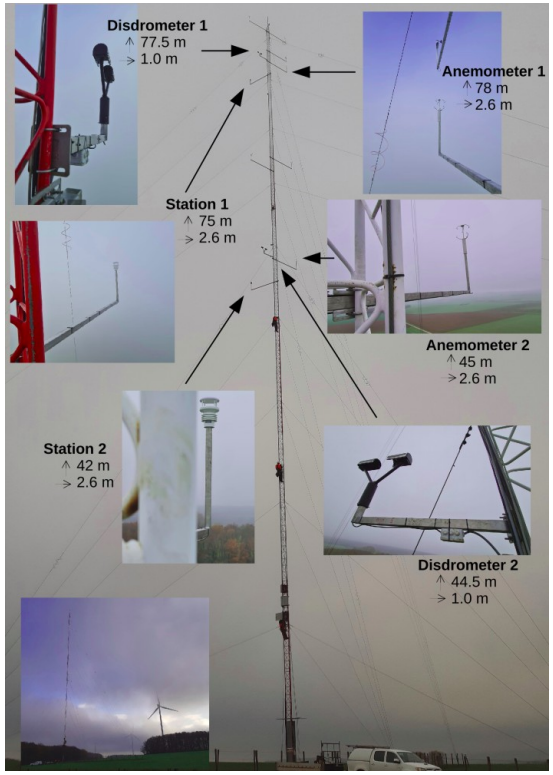
A pilot site : the wind farm of Pays d'Othes

4 turbines (totalling 8 MW of power production) operated by BORALEX

With a 86 m instrumented meteorological mast:



HM&Co Team :

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Funding:

2019-2022

The project is funded through the JCJC (for young scientist) scheme of the French National Research Agency

Partners :

Involvement of a wider academic and industrial consortium :

BORALEX — **Ernani Schnorenberger**

Sandrine Aubrun — LHEEA Centrale Nantes, CNRS

Carl von Ossietzky Universität Oldenburg — **Joachim Peinke**

Paul Veers — NREL National Renewable Energy Laboratory

RW-Turb

Rainfall Wind Turbine or Turbulence

https://hmco.enpc.fr/portfolio-archive/rw-turb/

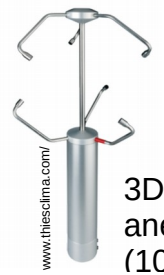
What RW-Turb is about ?

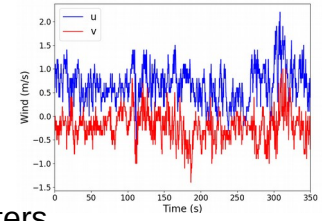
RW-Turb relies on the expertise of HM&Co in measurement and modelling across **wide range of spatio-temporal scales** of atmospheric **turbulence and rainfall** to quantify the impact of the latter on **wind power production**.

This project benefits from an industrial partnership with Boralex, a wind power producer.

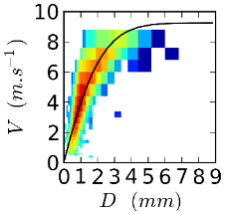
RW-Turb will open new paths to improve **nowcasts of power production**, a major challenge in a framework of increasing use of **renewable energies** in France and Europe.

High resolution instruments :

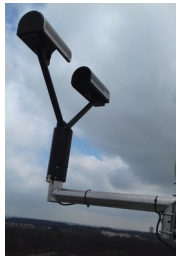




3D sonic anemometers (100 Hz)



Disdrometers (size and velocity of falling drops)



+ T(°), humidity and pressure sensors.

Outline of the project

RW-Turb

Coordination :

École des Ponts ParisTech — HM&Co

Steering Committee:

LHEEA Centrale Nantes — CNRS — BORALEX

International Advisory Board

Carl von Ossietzky Universität Oldenburg — NREL National Renewable Energy Laboratory

Research and innovation

WP1 : A high resolution measurement campaign

- Selection, purchase and installation of measurement devices
- Data base preparation
- Data validation.

WP 2: Analysis and simulation of rainfall effects on the wind power available

- Characterization of wind intermittency and air density under various rainfall conditions
- A 3+1D model of drops field in a turbulent wind field
- Development and validation of wind simulation

WP 3: Analysis of rainfall effects on energy conversion by wind turbine

- Characterization of the transfer of wind intermittency to power production under various rainfall conditions
- Computation of the torque fluctuations under turbulent wind constraints.
- Numerical simulation of wind turbine behaviour

Impacts

Wind Energy challenges, Scientific and professional dissemination, Toolbox, Exploitation and follow-up