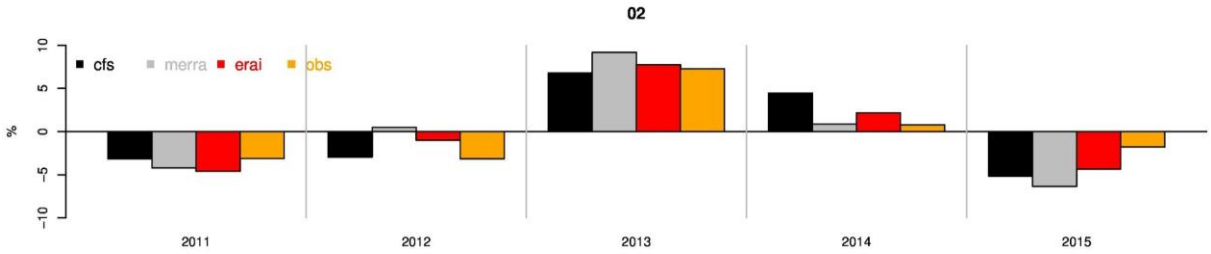
First-half time series anomalies (%) with reference to 2011-2015 period at WASA project locations for VORTEX time series data and observed records

Tower	Coordinates (Latitude, Longitude)	Region
1	-28.6018906, 16.6643982	Alexander Bay area
2	-31.5249519, 19.3607483	Calvinia area
3	-31.7305069, 18.4199219	Vredendal area
5	-34.611908, 19.6924438	Elim area
6	-32.5568008, 20.6912537	Sutherland area
7	-32.9667168, 22.5566711	Central Karoo DC

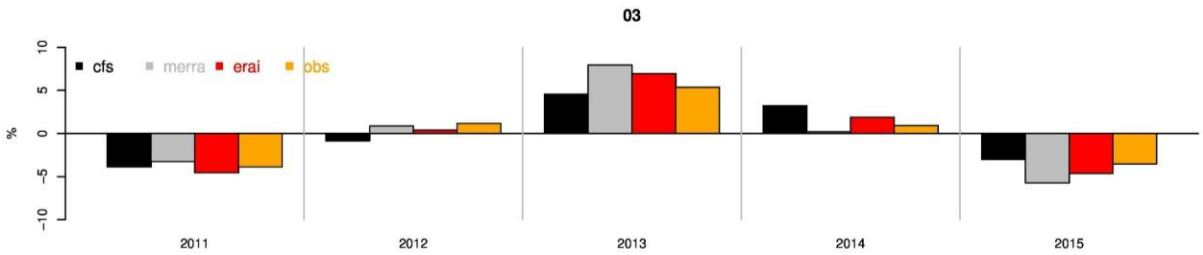
1	-28.6018906, 16.6643982	Alexander Bay area



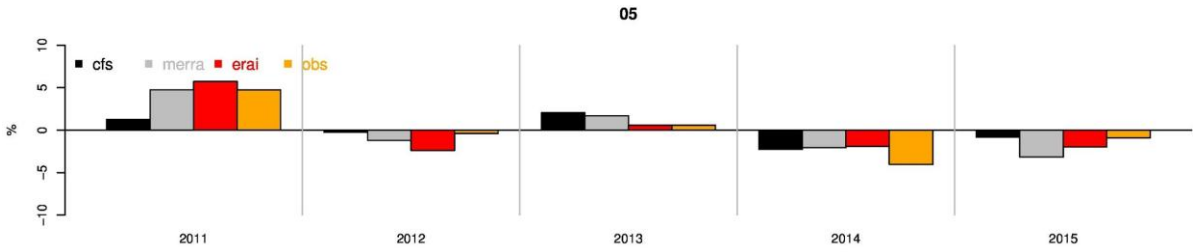
2	-31.5249519, 19.3607483	Calvinia area



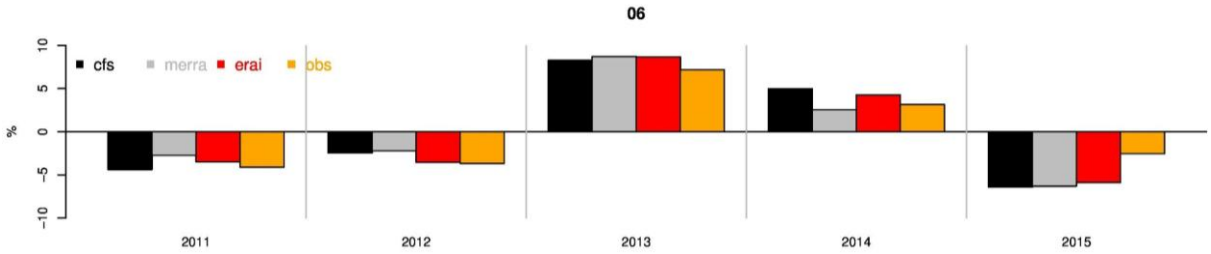
3	-31.7305069, 18.4199219	Vredendal area



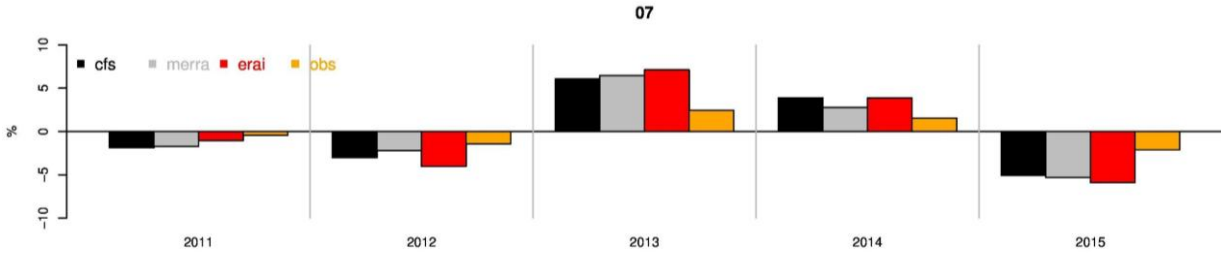
5	-34.611908, 19.6924438	Elim area



6	-32.5568008, 20.6912537	Sutherland area



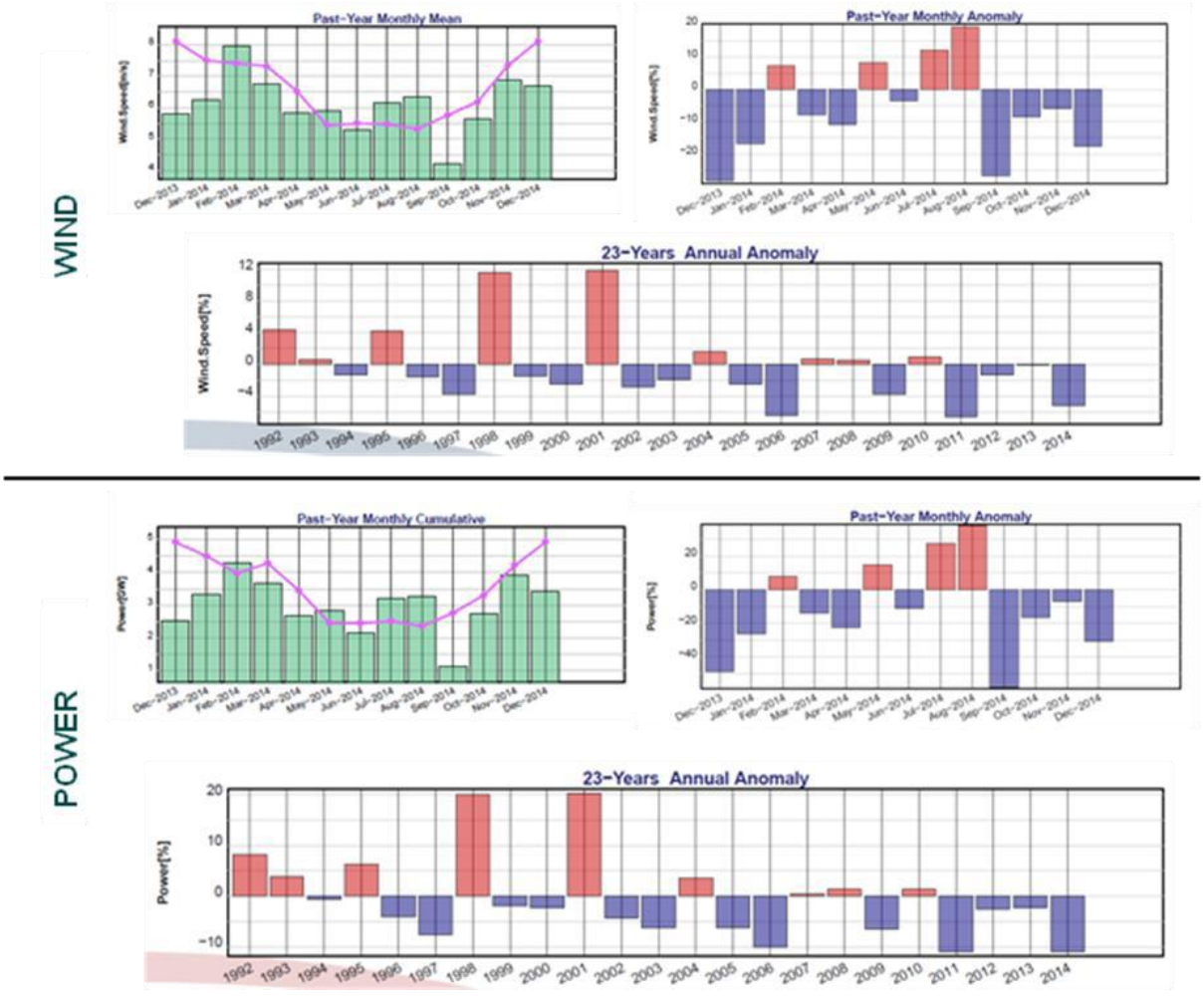
7	-32.9667168, 22.5566711	Central Karoo DC



VORTEX MONTHLY INSIGHT:

Monthly Insight is an enhanced tool for conducting site-specific anomaly impact studies for any given location, including wind and power production statistics. On-site measurements can be assimilated for effective bias correction and calibration using Vortex Remodeling technology. Some samples of the information provided by site-specific Monthly Insight reports are showed below.

Feel free to get in touch with us to obtain further information about INSIGHT features and capabilities.



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