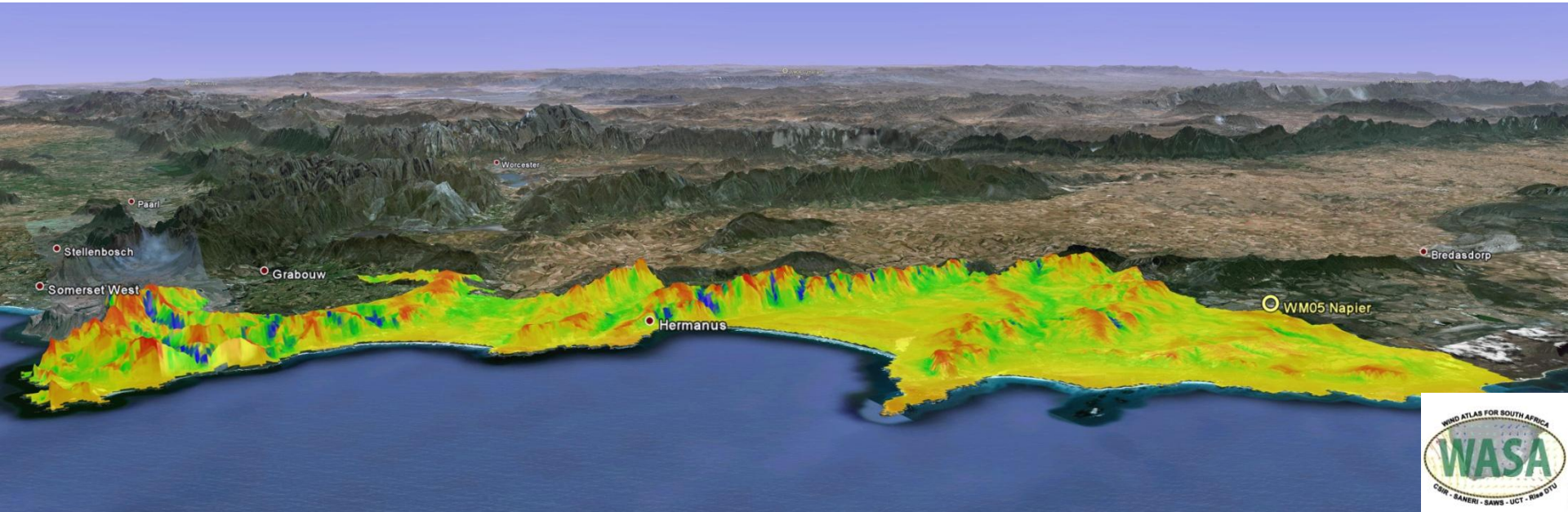
Wind Atlas for South Africa (WASA)

Overview and current status of Work Package 2 – Wind Measurements

Work Package 2
Wind Measurements

Eric Prinsloo and Eugéne Mabille
CSIR *(Built Environment, Council for Scientific and Industrial Research)*

Poul Hummelshøj , Niels G. Mortensen and Jens Carsten Hansen
DTU Wind Energy *(Dept of Wind Energy, Technical University of Denmark)*

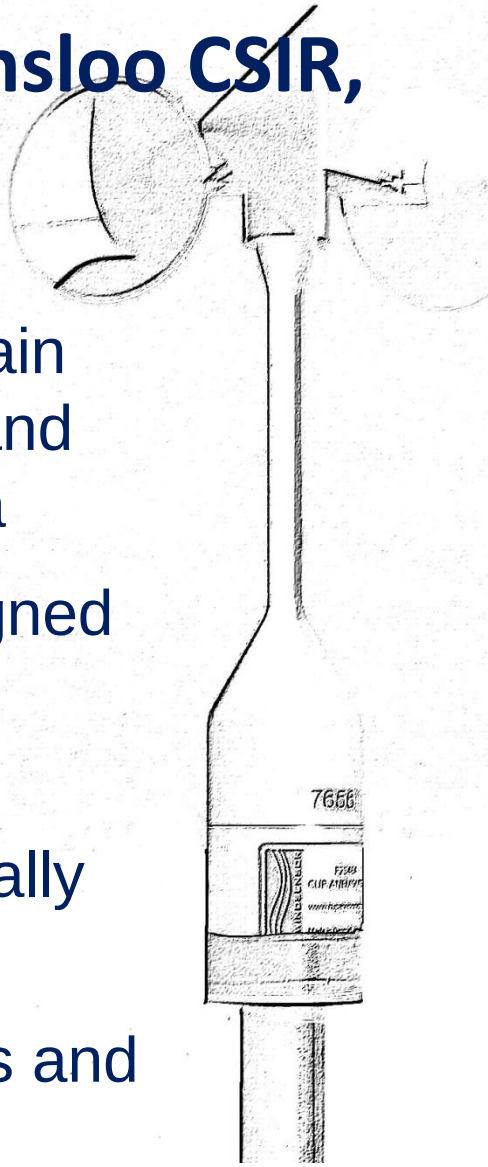


Why was CSIR invited to be part of Work Package 2 of the Wind Atlas Project?

- CSIR Stellenbosch involved with wind measurements since 1960's and automatic weather stations since early 1980's
- Was involved in first high mast wind energy related measurements in SA in 1998
- CSIR Stellenbosch managed large data bases for wave and wind measurements since the late 1970's
- Plus many relevant competences including wind tunnels, CFD modelling, GIS, mapping, etc

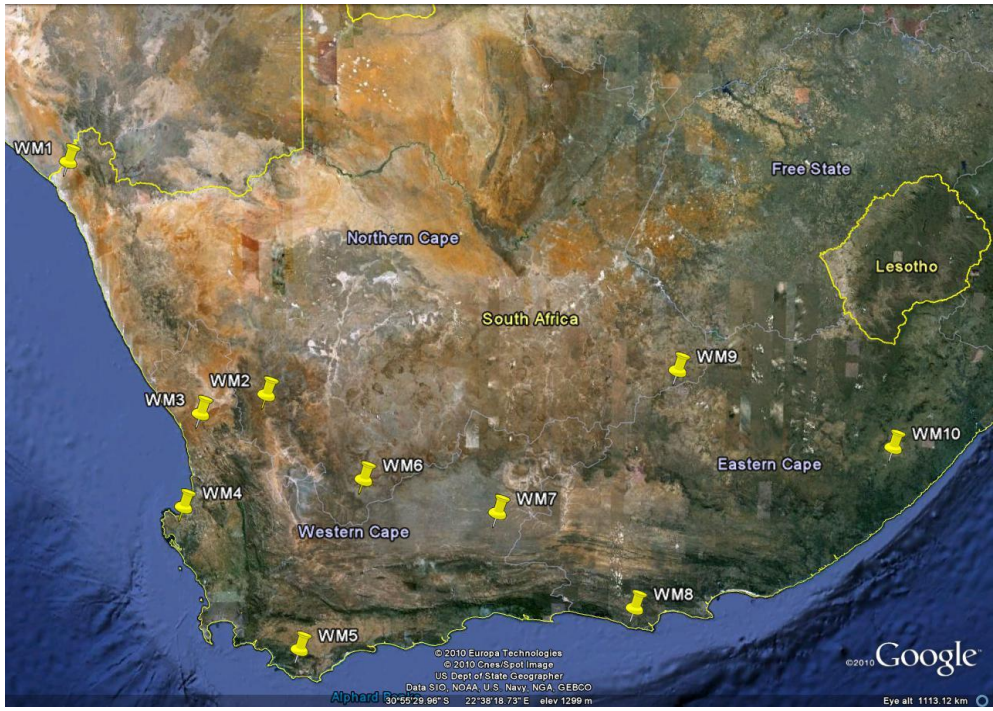
WP2 – Wind measurements (Eric Prinsloo CSIR, Poul Hummelshøj DTU, Denmark

- 10 sites were identified; representative terrain types, suitable for meso-scale modelling, and geographically spread over the project area
- The wind measurement stations were designed with a view to meeting IEC standards and MEASNET guidelines
- Proven sensors of high quality and individually calibrated to be used
- Instrumentation arranged to minimise errors and uncertainties due to flow distortion



WP2 – Wind measurements installation process

- Site selection criteria developed
- 10 sites selected, site visits, land owner interaction and agreements completed
- 10 x 60m masts locally designed, procured and manufactured
- Measurement equipment designed and delivered
- Data acquisition system delivered, installed and training by DTU completed



- EIA - Basic assessment procedure completed (was applicable at the time)
- Environmental approvals obtained
- Masts transported to site and erected
- Instrumentation installed
- Data acquisition from last mast started 17 September 2010
- RODEO (data acquisition system), web and data availability for public access since Oct 2010.

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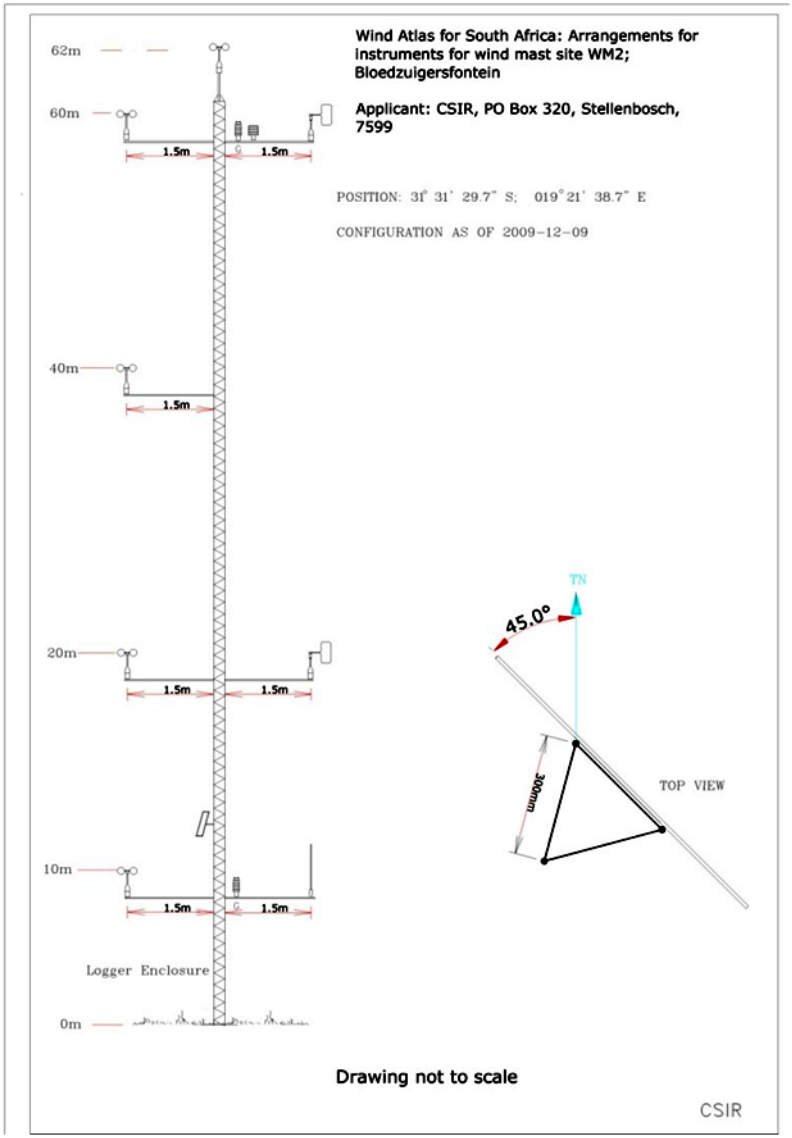
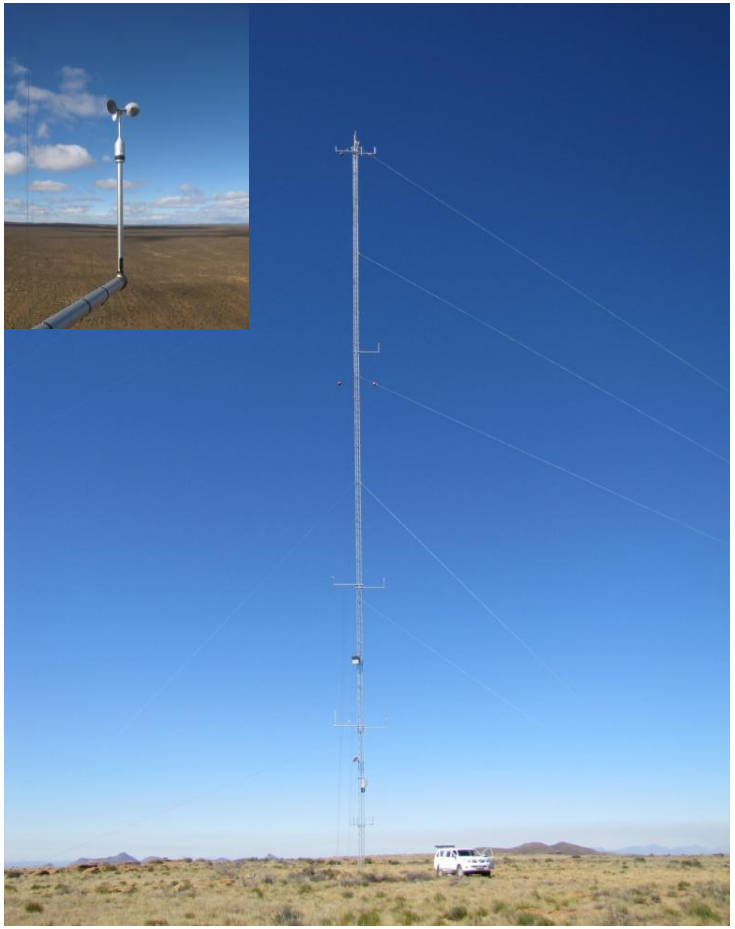
Masts installed - layout

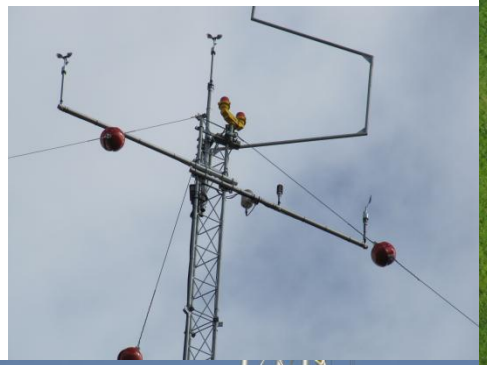


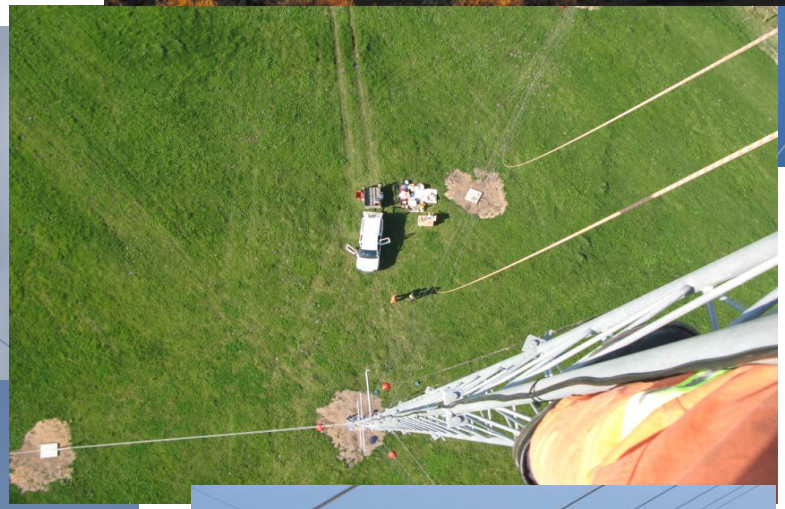
Standardised layout for WASA project



WM9 Noupoort
60-m lattice mast

15m Test mast installed first to test instrument and comms setup





Installation statistics:

- Most remote site: WM1
- Most difficult site: WM9
- Max wind speed during installation: WM9 Noupoort: 27 m/s
- Min temperature during installation: WM7 Beaufort West: 8 C with 16m/s wind speed

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WASA Web Site

- All QA'd data available free to public.
- Free registration necessary to download data
- Daily data transfer from stations via GSM
- Acquisition, QA, calibration and database organisation and web publishing by RODEO at CSIR
- Web site: www.wasa.csir.co.za
  - Graphs daily
  - Data files monthly
- Download site: http://wasadata.csir.co.za/wasa1/WASAData

  Note: Data is used at own risk

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Other links: WASA Online Graphs | WASA FAQ | Arrangement Drawing | Instrumentation Summary | Mast Site Information | Station and Site Description (Feb 2012)

Message Board:

- Please note: All the date/times are in SAST (UTC +2)
- 2012/10/16: September 2012 data now available.
- 2012/10/02: August 2012 data now available.
- 2012/09/03: July 2012 data now available.
- 2012/08/17: June 2012 data now available.
- **2011/01/06: The directions of all the stations have been corrected. Please download the new versions.**
- 2011/01/06: (Magnetic declination had been added instead of subtracted)

Welcome to the WASA download site

If you are **already registered**, and want to download data, OR if you want to **check whether you are registered**, please complete the log in form below, and press the ***'Log in'*** button. If you have **forgotten your password**, please fill in your e-mail address, and press the ***'Send Password'*** button. It will be sent to you by e-mail.

E-mail:
Password:
Log in | Send Password

If you have **not yet registered**, and want to download data, please complete the registration form below.

First name: *
Surname: *
Company name / Affiliation / Personal user: *
Affiliation type: *
If 'Other' above, please enter:
Intended usage: *
If 'Other' above, please enter:
Address: *
Country: *

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CSIR | Built environment | Online data | Projects map | list | WM03 | Guest (not logged in) | Log in

WM03 project overview

Latest update 2012-12-07 15:10:00

Project overview | Graphs [1] | Graphs [2]

Project information

Duration:	2010-06-24 15:40 onwards
Historical data from:	2010-06-24
Position:	31° 43' 49.40" S 18° 25' 10.11" E 240 m A.S.L Show in the map
Contact:	Eric Prinsloo
Description:	Vredendal
Comment:	PLease note: The data is given in SAST (UTC+2)

Link to a larger image

Project documents

Arrangement Drawing
Instrument Summary
Mast Site Information
Station and Site Description (Feb 2012)

Measurements

Name	Height [m]	Duration	Latest (2012-12-07 15:10)
Station_ID	0.00	2010-06-24 15:40 onwards	490.00
WS_62	62.00	2010-06-24 15:40 onwards	8.97 m/s
WS_60	60.00	2010-06-24 15:40 onwards	9.03 m/s
WS_40	40.00	2010-06-24 15:40 onwards	9.05 m/s
WS_20	20.00	2010-06-24 15:40 onwards	8.81 m/s
WS_10	10.00	2010-06-24 15:40 onwards	8.19 m/s
WD_60	60.00	2010-06-24 15:40 onwards	236.50 °
WD_20	20.00	2010-06-24 15:40 onwards	239.40 °
Tair	60.00	2010-06-24 15:40 onwards	17.00 °C
Tgrad	60.00	2010-06-24 15:40 onwards	-1.29 °C
Pbaro	6.00	2010-06-24 15:40 onwards	986.80 hPa
RH	60.00	2010-06-24 15:40 onwards	80.20 %
Vbat	6.00	2010-06-24 15:40 onwards	13.92 V
Tpanel	6.00	2010-06-24 15:40 onwards	23.88 °C

Comments and help requests to the webmaster

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Statistics of WASA Data Usage

The updated statistics (2012/12/07)

- 1099 - registered users
- 47 - countries
- 28463 - downloads
- 783 - users that downloaded data

Active users by Affiliation-type (users that downloaded data)

- 5 - Non-SA Governmental/Provincial/Municipal Agencies
- 7 - Non-SA Non-Profit
- 111 - Non-SA Private Companies
- 33 - Non-SA Universities and Schools
- 12 - Non-SA Other
- 58 - SA Government/Provincial/Municipal Agencies
- 35 - SA Non-Profit
- 290 - SA Private Companies
- 84 - SA Universities and Schools
- 145 - SA Other

WASA Wind Measurement Experiences

- Some sites were quite remote, only accessible with low range 4x4 vehicles
- Pre-determining of prevailing winds (courtesy SAWS, but where appropriate, also looked at vegetation in area), to ensure mast and boom orientated to minimize flow distortion
- Security sometimes a problem, i.e theft of solar panels and batteries, and damage to instruments and instrument cables at masts near Butterworth and Vredenburg. Mitigation measures are being explored and implemented (also navigation lights)
- Severe snow storms in July 2011 causing Noupoort mast to collapse. Guy rope anchoring of new mast modified to prevent similar occurrence. (Ours not the only mast that collapsed during that snow storm)
- The Certificates of Conformance (CofC) that we insisted on for all mast ensured that there were no problems with insurance claim being paid out
- Birds nesting in masts
- Some anchor blocks had to be enclosed to prevent cattle rubbing against guy ropes
- At one mast site we had to apply for temporary re-zoning from agriculture use to wind energy measurements