

MesoMap Wind Mapping System: An Overview of Experience and Validation Results

About TrueWind Solutions

- **Partnership** of 3 Organizations
 - AWS Scientific, Inc. (Bruce Bailey)
 - MESO, Inc. (John Zack)
 - Brower & Company (Michael Brower)
- **Mission:** To provide advanced wind forecasting and wind resource assessment services to the wind energy industry



TrueWind Solutions

Setting the Standard in Wind Mapping and Forecasting

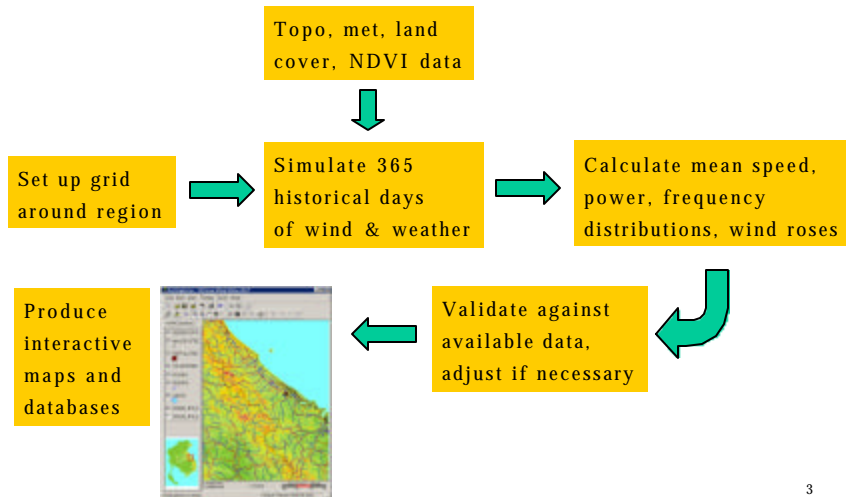
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What is MesoMap?

- A powerful approach to wind resource assessment both for complex regions and for areas lacking reliable surface data
- A numerical weather model (MASS) coupled to a wind flow model (WindMap) and global weather, topographical, and land cover data
- A parallel processing system equivalent in power to 4 Cray supercomputers

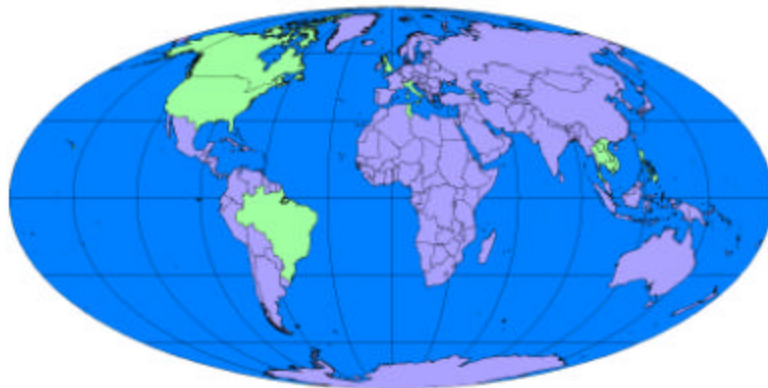
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The Mapping Process



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MesoMap Experience



Maps completed or planned in 11 countries, including 15 US states and 5 Canadian provinces.

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Recent “Public” Projects

- **New York Wind Map**
 - Funded by NYSERDA
- **Southeast Asia Wind Atlas**
 - Funded by the World Bank
- **Brazil Wind Atlas**
 - Partner: Camargo-Schubert Wind Engineering,
Funder: CEPEL/Eletrabras

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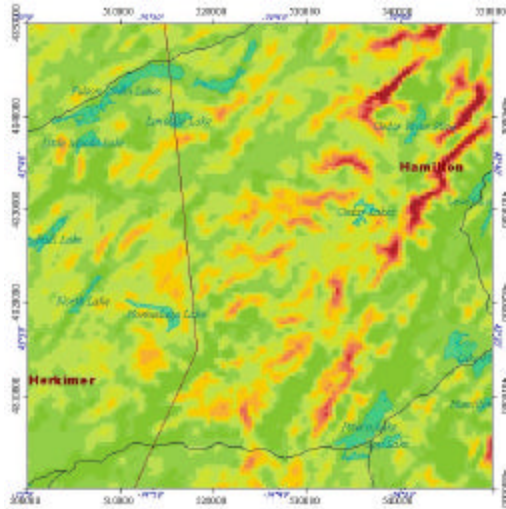
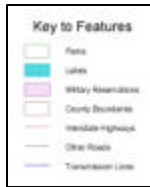
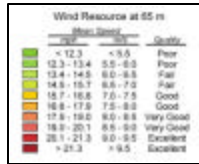
New York Wind Map



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Interactive Web Site

www.abacuswave.com/truewind/



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New York Validation Results

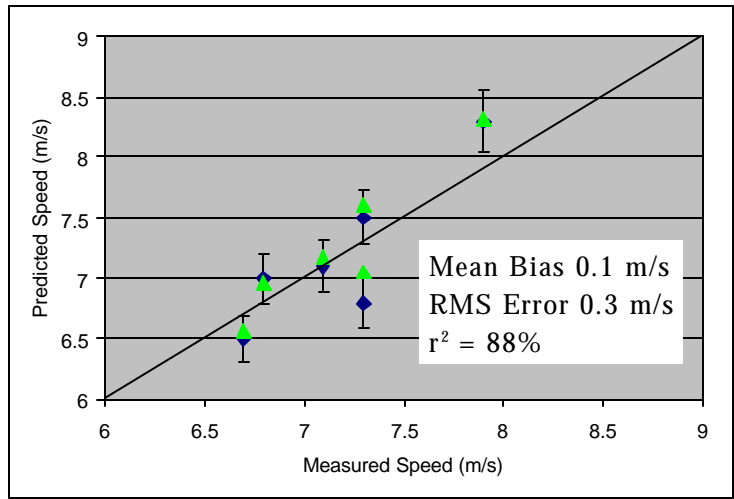
400 m Grid

Site	True Elev (m)	Model Elev (m)	Projected/Measured Speed (m/s)	Simulated Speed (m/s)	Bias (m/s)	Adjusted Bias (m/s)
1	18	26	6.8	7.0	0.2	0.1
2	34	30	7.9	8.3	0.4	0.4
3	101	90	6.7	6.5	-0.2	0.0
4	543	492	7.3	6.8	-0.5	0.1
5	631	610	7.3	7.5	0.2	0.5
6	564	548	7.1	7.1	0.0	0.2
AVERAGE			7.2	7.2	0.0 (0%)	0.2 (+2%)
STANDARD DEVIATION					0.3 (4%)	0.2 (2%)

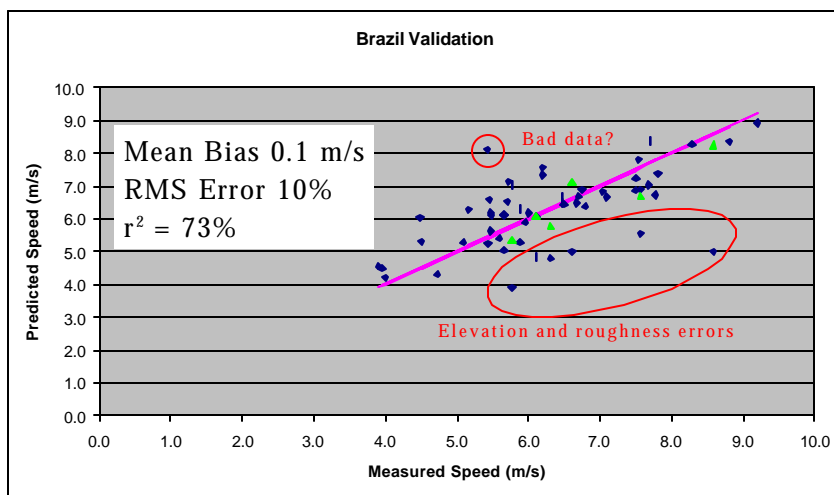
The “adjusted bias” removes the effects of discrepancies between the elevation assumed by the model and the true elevation, assuming 0.5 m/s per 100 m elevation change.

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New York Validation Tall Towers - 400 m Grid



Brazil Validation



Main Sources of Error

- ✓ Sub-grid scale variations in topography and land cover
- ✓ Errors in topo and land cover data
- ✓ Difficulty of simulating moist convection over tropical oceans
- ✓ Errors in meteorological data

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Summary

- MesoMap has proved useful in a wide range of climatic regimes
- Objective errors range from 2% to 10% of mean speed depending on climate and topography
- Priorities
 - Continue to improve spatial resolution
 - Acquire best land cover and topo data for each region
 - Improve simulation of moist convection in tropical climates

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