



## Observations of the atmospheric flow integrating real climate conditions at offshore, coastal, high altitude, complex and subtropical sites

Hasager, Charlotte; Mendez, Beatriz; Dyer, Kirsten; Kinsley, Peter; Prada, Iván

*Publication date:*  
2024

*Document Version*  
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

*Citation (APA):*

Hasager, C., Mendez, B., Dyer, K., Kinsley, P., & Prada, I. (2024). *Observations of the atmospheric flow integrating real climate conditions at offshore, coastal, high altitude, complex and subtropical sites*. Poster session presented at WindEurope Annual Event 2024, Bilbao, Spain.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.



**Observations of the atmospheric flow integrating real climate conditions at offshore, coastal, high altitude, complex and sub-tropical sites**

Charlotte Hasager<sup>1</sup>, Beatriz Mendez<sup>2</sup>, Kirsten Dyer<sup>3</sup>, Peter Kinsley<sup>3</sup>, Iván Prada<sup>4</sup>

<sup>1</sup> DTU (DK), <sup>2</sup> CENER (ES), <sup>3</sup> ORE Catapult (UK), <sup>4</sup> PLOCAN (ES)

# AIRE observations datasets will be open access

**AIRE is short for**

“Advanced study of the atmospheric flow Integrating REal climate conditions to enhance wind farm and wind turbine power production and increase components durability”.

**MEASUREMENTS**

We collect observations at offshore, coastal, high altitude, complex and sub-tropical sites in order to deliver the measurements necessary to progress beyond state of the art. The sites are indicated in Figure 1.

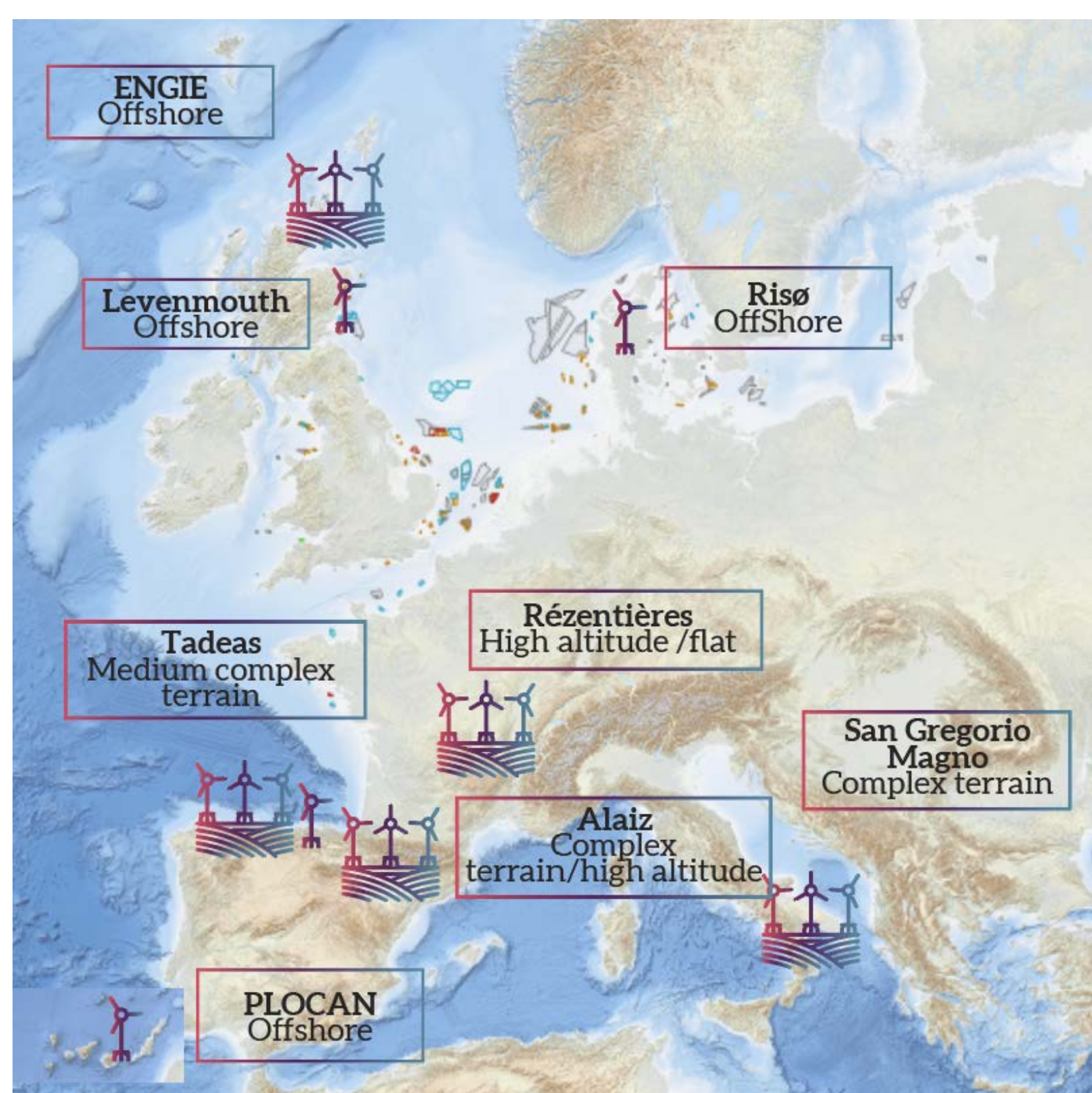


Figure 1. AIRE sites – EU representative locations for wind energy production.

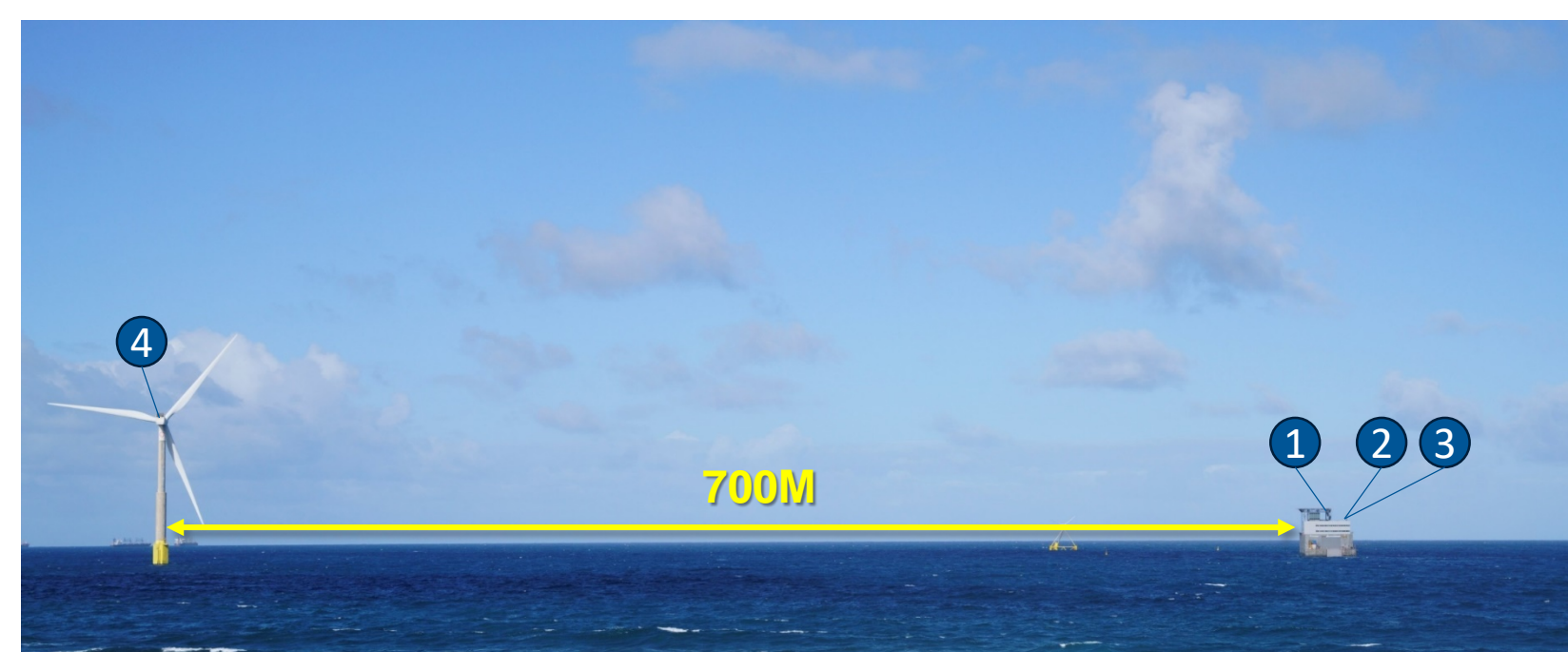


Figure 2. PLOCAN site with floating turbine (4), air quality (1), wind lidar (2), and meteorological station (3) sensors.

**METHOD**

We observe wind, precipitation and suspended dust potentially hitting the operating turbines and causing erosion at the leading edge of blades. Furthermore, SCADA data and auxiliary data are recorded to study their effect on production.

The sites vary from offshore such as PLOCAN , see Figure 2 to high-altitude complex such as ALAIZ , see Figure 3.

**DATA ANALYSIS**

Quality control of data and applied use for modelling is on-going. The data will be used in various models including mesoscale model, wake models, erosion damage models and airfoil performance model.

The database is being established. Collaboration with Horizon Europe funded projects FLOW and MERIDIONAL is on-going to enable wider benefit of the data.



Figure 3. ALAIZ site with micro rain radar (1) and disdrometer (2).

**NEXT STEPS**

The potential risk of leading-edge erosion will be assessed at various sites based on the observations and modelling. Wind farm wake studies will compare to wind lidar data and SCADA data. Uncertainties in the wind farm annual energy production will be in focus.

Get to know more about AIRE activities at [www.aire-project.eu](http://www.aire-project.eu)



**ACKNOWLEDGEMENTS**



This project has received funding from the European Union’s HORIZON-CL5-2021-D3-03 program under grant agreement No 101083716.

Meet us at



Watch this presentation

Download the poster