An Overview of the Lollex Experiment

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TRAIN²WIND is a PhD TRAINing school analysing enTRAINment in offshore WIND farms.

Rationale: Very large wind farms influence the boundary layer – where is the momentum coming from?

We aimed at a measurement campaign at the Rødsand II offshore wind farm in Lolland, Denmark, with a high-intensity measuring period where we deploy UAS, LIDARs, and collect information from satellites to establish the transition between the undisturbed air and the atmospheric boundary layer in the presence of the wind farms. We investigate the wake effects using the Weather Research and Forecasting model (WRF) with two wind farm parametrisations around the wind farms.

Method: A Measurement Campaign in Lolland - Lollex

Initial plan: 3 weeks intense obs in Sept '22

We started 6 months before the envisaged starting date (Sept 2022) to discuss with flight authorities – too short for the flight permits (we need 100 km up to 600m, and one for flying beyond visual line of sight). -> Postponed to March 2023. Starting with 2 lidars on the CTV.

Real life

Wind speed deficit at hub height. Westerly winds.

National Park Rødsand II: 30 km², 60 Turbines, 100 MW. No connection to grid until 2024.

Actual campaign: April-July '23

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Other results by the fellows

Oscar Garcia, DTU
Abdalmen Owađa, DTU
Mauro Ghirardelli, UIB
Grischa Fraumann, UCPH

Meso-scale modeling of hybrid and Rødsand II wind farms.

Visit for wind investigatons using satellite data.

Winds above the wind farm. Meso-scale modeling of hybrid and Rødsand II wind farms.

Modeling of the spectra at lower frequencies under different stability conditions.

Study of scientific collaboration. Participant observations of preparations for the Lollex experiment, for example, several test flights of UAS and installation of lidars.

Next steps

- Collect Lollex data, publish the data
- Flight campaigns elsewhere (near Tübingen)
- Finish 13 PhDs
- Studies of wind farm wake control, and vertical axis turbines
- Possibly experiment at floating vertical axis turbine (SeaTwirl prototype, Sweden)
- Find financing for Lollex 2, doing the full experiment

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