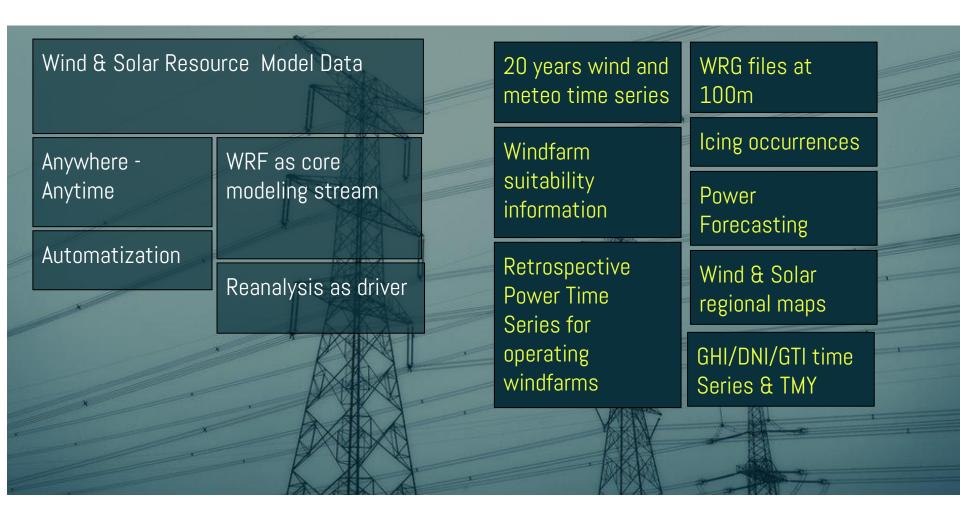
ERA-Interim viewed by the Wind Industry

Gil Lizcano VORTEX

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→ VORTEX



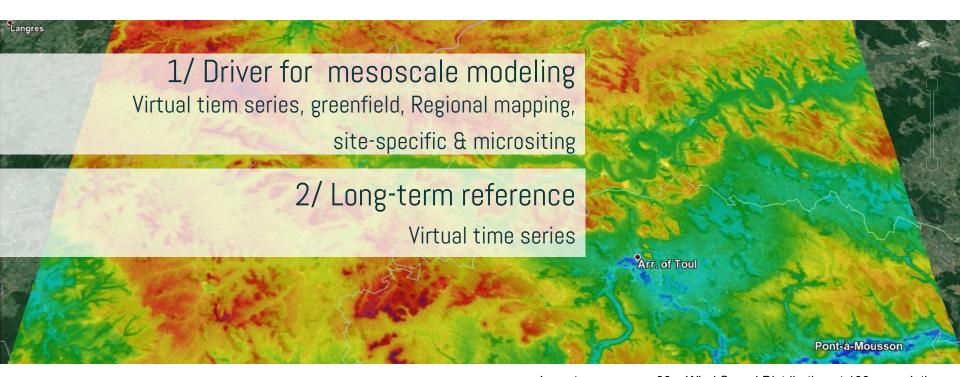


Validation Exercise (Usage)

Working with Model data (Conclusions)

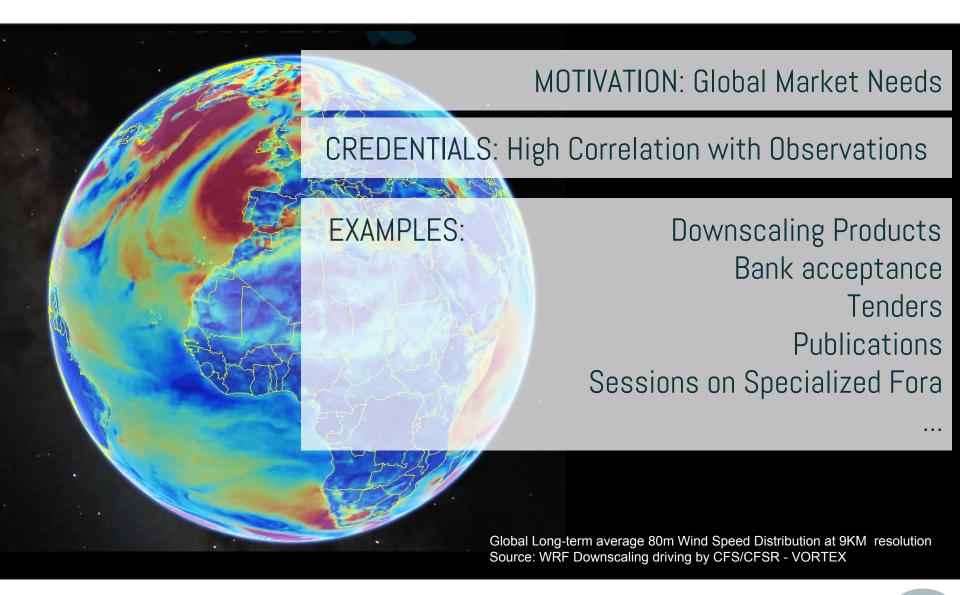


Background: Reanalysis and downscaled products Usage (Wind Industry)

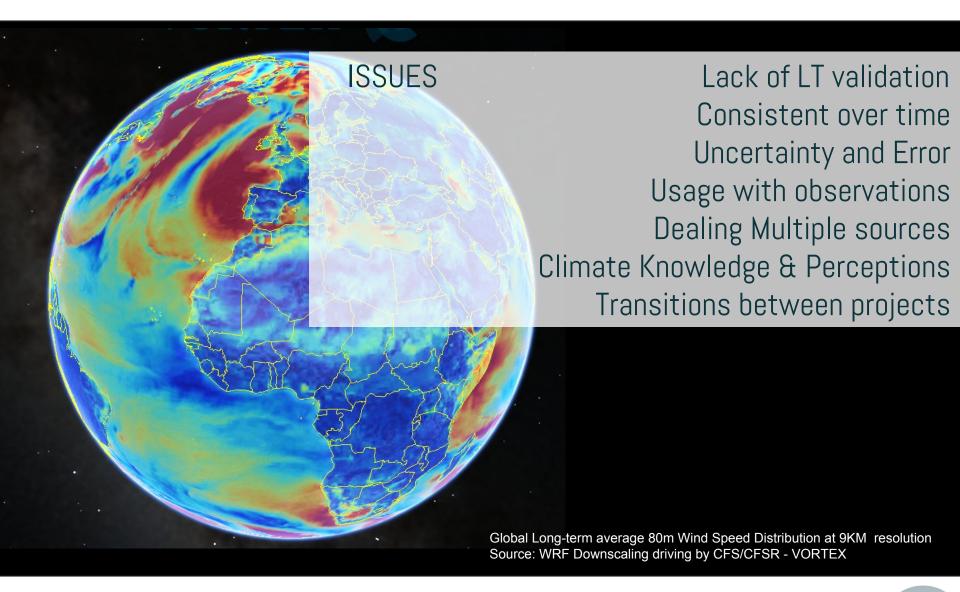


Long-term average 80m Wind Speed Distribution at 100m resolution Source: WRF Downscaling driving by CFS/CFSR - VORTEX











□ Background: Reanalysis Questionnaire

REANALYSIS	MERRA/MERRA2	ERA-Interim	CFS-CFSR
Long-term Reference Usage	+++	++	-
Driving condition for mesoscale downscaling	+	++	+++
Popular	Overall good correlation Access to data	Offshore (Europe)	Accurate downscaling results
Consistency Examples	Chile (North) Brazil (NE)	South France	SFC winds Problematic
User Notes	Transition Merra-Merra2	Arrived late *	Consistency handicap



^{*} Personal Opinion

- ☐ Climate Quality
 - Daily cycles averages
 - Annual cycle
 - ☐ Inter-annual variability
 - ☐ Extreme events



- Passport / Credentials
 - lacktriangle Match the observed data -> R2
 - ☐ Time consistent -> Visual inspection / Test / Dig inside
 - Events Amplitude -> Conflict (OBS period = extreme anomaly)
 - ☐ Usage context -> Tuning / Bias correction /MCP / Recalibration



Outcomes from Validation

- Model data
 - ERA Interim , 10 m, 4xday
 - ERA Interim + WRF (3Km), 80 m, hourly
 - ☐ MERRA , 10m, hourly
 - MERRA + WRF (3Km), 80m, hourly

- Measurements:
 - Wind mast data
 - ☐ Industry standards
 - ☐ hourly time series
 - Quality check
 - → At least 12 consecutive months periods

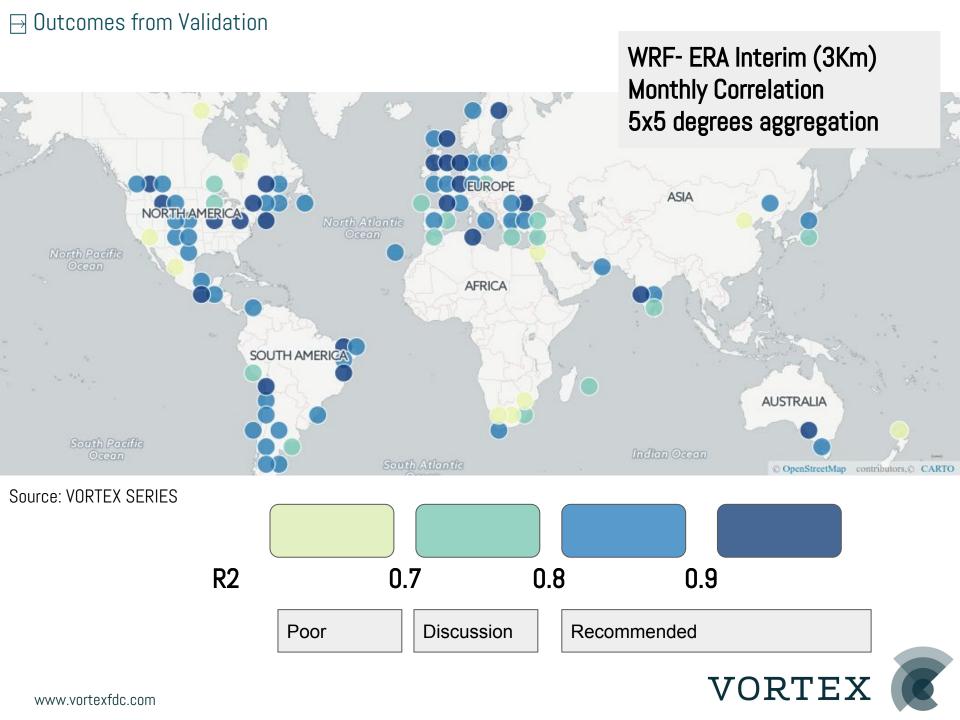


\boxminus Outcomes from Validation

Daily R2 (240 sites)	Q25	Median	Q75	Q90
ERAI	0.47	0.70	0.80	0.86
WRF - ERAI (3km)	0.70	0.81	0.85	0.91
MERRA	0.53	0.75	0.84	0.88
WRF-MERRA (3km)	0.70	0.87	0.93	0.95

Monthly R2 (240 sites)	Q25	Median	Q75	Q90
ERAI	0.45	080	0.90	0.94
WRF - ERAI (3km)	0.72	0.88	0.93	0.96
MERRA	0.52	0.82	0.91	0.93
WRF-MERRA (3km)	0.70	0.87	0.93	0.95





Selection Criteria (*): R2 Monthly > 0.85 & R2 Daily > 0.75

 ERA-Interim
 WRF-ERA Interim
 MERRA
 WRF-MERRA

 Pass
 34 %
 67%
 39%
 68%

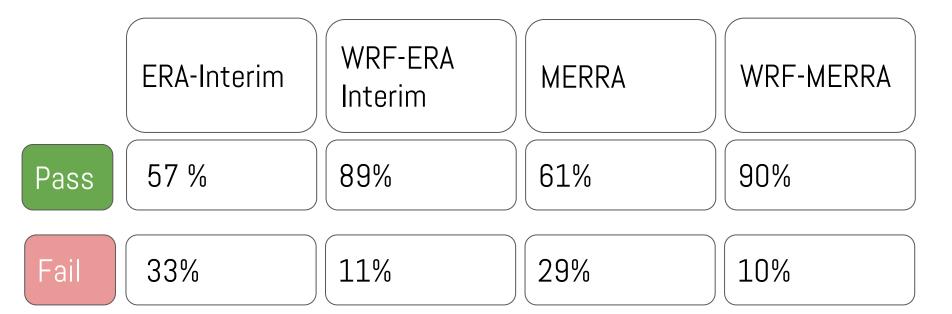
 Fail
 66 %
 33%
 61%
 32%

GLOBAL Sample

(*) No standard definition exists



Selection Criteria (*): R2 Monthly > 0.85 & R2 Daily > 0.75



North & WEST EUROPE ONLY (North Sea, UK, France, Scandinavia & Germany, Benelux)

(*) ther is no standard criteria



Wind Industry view on Reanalysis products

- Reanalysis are "Wind Industry" adopted data
- Regional improvements are needed
- Perception is positive (this is important)
- Reanalysis enable Wind Conditions modeling in the time domain
- New markets will test wider Reanalysis products quality (Souther Hemisphere, for instance)
- We expect New Reanalysis and Downscaling solutions to be even better



Challenges are outside the Reanalysis products

Use Reanalysis derived products with **use**rs data "Reanalysis derived products are model data" More work on consistency discrimination "It is weird, it is inconsistent" More work on understanding climate variability for real projects "How many years are enough?" More work on dealing with multiple sources "Which source I have to choose?" And finally, the uncertainty "Uncertainty of the data employed to assess the uncertainty!" If you are attending Wind Europe Conference next week:

"What brings new MERRA2"

Mesoscale Modeling Session

Wednesday 28th September 14h

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→ Background: Missing and problematic



