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Barcelona, 13 May 2015

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

EXCELENCIA SEVERO OCHOA

EARTH SCIENCE SERVICES

Seasonal and Sub-seasonal climate predictions

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Services – Earth Science Department

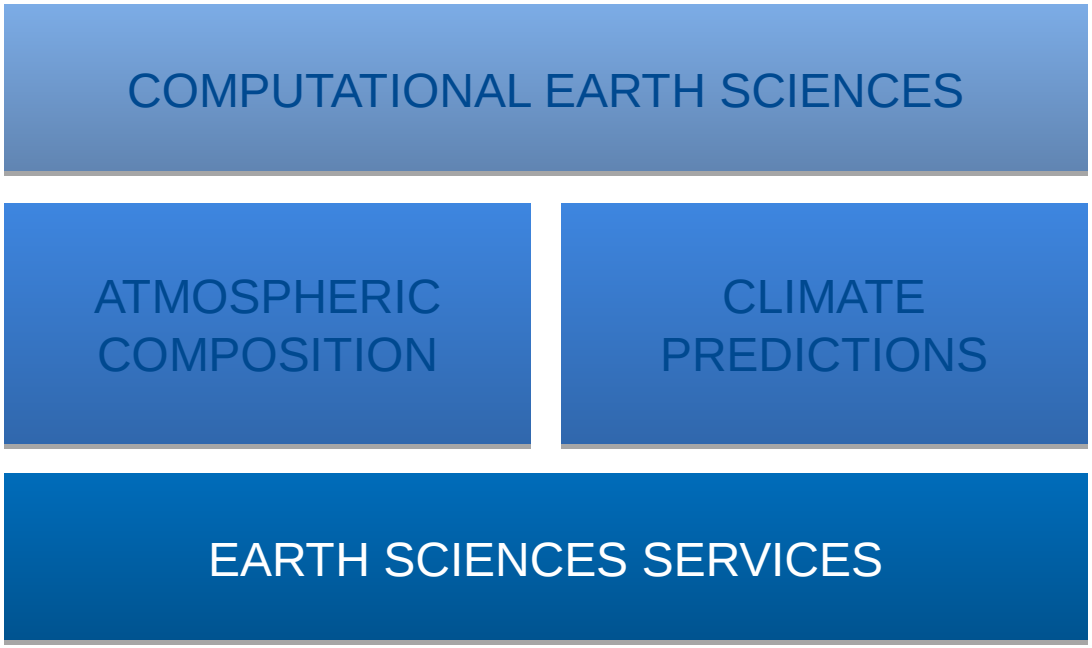
Earth Sciences Department

- Merging process between

Climate Forecasting Unit

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

- New structure: 4 groups (~ 50 people)

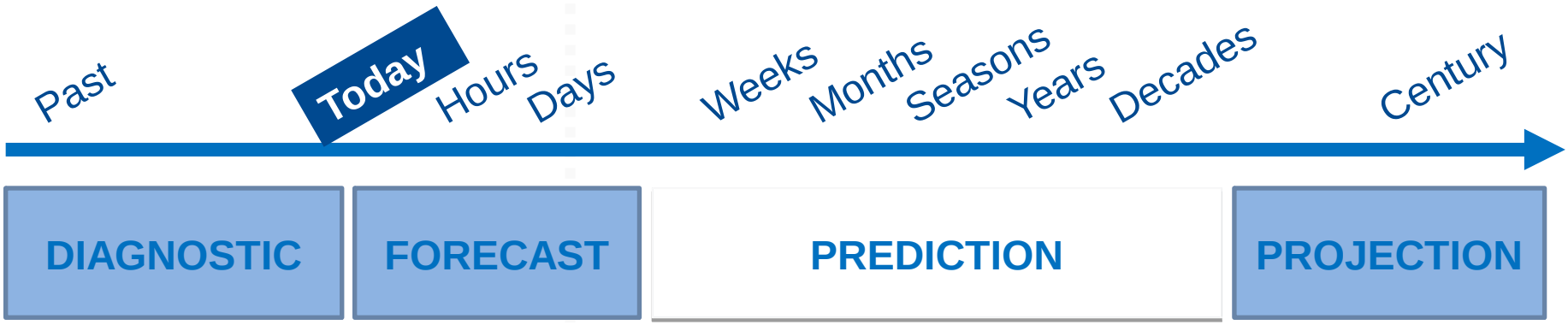


OUR OBJECTIVE:

Facilitate technology transfer of state-of-the-art research from local, national to international levels in five areas:

- Air quality assessments
- Mineral Dust modelling
- Weather forecasting
- Climate predictions
- Computational Earth Services

Temporal scales



EU Projects on Climate predictions

SPECS: Seasonal-to-decadal climate Prediction for the improvement of European Climate Services

http://www.specs-fp7.eu/

EUPORIAS: EUropean Provision Of Regional Impact Assessment on a Seasonal-to-decadal timescale

http://www.euporias.eu/

NEWA: New European Wind Atlas

http://euwindatlas.eu/

PRIMAVERA, IMPREX, …

Climate predictions for wind power

- Wind farms viability plans are in a decadal timeframe (10-15 years)

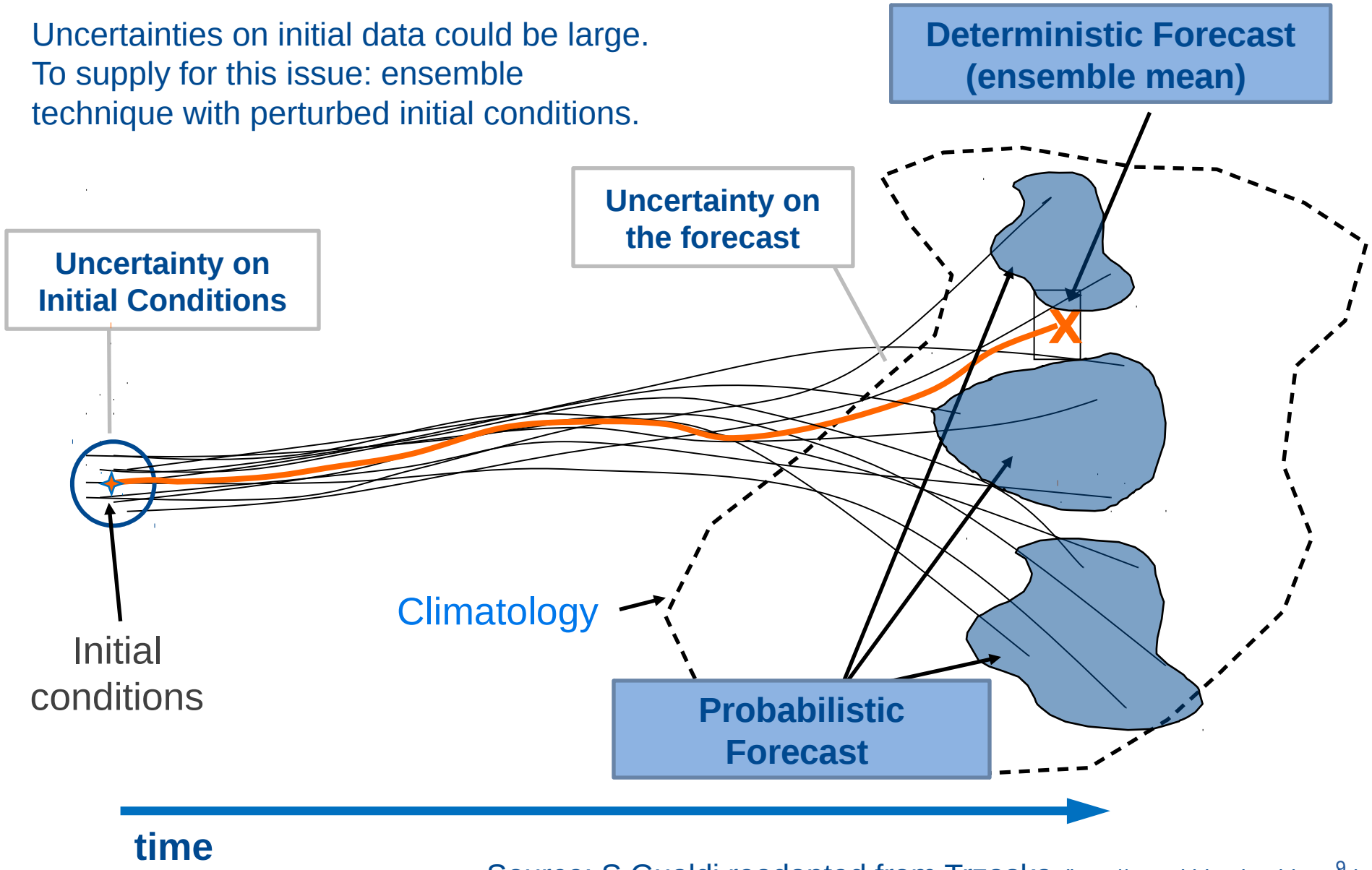
- Need for sub-seasonal, seasonal and decadal climate predictions, new field in climate predictions

- Worldwide only BSC-ES + Met Office work in this timeframe

- Partners in European projects (FP7 and H2020) in collaboration with private wind sector (EDPF, Vortex, EDPR…)

Climate predictions and predictability

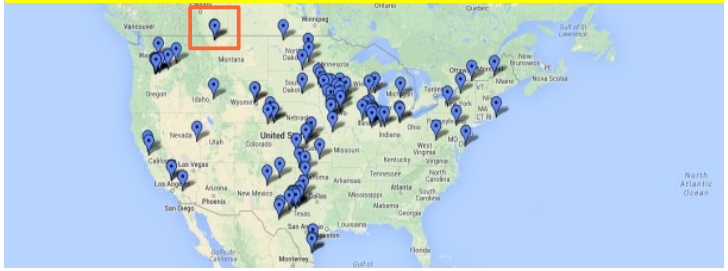
Uncertainties on initial data could be large.
To supply for this issue: ensemble technique with perturbed initial conditions.



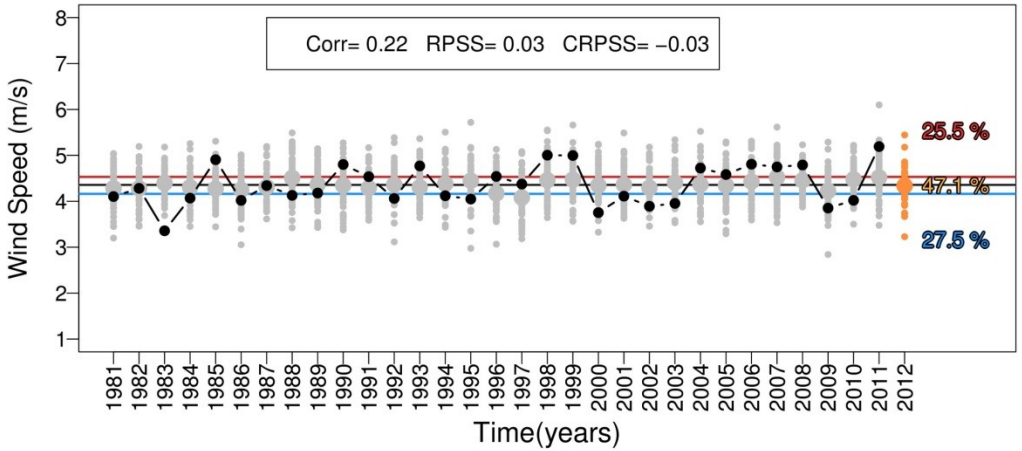
Source: S.Gualdi readapted from Trzaska (http://portal.iri.columbia.edu)

Example: wind power predictions

Climate model:**ECMWF S4**
10m wind speed “observations”: ERA-Interim
Winter season forecast: 1 month lead time

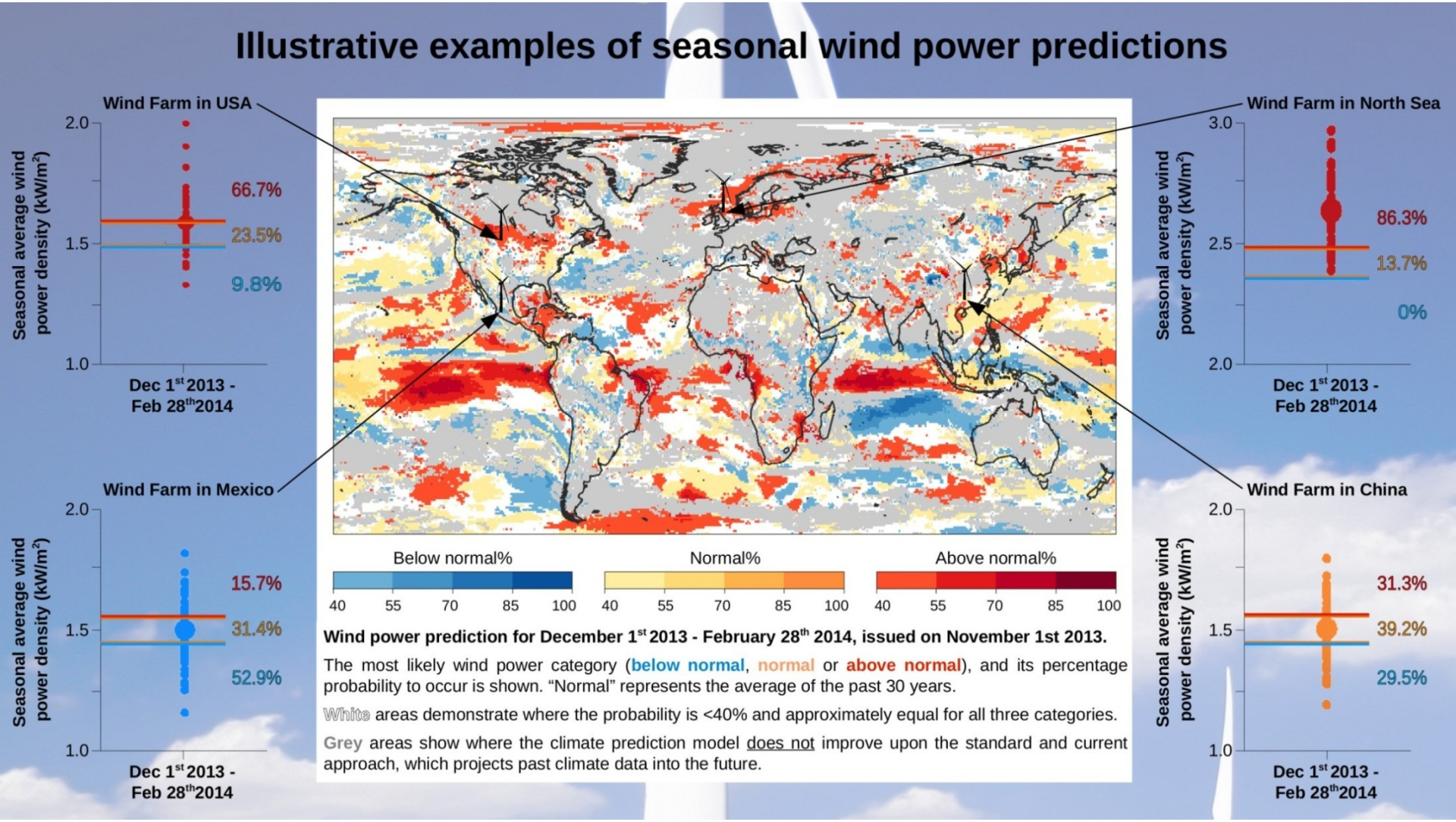


Simple bias correction

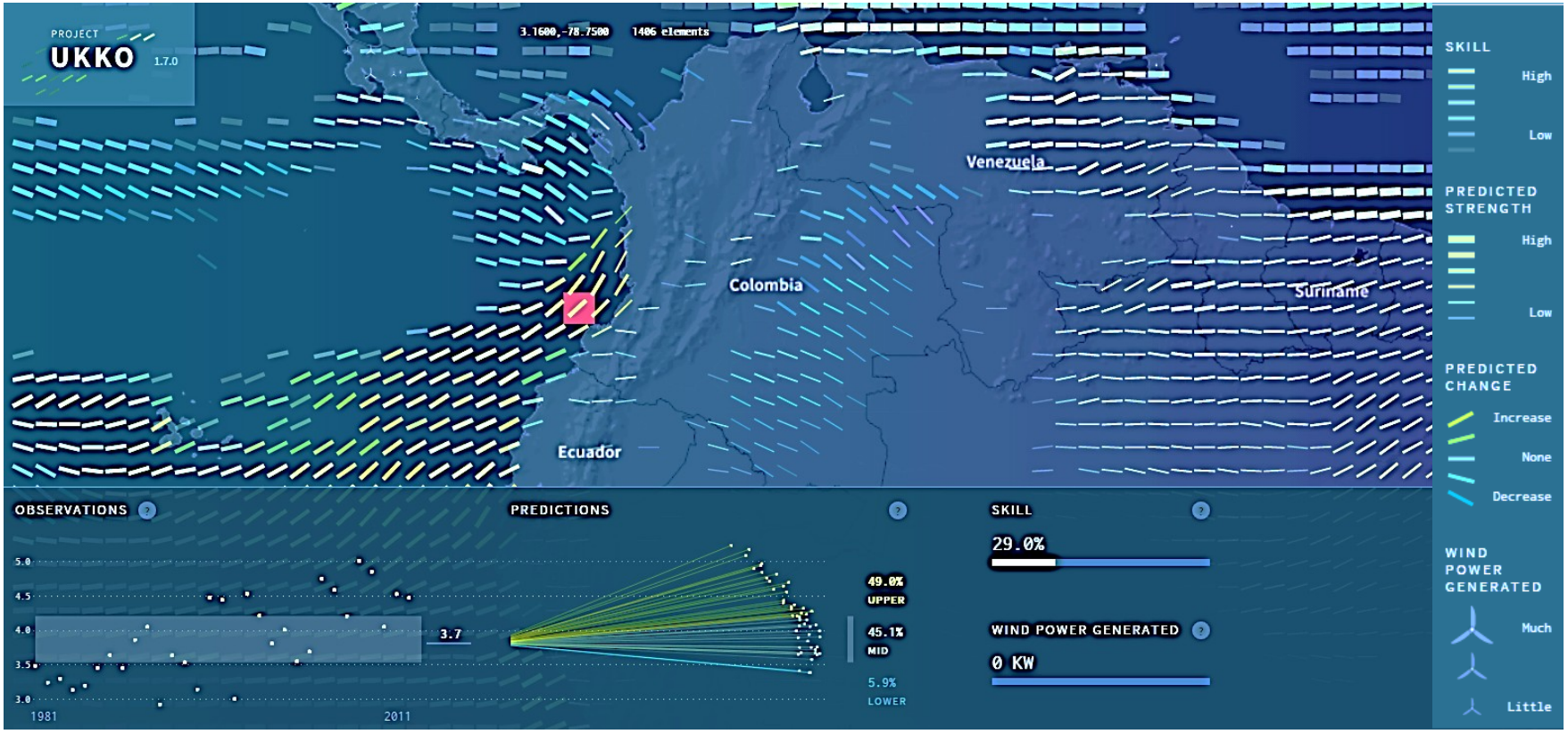


- Data from **ECMWF** (European Centre for Medium-Range Weather Forecasts)
- We don’t provide deterministic predictions. We assess the global behaviour providing a **probabilistic predictions**
- Aggregated output in **terciles**:
  - Above normal
  - Normal
  - Below normal

Example: wind power predictions



Example: wind power predictions



RESILIENCE PROTOTYPE

EUPORIAS

Climate predictions for wind power

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Pre-Construction Decisions: **Annual to Decadal Timescales**

- **Wind farm planners:** Site selection
- **Wind farm investors:** Evaluate return on investments
- **Policy makers:** Understand changes to energy mix

Post-Construction Decisions: **Monthly to Seasonal Timescales**

- **Energy producers:** Resource management strategies
- **Energy traders:** Resource effects on markets
- **Wind farm operators:** Planning for maintenance works
- **Wind farm investors:** Optimize return on investments

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Thank you!

For further information please contact

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