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National Oceanic and Atmospheric Administration
U.S. Department of Commerce

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El Nino forms, expected to strengthen, say NOAA forecasters

Prolonged period of above-average temperatures in the equatorial Pacific expected to peak this winter

Focus areas: Weather, Climate Topics: El Nino, La Nina, ENSO Share:

June 11, 2026

BBC

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El Niño under way and threatens weather extremes, scientists say

11 June 2026

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Matt McGrath, Environment correspondent, **Simon King,** Lead Weather Presenter and **Mark Poynting,** Climate reporter

Bangkok Post

NEWS THAILAND BUSINESS LIFE GURU LEARNING

THAILAND 〉 GENERAL

El Niño set to continue all year

PUBLISHED : 17 JUN 2026 AT 04:50
NEWSPAPER SECTION: NEWS WRITER: APINYA WIPATAYOTIN

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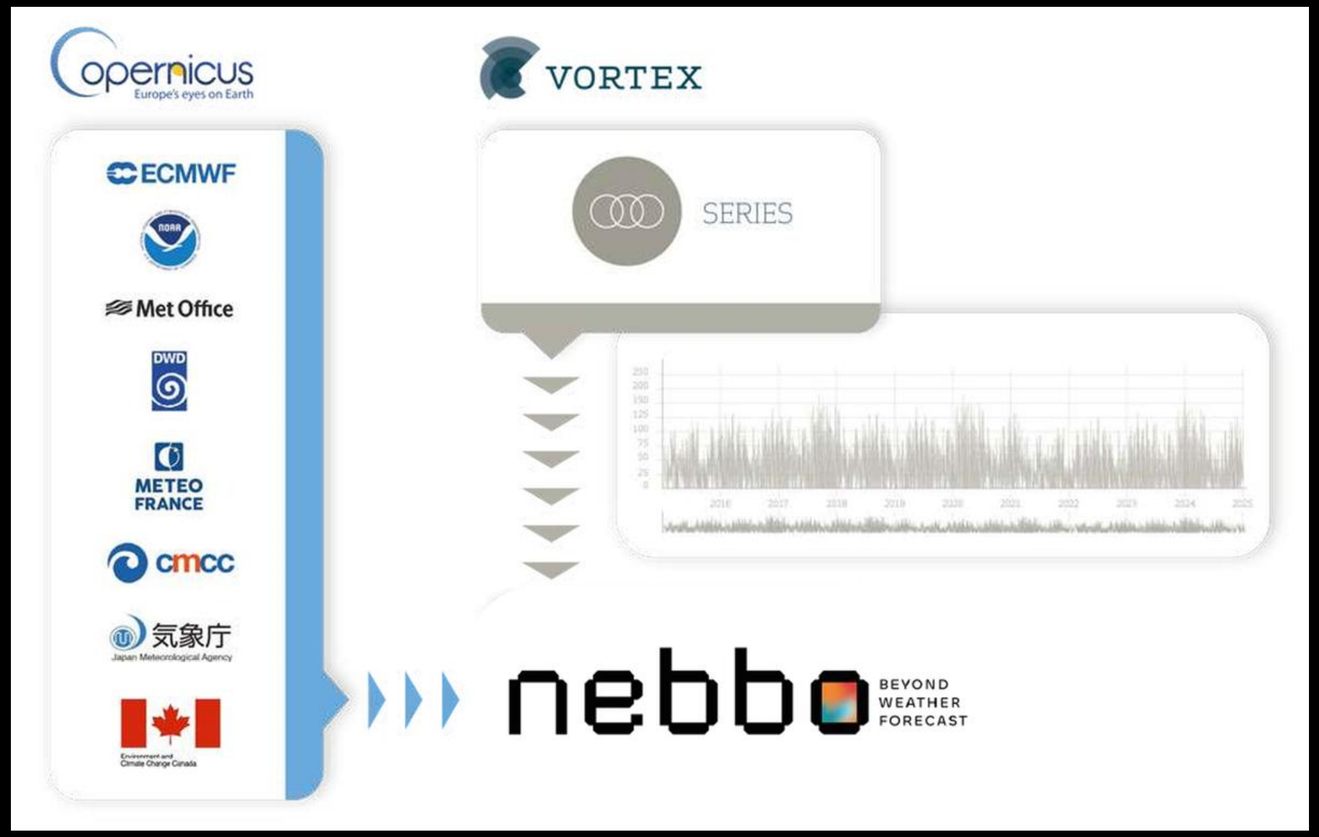
Thailand faces a 96–98% probability of entering an El Niño phase between June and July, with conditions potentially persisting into early 2027, warned Natural Resources and Environment Minister Suchart Chomklin.

BEYOND WEATHER FORECAST

Nebbo provides **meteorological services** for the **energy** sector. As a **Vortex spin-off**, we leverage high-resolution data and the latest AI technology to downscale and calibrate models.



State-of-the-art Tech Stack

- **Hybrid-modeling**
  - Combining physical weather models with regional AI/DL calibration
- **>30 years of high-resolution data**
  - Exclusive access to VORTEX's high-resolution weather data (3km)
- **Global coverage**
  - Predictions anywhere without need of on-site measurements
- **Hyper-local downscaling**
  - Asset or regional level forecasting with daily, weekly & monthly granularity.

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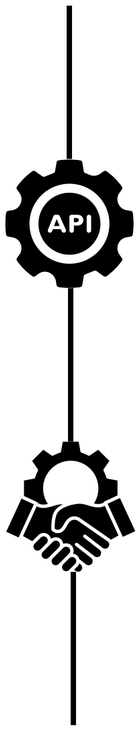
Nebbo's complete prediction spectrum



FORECAST HORIZON	RANGE	GRANULARITY	Update	VARIABLE
SUB-SEASONAL	day 15 to 45	daily / weekly	Daily	**Wind** energy **related** (wind speed & wind production) Many **others** (solar irradiance, precipitation, temperature…)
SEASONAL	month 1 to 6	weekly / monthly	monthly	
YEARLY+	month 7 to 18	monthly / semesterly	monthly	
Ad-hoc / co-development of custom services				

Custom use-cases: financial planning (1/3)

The problem

- The customers wanted to derive **P50/P90 production figures** of the past **30 years**
  - **Driver**: *do recent years had been "normal" or under-productive?*
- Then, they wanted to forecast the wind **production** for the **next financial year**
  - **Driver:** *can we mitigate another under-productive year by properly budgeting?*

The solution

- We used **Vortex SERIES** to extrapolate **what** the **farm would have produced** 30 years ago
- We leveraged **AI** & local **climatic drivers** to deliver **18-month** probabilistic **forecasts**

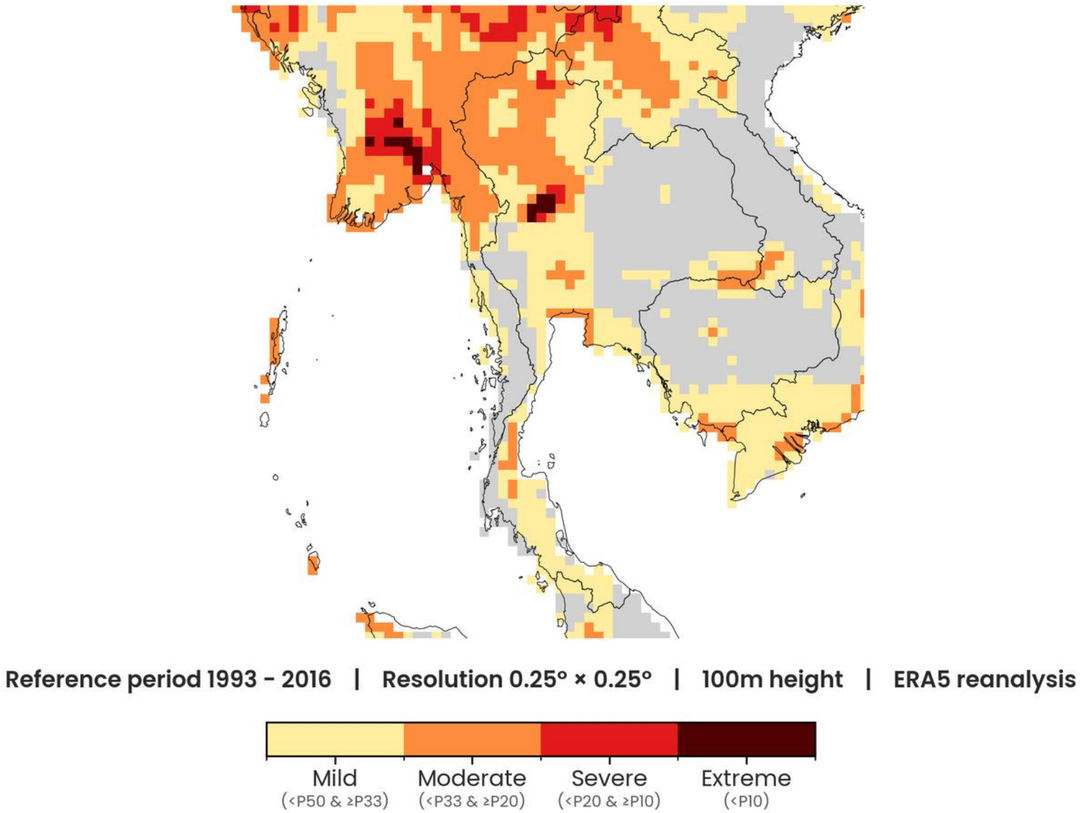


Fig 1. Wind drought map for Feb-Apr 2026

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Custom use-cases: energy hedging (2/3)

The problem

- The customers wanted to **assess predictability months** in **advance**
  - **Driver**: *can we mitigate volume risk and hedge energy?*
- Then, they wanted to focus on **episodes** of **low generation** & **high demand**
  - **Driver:** *can we anticipate hot-season doldrums in Mar-May or cloudy Monsoons in Sep-Oct? (especially relevant for hybrid operators: with part of solar portfolio)*

The solution

- We assessed our seasonal models' predictability months in advance
- We delivered this data in our interface with back-testing & uncertainty quantification

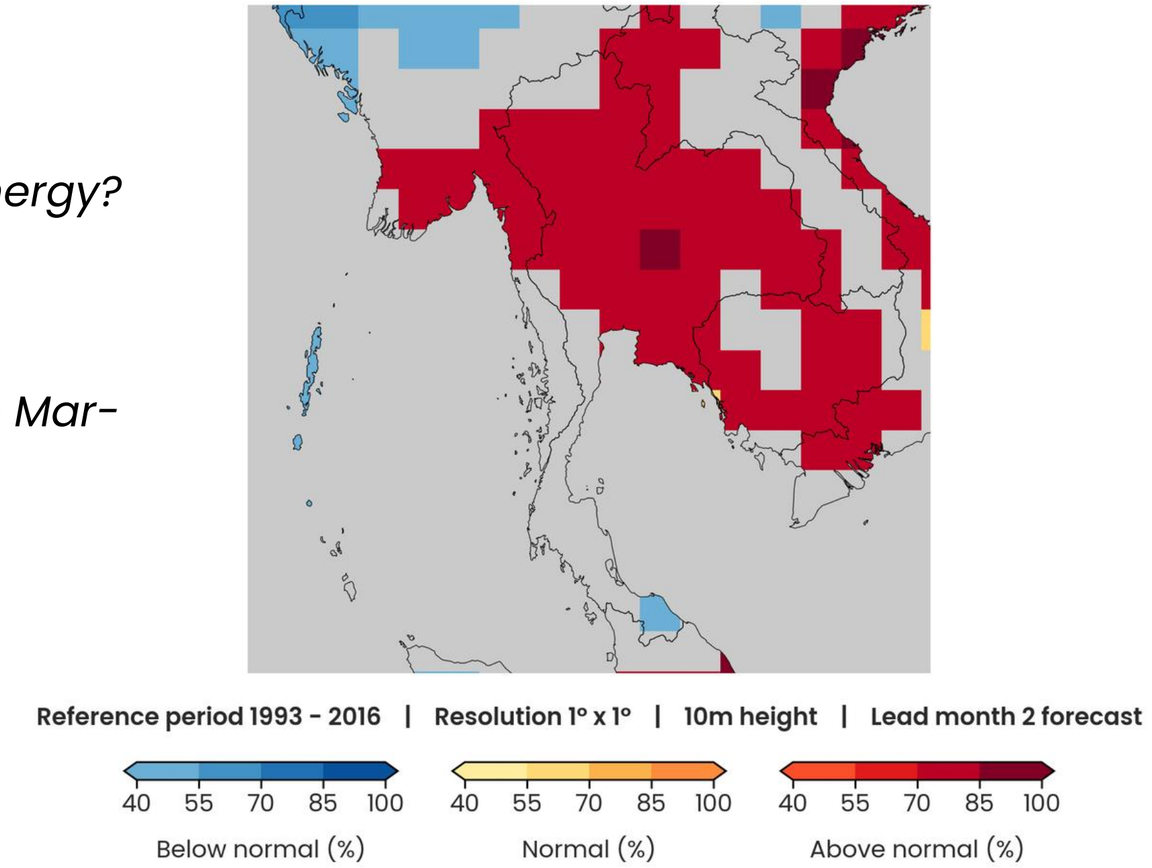

Fig 2. Multi-model probabilistic monthly prediction for May 26 (issued in Apr 26)

Custom use-cases: early warnings (3/3)

Several situations

- The customers wanted to **operate weeks ahead** and had solar-wind portfolios
  - **Driver**: *can we enhance our wind generation planning? what if we have hybrid portfolios?*
- The customers wanted to **mitigate** the **impact** of **extreme events** (precipitation, river inflow)
  - **Driver:** *can we enhance our hydroelectric operations by anticipating these?*

The solution

- We delivered our **sub-seasonal forecasts** with back-testing & uncertainty quantification
- We **adapted** the data to the end-user's **use-case**, with **custom variables** & **outputs**

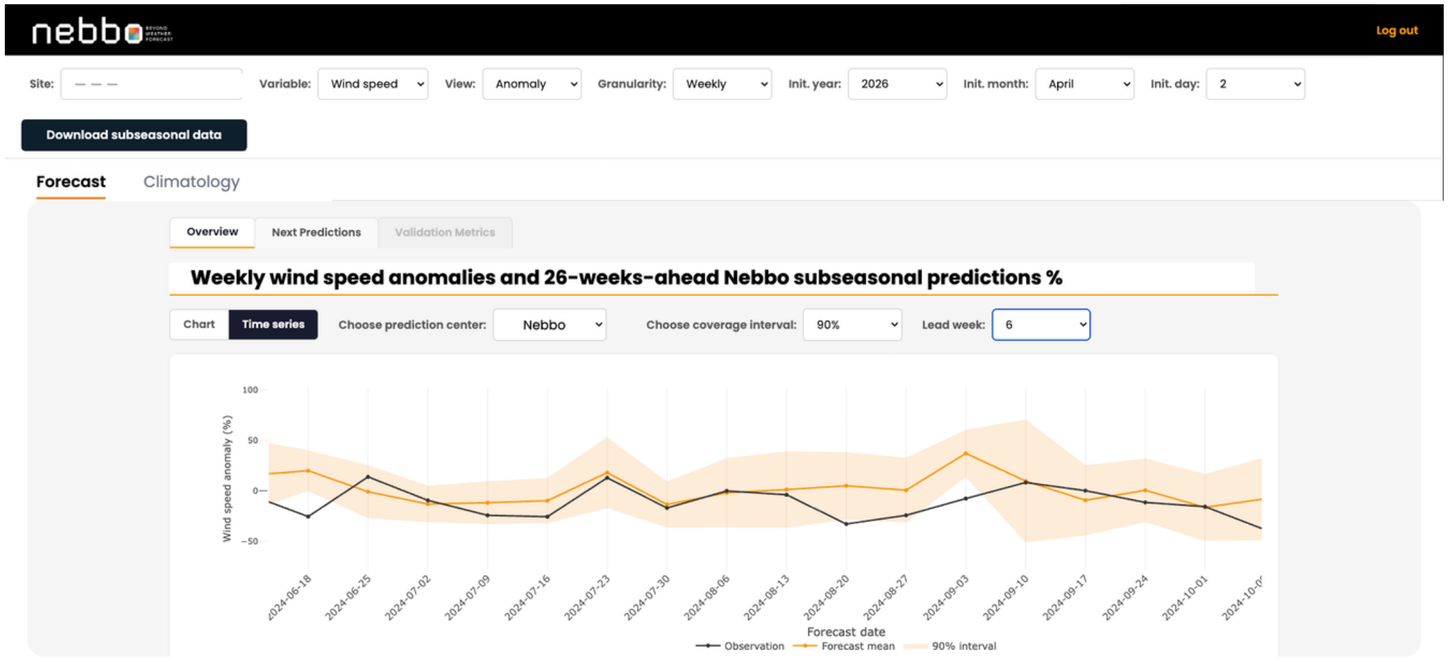

Fig 3. Back-testing view from the subseasonal forecasting interface.

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What does Nebbo say about the next quarter?

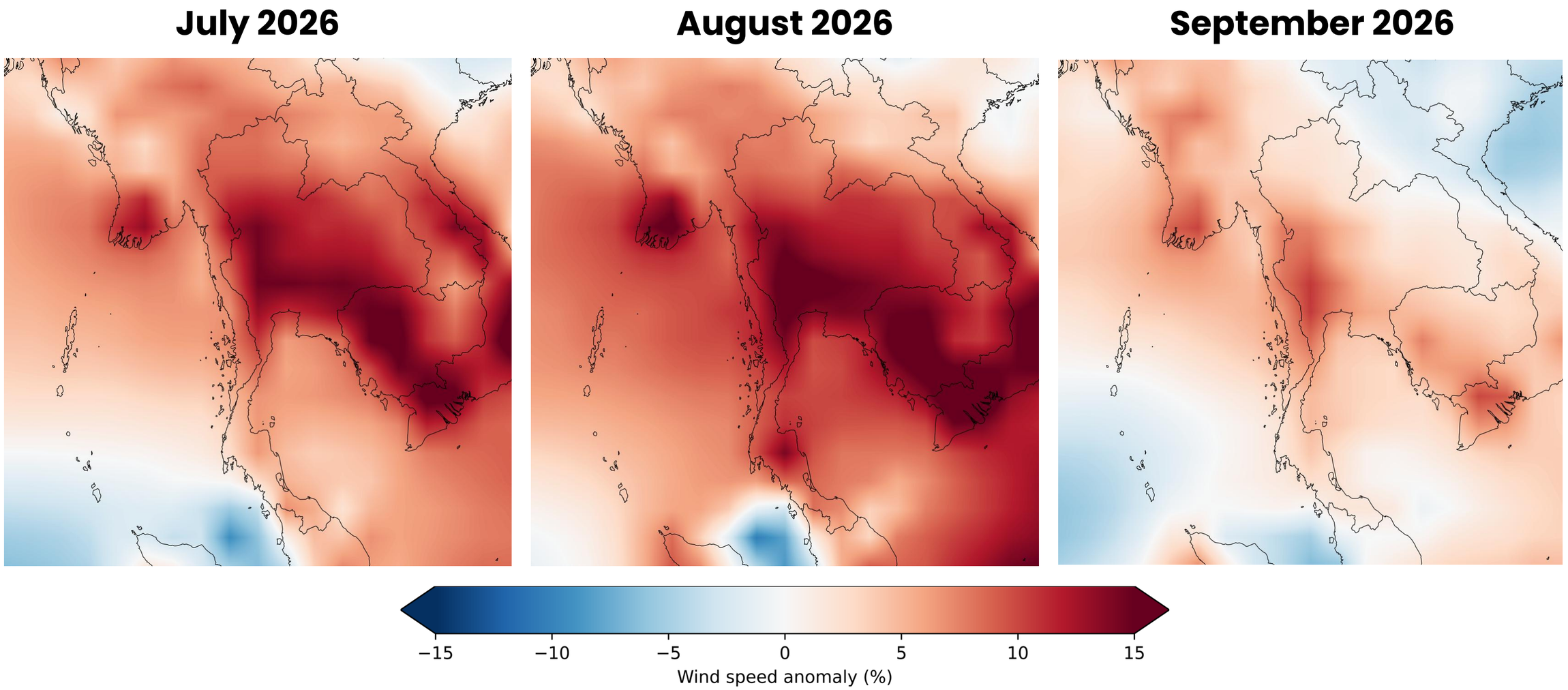

Fig 4. Multi-model monthly anomaly predictions for the next 3 months issued in **June 2026**. Note the effect of lead time.

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Some of the brands who trust us

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ACWA POWER

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SEE FURTHER,
PLAN BETTER.

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Wind Resource Assessment: Current Climate to Future Scenarios

Marwin Asksonmee

powered by

VORTEX

climatescale.com

VORTEX | The Wind Resource | Last 40 years

SIROCCO | The Power | Next 24-48 hours

nebbo BEYOND WEATHER FORECAST | The Wind Anomalies | One Season Ahead

CLIMATE SCALE

The Risks of a Changing Climate

Now and Next Decades

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WHO and WHY

We SUPPORT

Asset Managers / Investors / Technical Teams

Deploy specialized risk analysis for multiple applications and build in climate resilience for climate proofing assets.

Sustainability Teams

Report the financial implications of climate change to investors and meet sustainability requirements
#EUTaxonomy #TCFD #ESRS #IFRS #CSRD ...

WHY

Banks and ESG frameworks increasingly require climate sensitivity in wind assessments

Pre-financial close climate DD

Portfolio physical risk disclosure (CSRD/SFDR)

Client climate risk reporting mandates

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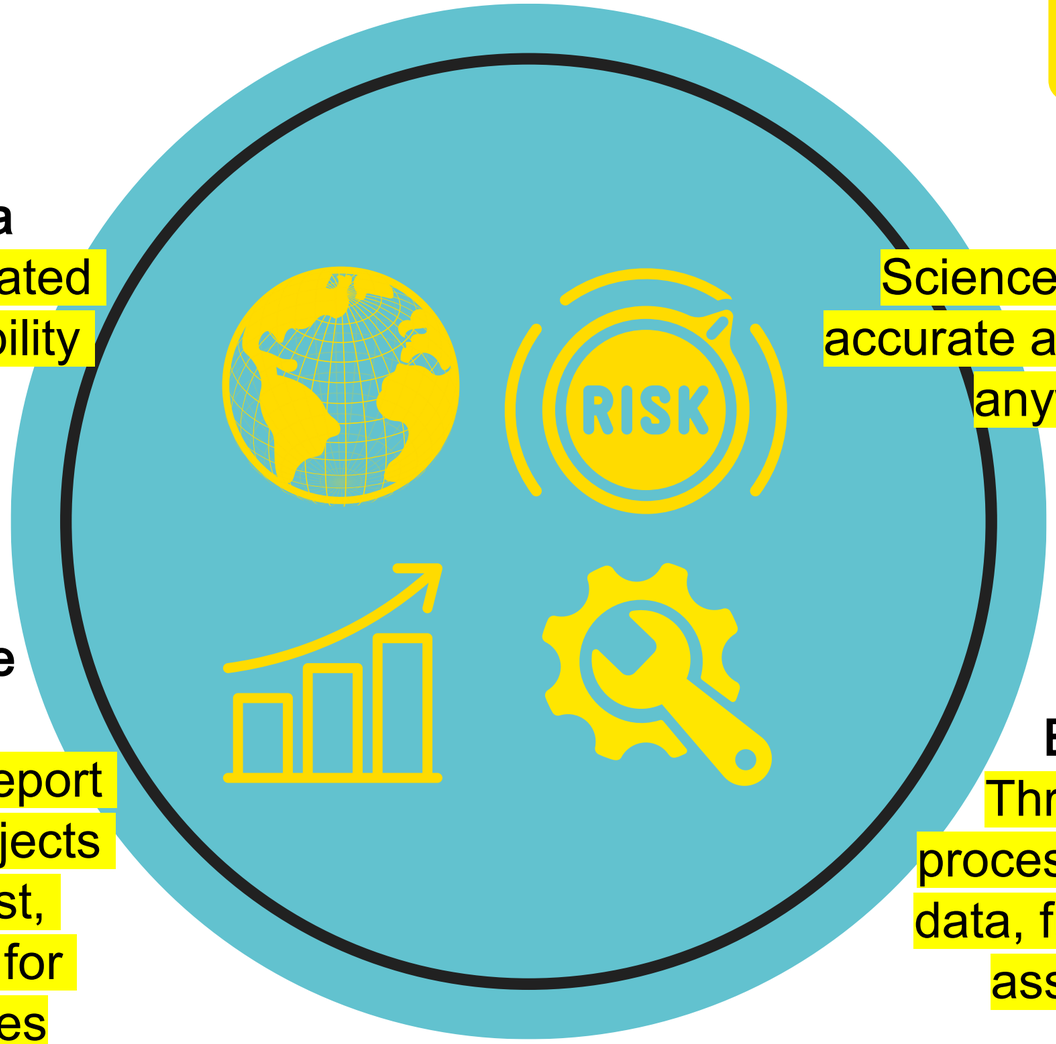
HOW

Actionable Climate Data

Comprehensive climate-related physical risks for sustainability reporting

Climate Risks

Science-based climate data for accurate analysis of climate impacts anywhere in the world.



High-Resolution Climate Projections

Understand, quantify, and report physical climate risks in projects and portfolios using robust, downscaled climate data, for present and future climates

Expert guidance

Throughout the entire process, to interpret climate data, future projections, and assess uncertainties.

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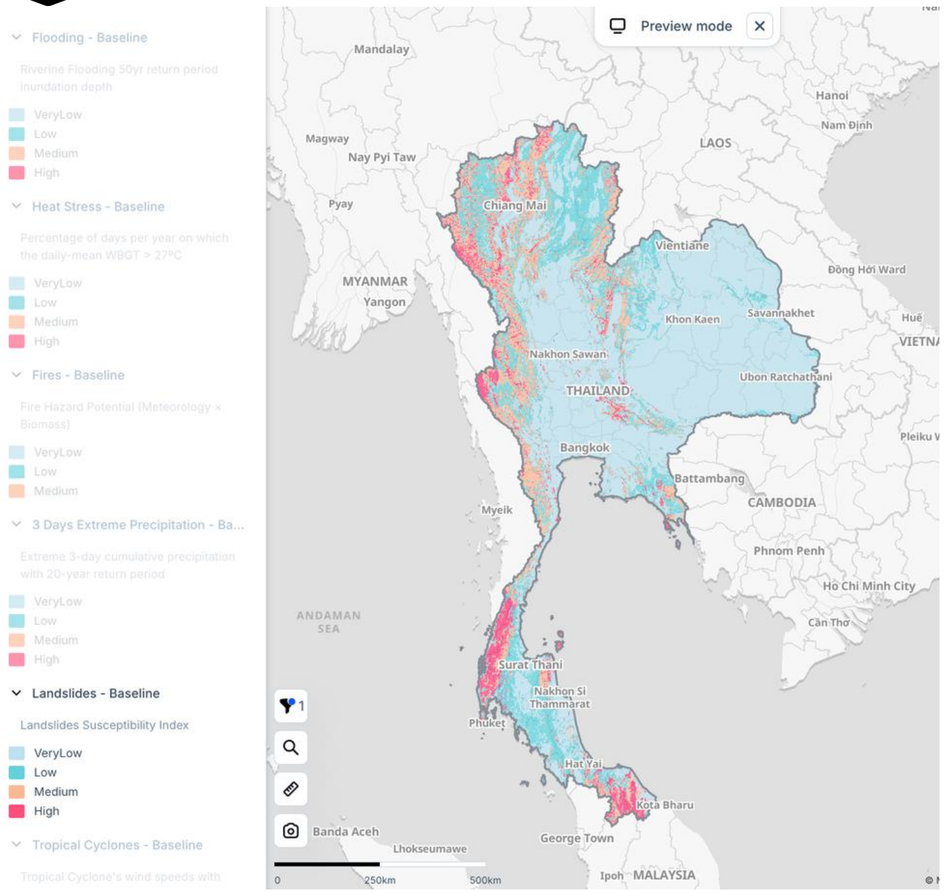
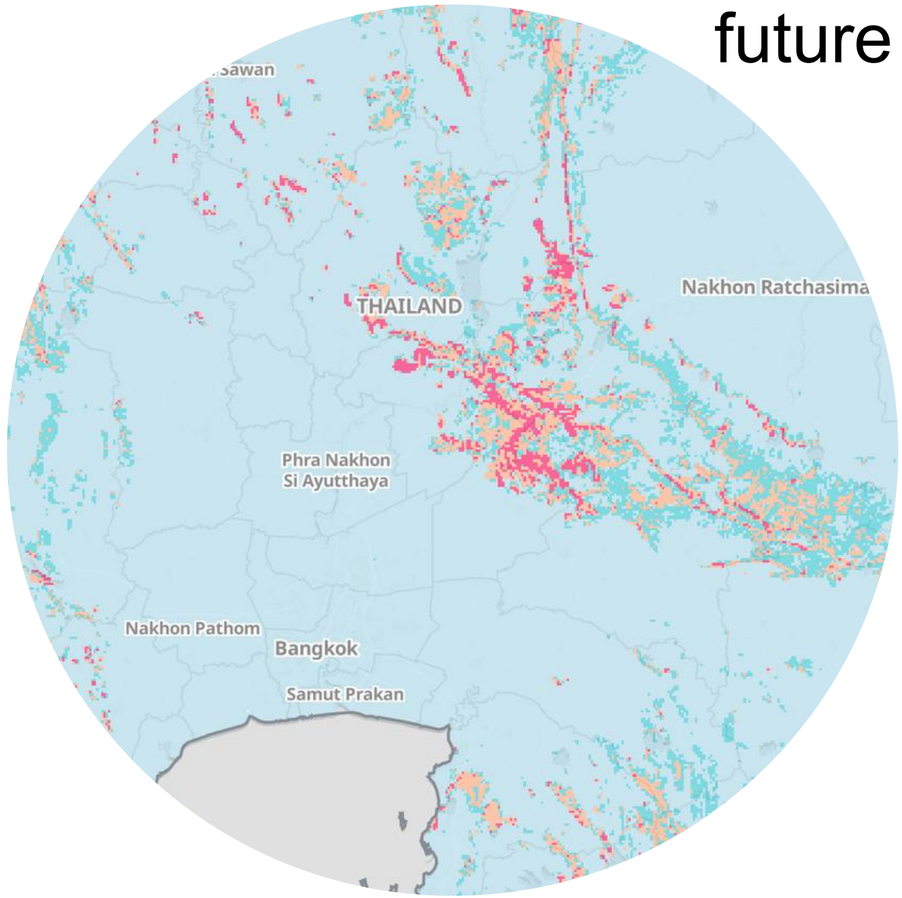
atlas.climatescale.com

High-Resolution Historical and future Scenario Data





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REPORTS

SERIES

MAPS

Multiple hazards: daily CMIP6 statistics and time series, bias-adjusted with ERA5/Vortex data.

							Observed			CMIP6	
CS ID	Location Name	Country	Technology	Metric Code	Risk Metric	Type	Risk Category	Future Horizon	Emissions Scenario	Risk Category	Confidence
13984	Sitio de Picapau	BRA	General	TE1	**Extreme Heat Stress (Human)**	Acute	Low	2040-2059	SSP2-4.5	Medium	Medium
13984	Sitio de Picapau	BRA	Wind	TE10	**Cold Days**	Chronic	VLow	2040-2059	SSP2-4.5	VLow	High
13984	Sitio de Picapau	BRA	Wind	TE11	**Hot Days**	Chronic	VLow	2040-2059	SSP2-4.5	VLow	High
13984	Sitio de Picapau	BRA	General	TE2	**Extreme Fire Conditions**	Acute	Low	2040-2059	SSP2-4.5	Low	Medium
13984	Sitio de Picapau	BRA	Wind	TE7	**Icing Days**	Chronic	VLow	2040-2059	SSP2-4.5	VLow	High
13984	Sitio de Picapau	BRA	General	WA2	**Water Scarcity (Hydrological)**	Chronic	VLow	2040-2059	SSP2-4.5	VLow-Low	Medium
13984	Sitio de Picapau	BRA	General	WA3	**Water Scarcity (Agriculture)**	Chronic	VLow	2040-2059	SSP2-4.5	VLow-Low	Medium
13984	Sitio de Picapau	BRA	General	WA6	**Extreme Precipitation (Flooding)**	Acute	Medium	2040-2059	SSP2-4.5	Medium	Medium
13984	Sitio de Picapau	BRA	Wind	WI1	**Average Wind@100 Reduction**	Chronic	-	2040-2059	SSP2-4.5	VLow	Medium
13984	Sitio de Picapau	BRA	General	WI3	**Extreme Wind (Storminess)**	Acute	VLow	2040-2059	SSP2-4.5	VLow	High
13984	Sitio de Picapau	BRA	Wind	WI4	**Extreme Wind Speed (Vref)**	Chronic	-	2040-2059	SSP2-4.5	VLow	High
13984	Sitio de Picapau	BRA	Wind	WI6	**Average Air Density Reduction**	Chronic	-	2040-2059	SSP2-4.5	Low	High

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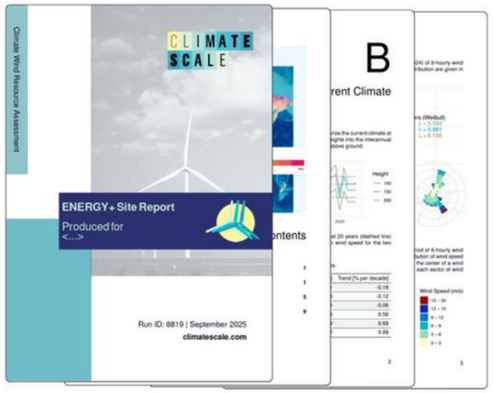
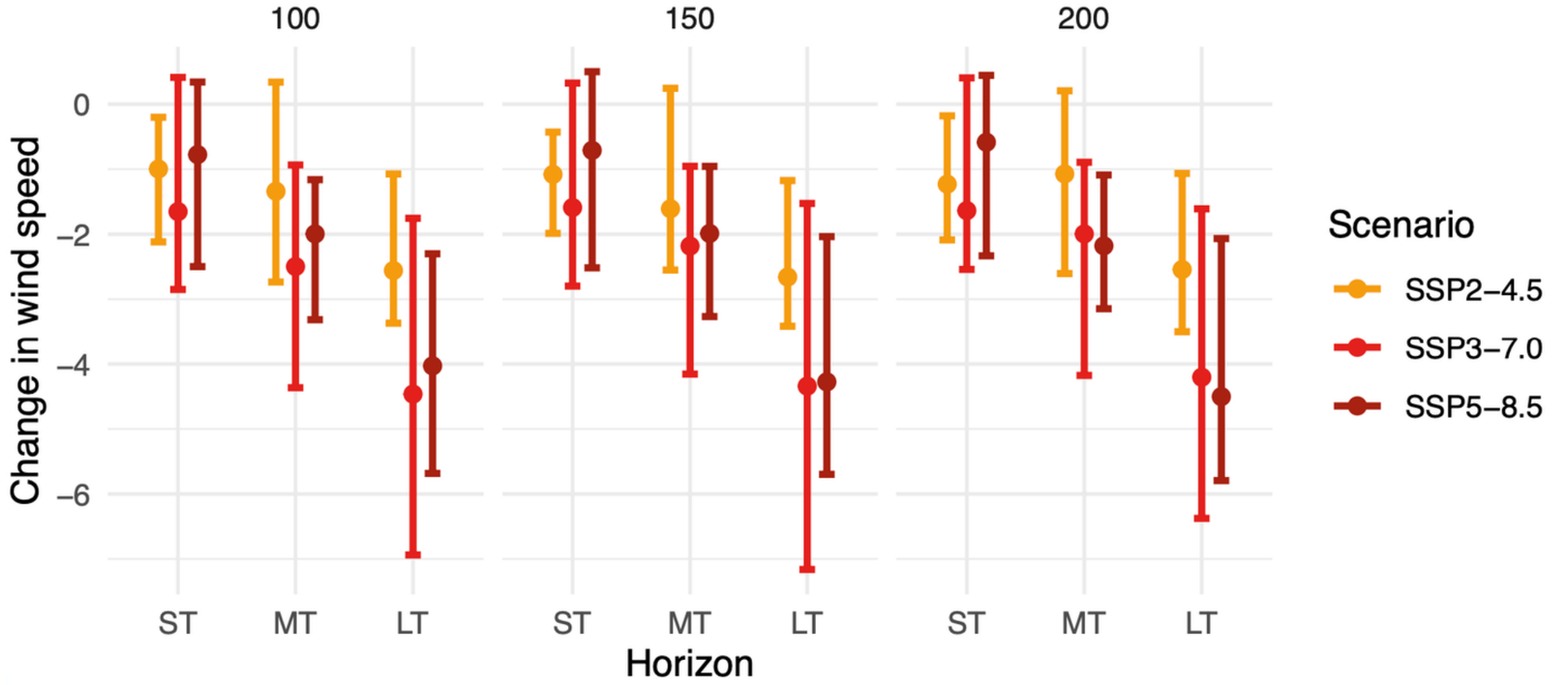
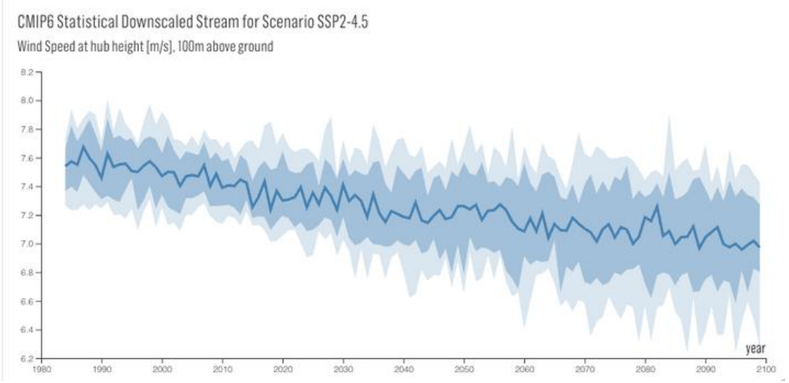
Ready-to-Download Reports and Data







ST - Short Term / Next 20 year
MT - Mid Term / Mid of Century
LT - Long Term / End of Century
SSP - Shared Socioeconomic Pathway

CLIMATE WIND RESOURCE ASSESSMENT

Case Study

Location in Thailand

Average Wind Speed Use-Case Analysis — Current Climate & Scenario Outlook

| Run ID 15373 | Climate Scale, June 5 2026 | Height analyzed: 150 m AGL

6.4 m/s

40-yr average wind speed (150 m, 1985–2024)

Stable

Trend not statistically significant across 40 years

+0.3 to +2.1%

Projected median change by 2045–2064, across scenarios

18–24

CMIP6 models per scenario driving the future outlook

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Input Data: What's Behind the Numbers

Two datasets, joined by bias correction

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Vortex SERIES

Historical current-climate baseline

RESOLUTION

3 km spatial grid

METHOD

ERA5-driven WRF dynamical downscaling

RECORD LENGTH

40 years, sub-daily — 1985 to 2025

ROLE IN THIS REPORT

Ground-truth baseline for all current-climate statistics, and the calibration reference for the CMIP6 ensemble

bias corrects

CMIP6 Downscaled Ensemble

Future-climate scenario projections

OUTPUT TYPE

Sub-daily, hub-height climate model data

SCENARIOS

3 SSPs — SSP2-4.5, SSP3-7.0, SSP5-8.5

ENSEMBLE SIZE

18–24 CMIP6 models per scenario

CALIBRATION

Bias-corrected against the Vortex SERIES historical record before any change statistics are computed

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Current Climate: Historical Average Wind Speed

Vortex reanalysis, 1985–2024, hourly data at 150 m above ground level — charts reproduced from the source report

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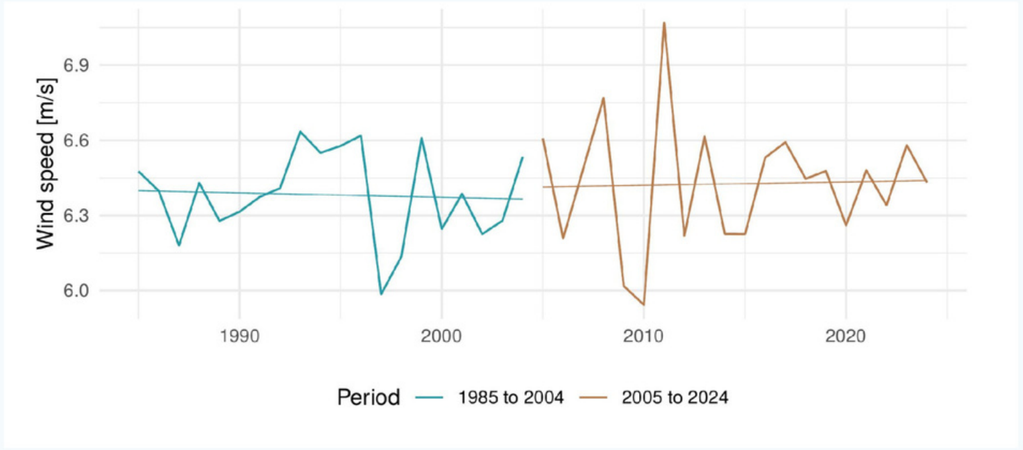
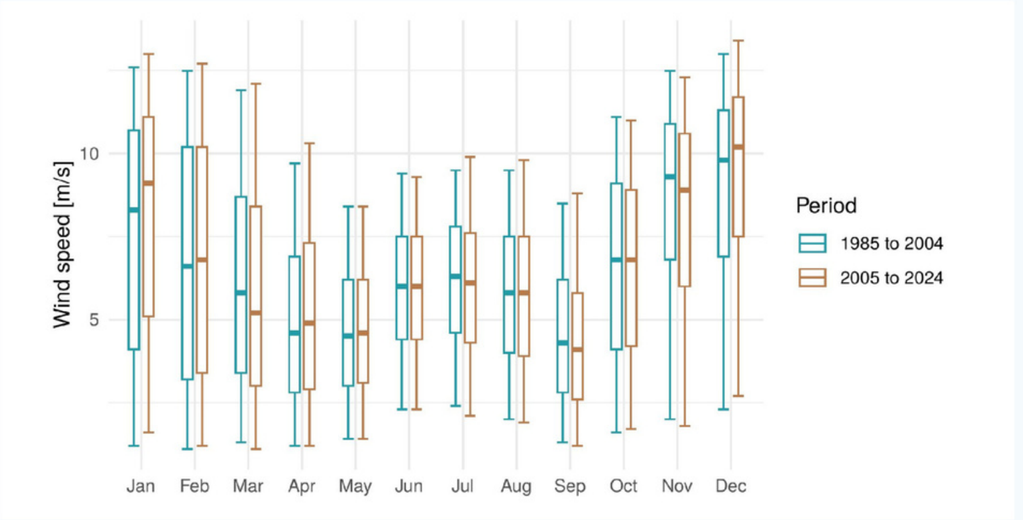
Annual Average Wind Speed, 1985–2024



Monthly Distribution of Wind Speed



1985–2004: 6.4 m/s avg · 2.8% interannual variability · −0.3%/decade trend (n.s.)

2005–2024: 6.4 m/s avg · 4.0% interannual variability · +0.2%/decade trend (n.s.)

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Future Climate: How to Read a Scenario Analysis

CMIP6 model ensemble, calibrated against the Vortex baseline (2005–2024)

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It's not one model — it's an ensemble

18–24 global climate models are pooled per scenario. Each black dot on the chart is one model; the colored dot is the ensemble median; the bar is the 66% likely range.

Three emission “scenarios” = three futures

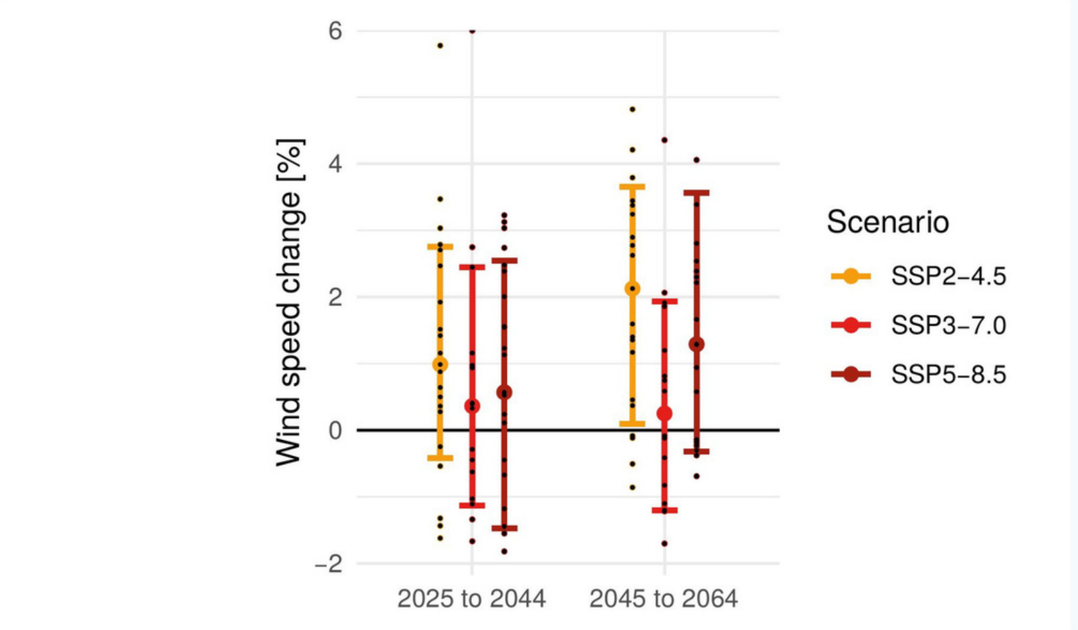
SSP2-4.5 (moderate), SSP3-7.0 (high), SSP5-8.5 (very high) describe different global emissions pathways — not forecasts, but bracketed what-ifs.

Two horizons, one baseline

Short-term (2025–2044) and medium-term (2045–2064) average wind speed changes are both expressed as % relative to the same 2005–2024 baseline.

Long-Term Changes in Average Wind Speed

Reproduced from the source report · 150 m height, vs. 2005–2024 baseline



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What This Means

Average wind speed outlook, in three takeaways

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The 40-year record shows no material trend

Average wind speed is 6.4 m/s in both the 1985–2004 and 2005–2024 sub-periods; neither 20-year trend (−0.3%/dec, +0.2%/dec) is statistically significant.

All scenarios point the same direction: flat to slightly up

By 2045–2064, the ensemble median change ranges from +0.3% (SSP3-7.0) to +2.1% (SSP2-4.5) — no scenario projects a resource decline.

Use the ensemble spread, not a single number

Individual models range roughly −2% to +6% around the median — build base-case yield on the median and stress-test against the model spread, not a point estimate.

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Download an ENERGY+ Sample Report here

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Q&A Session