



Useful Data in the New European Wind Atlas

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Useful Data in the New European Wind Atlas

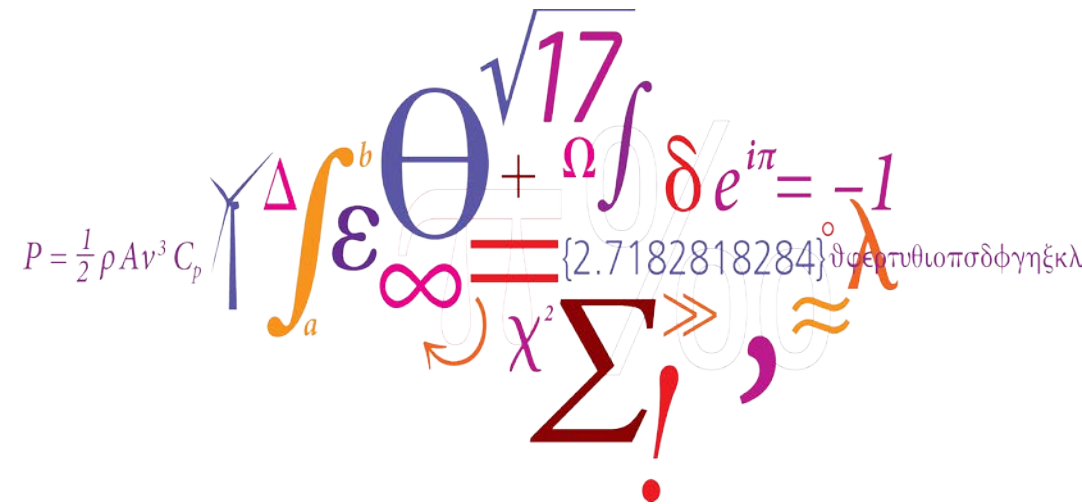
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Collected from [NEWA Project Team](#) lead by Jakob Mann <jmsq@dtu.dk>

IEA Task 36 (Wind Forecasting) @ WindEurope

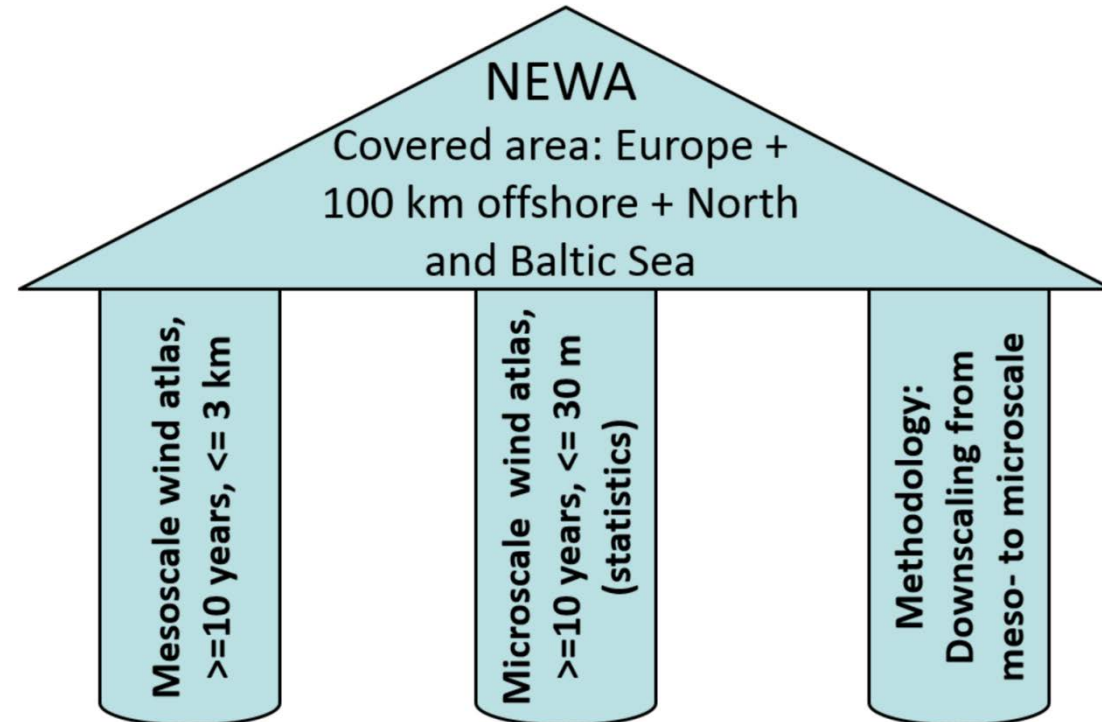
1 December, 2017

Article: [Complex terrain experiments in the New European Wind Atlas, 2017](#)



NEWA Project Goals

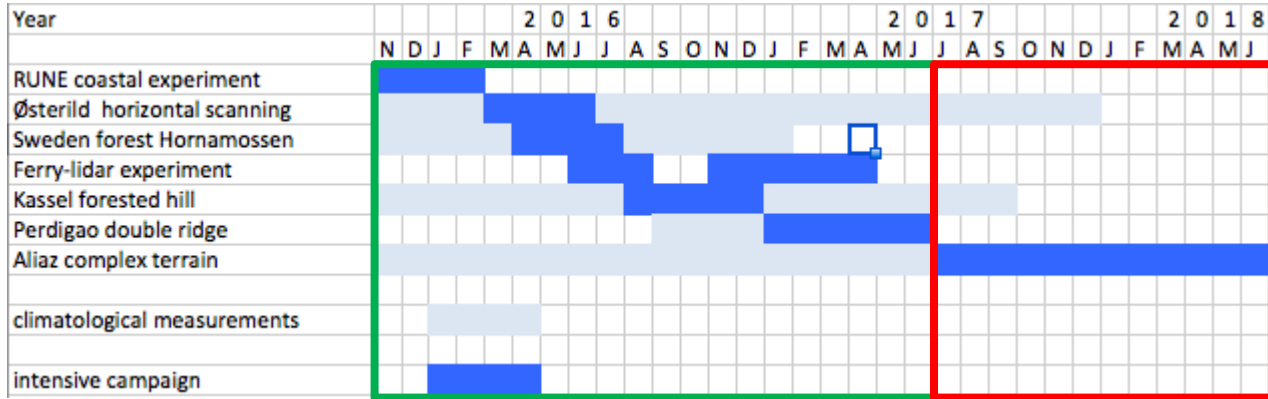
- Accurate mapping of wind conditions for the estimations of resources and loads
- Development and testing of the model chain
- A series of atmospheric field experiments to validate the model and atlas



NEWA Outcomes

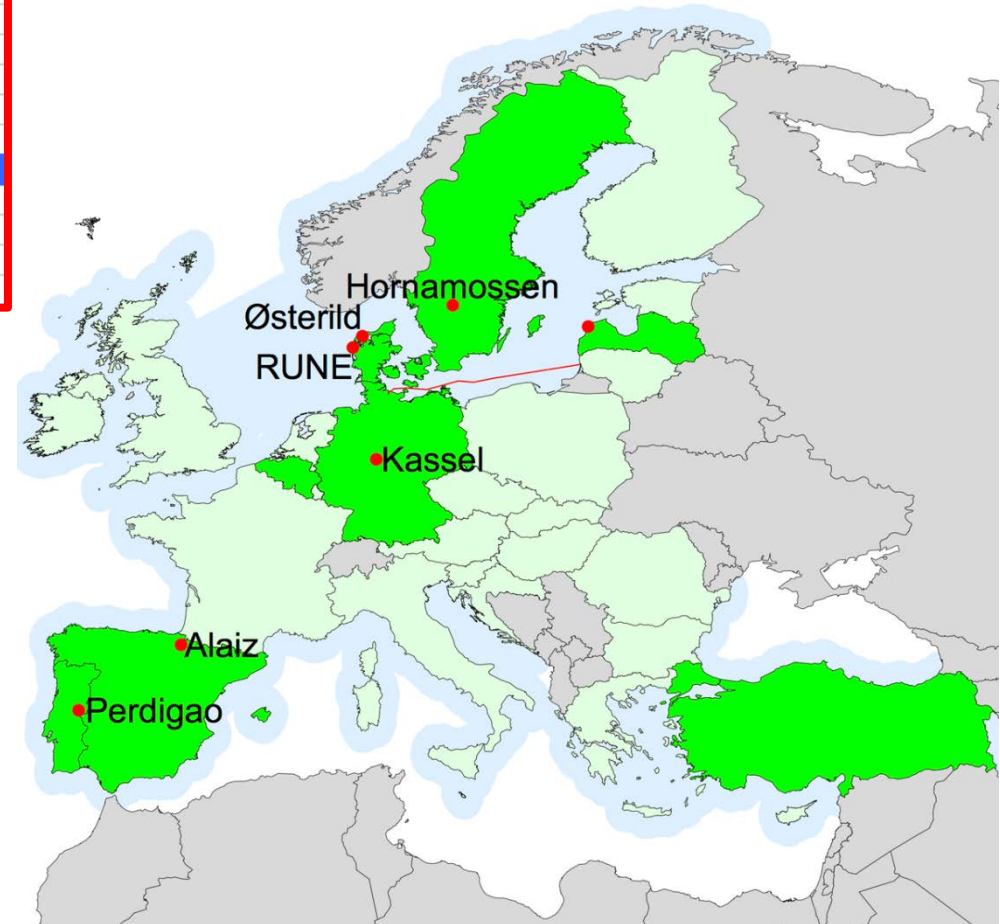
- A unified high resolution and freely available data-set of wind energy resource in Europe
- Wind resources with a resolution < 100 meters in at least 10 wind turbine relevant heights
- Data from large scale field experiments and at least 10 years of mesoscale simulations with a resolution of 2-3 km
- Publicly available data for all EU countries, including 100 km offshore plus the Baltic and the North Sea
- Measures of wind variability, wind power predictability from day-ahead to decadal as well as parameters for wind turbine design

Experiment Locations and Timeline



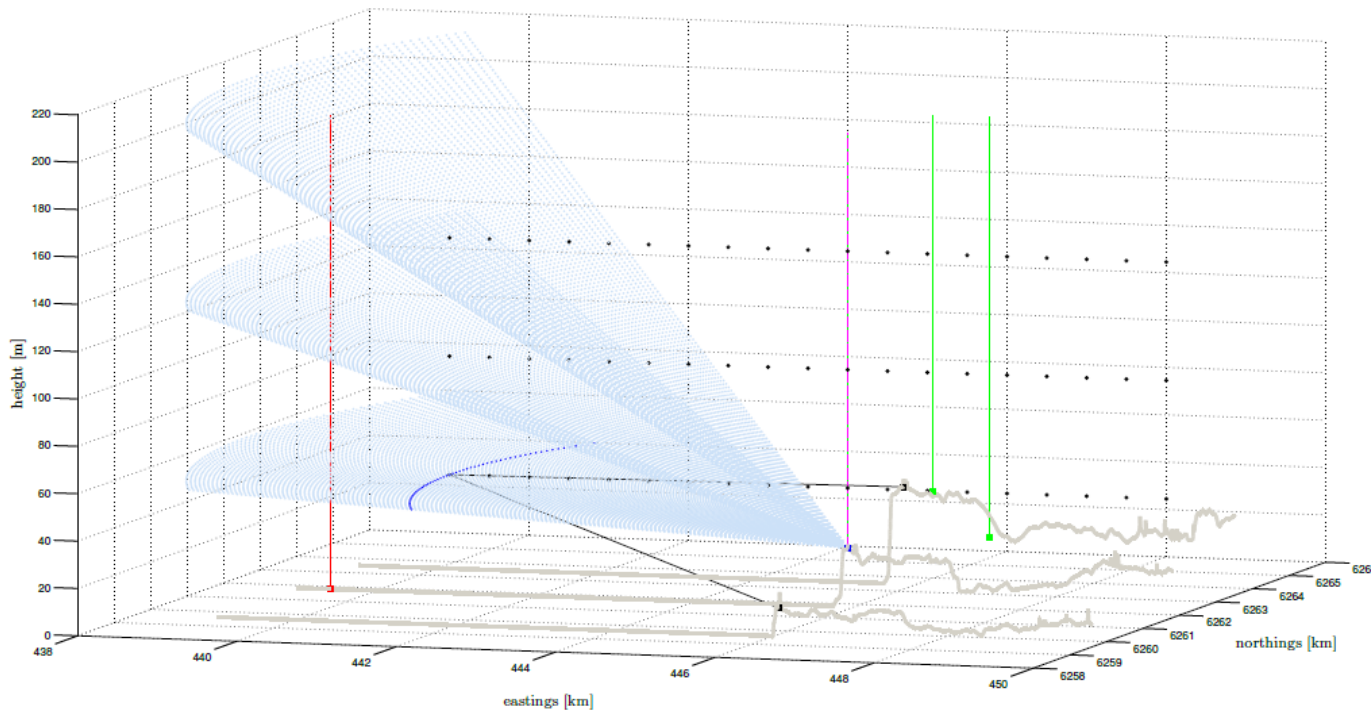
completed

- All experiments completed at present except Aliaz complex terrain (starting January 2018)



Experiment 1: RUNE (Denmark)

Reducing Uncertainty of Near-shore Energy Estimates

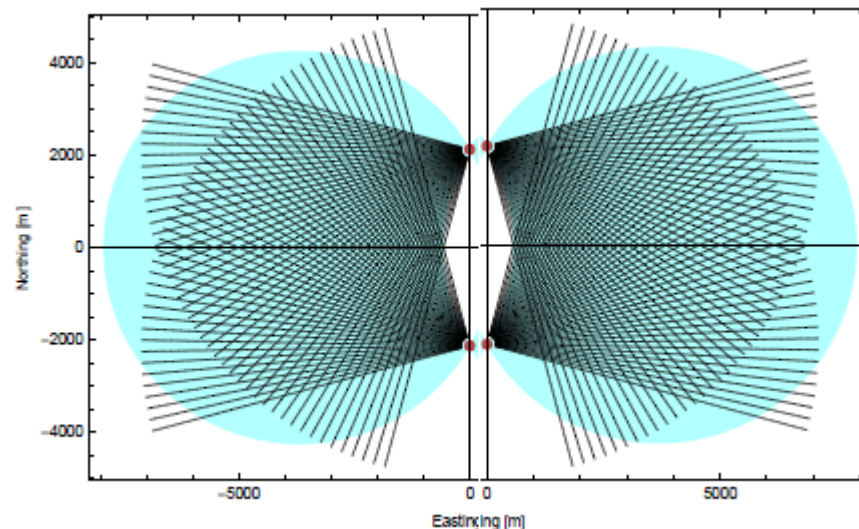
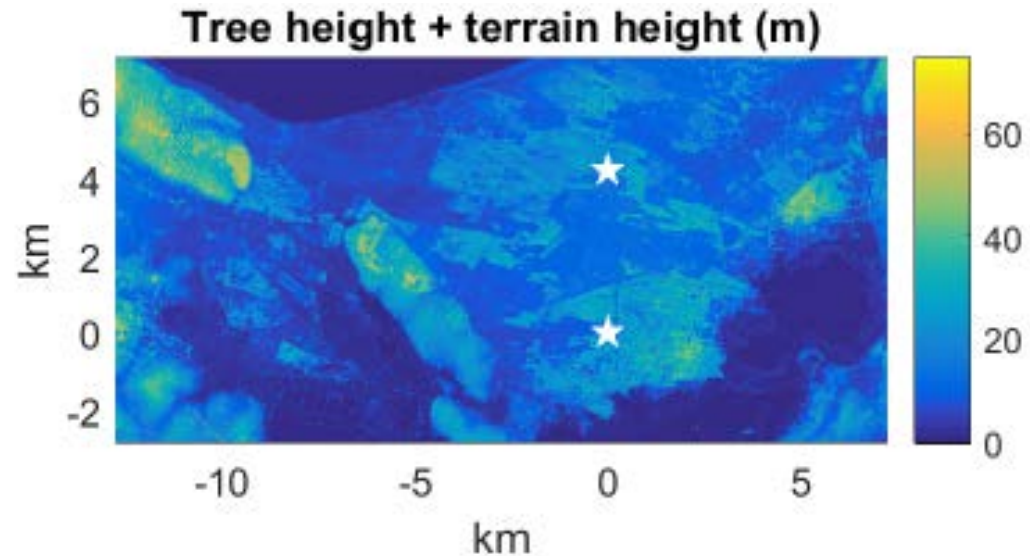


Data sources:

- 3 WindScanners on the coast
- 4 profiling lidars on the coast
- Floating lidar on buoy
- Sentinel-1 satellite winds
- TerraSAR-X satellite winds
- ASCAT| satellite winds
- Sonic + Høvsøre met-mast
- Triaxys wave buoy

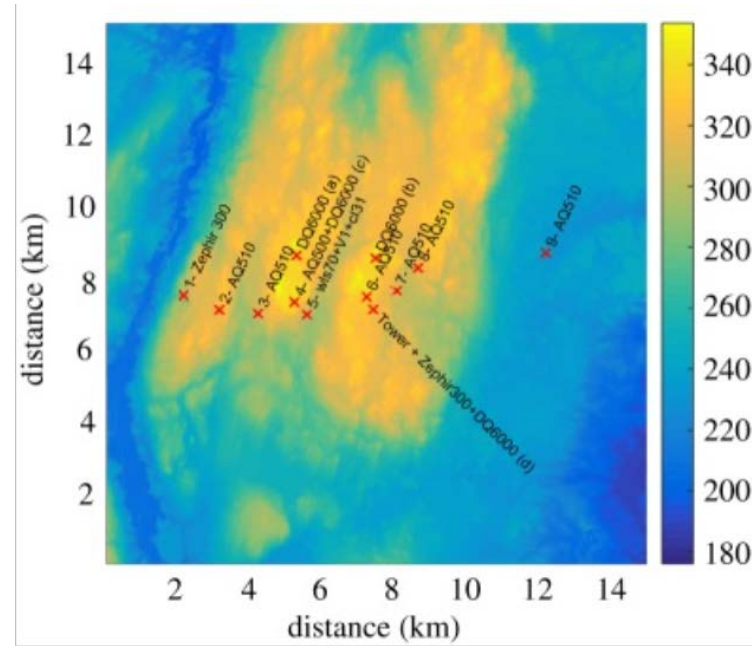
Experiment 2: Østerild Balconies (Denmark)

- 2 x WindScanners raised to 50m and later 200m AGL (2 months each)
- Scanning horizontally (PPI) with no elevation angle
- Scientific goal(s):
 - How do surface heterogeneities propagate to rotor height?
 - Inflow measurements for very-short term forecasting

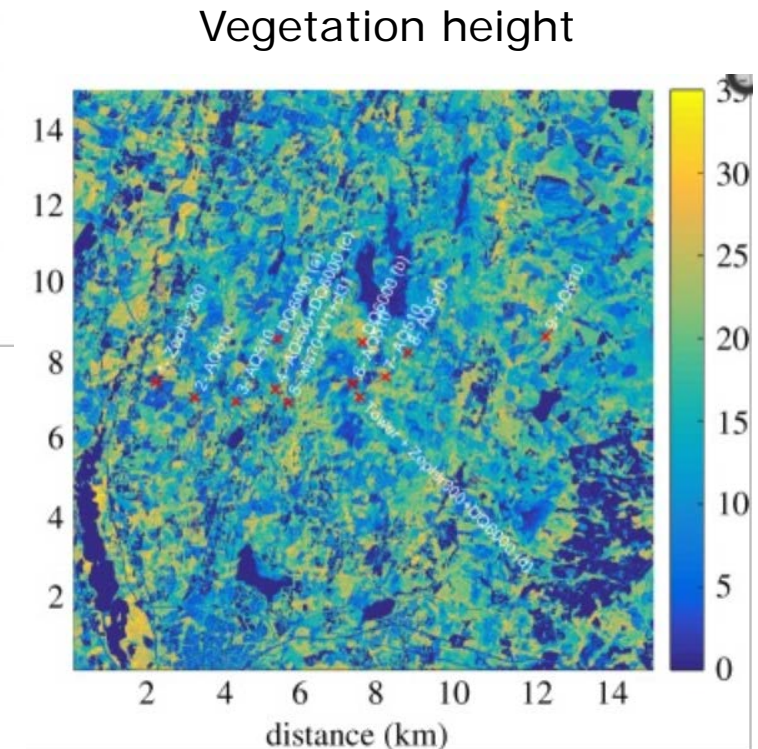


Experiment 3: Hornamossen (Sweden)

- Scientific goal:
 - Study transition between flat and forested areas
 - Better understand flow over the forest
- Instrumentation:
 - Mast data (180m)
 - 8 sonic anemometers, 10 cups,
 - 10 thermometers, 3 wind vanes
 - Ceilometer, sodar, lidar profiler



Elevation

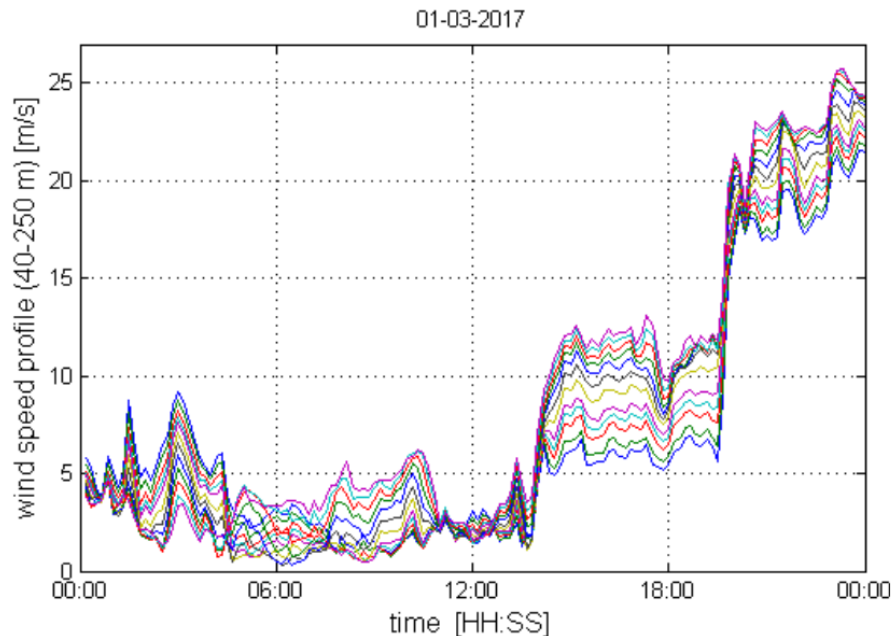


Experiment 4: Ferry Mounted Lidar in the Baltic

- Obtain wind profiles over large spatial area with sparse observations
- Heights from 40-250m
- Ship position and velocity also recorded

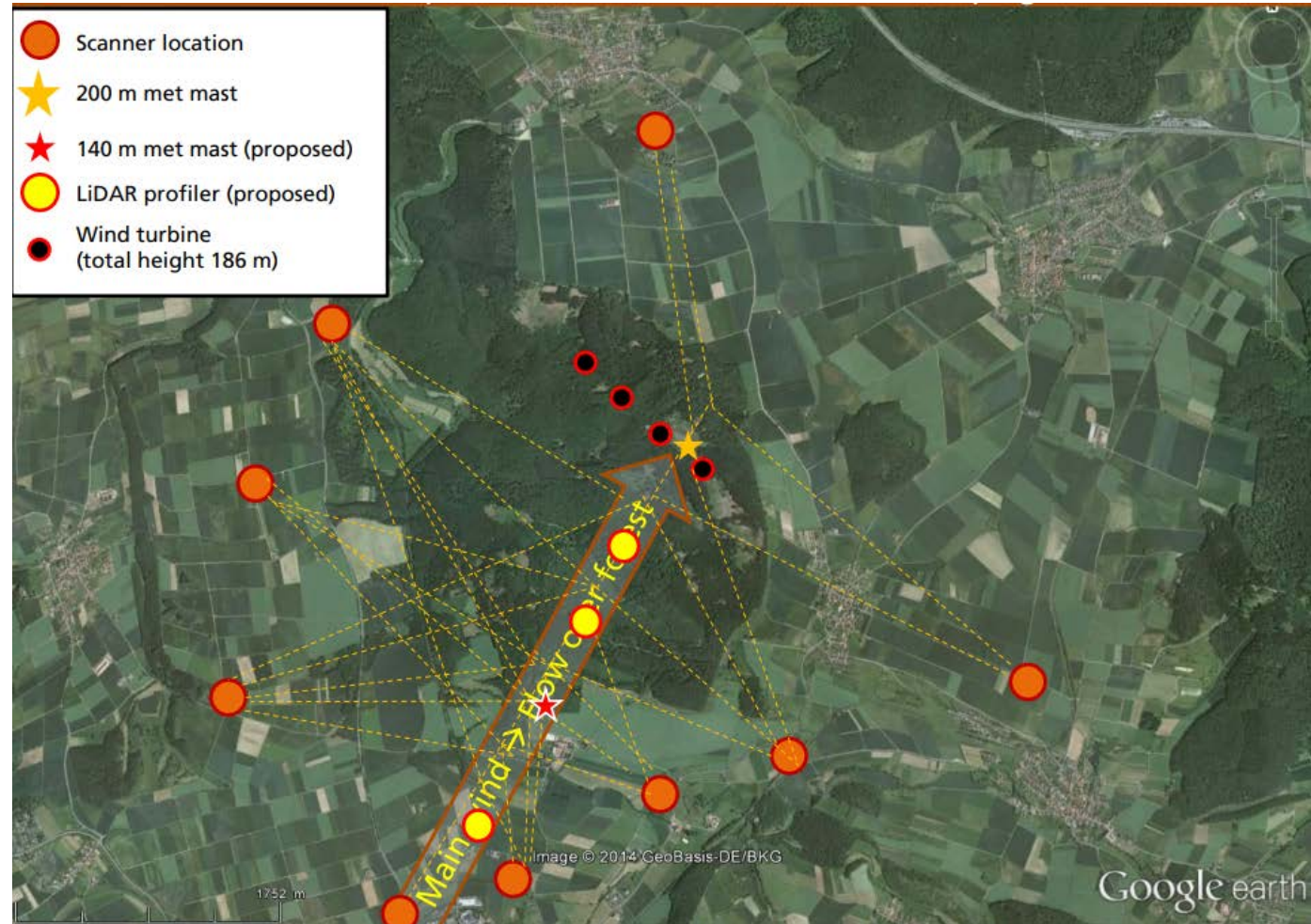


- Route Kiel – Klaipeda selected
- Approved by DFDS Seaways
- Start of campaign early 2017



Experiment 5: Kassel Forested Hill (Germany)

- Measure complex flow over forested hill and compare with models
- Instrumentation:
 - 2 masts @ 200m and 140m
 - 9 WindScanners
 - 4 lidar profilers
 - 1 ceilometer
- Period:
 - May 2016 – April 2017

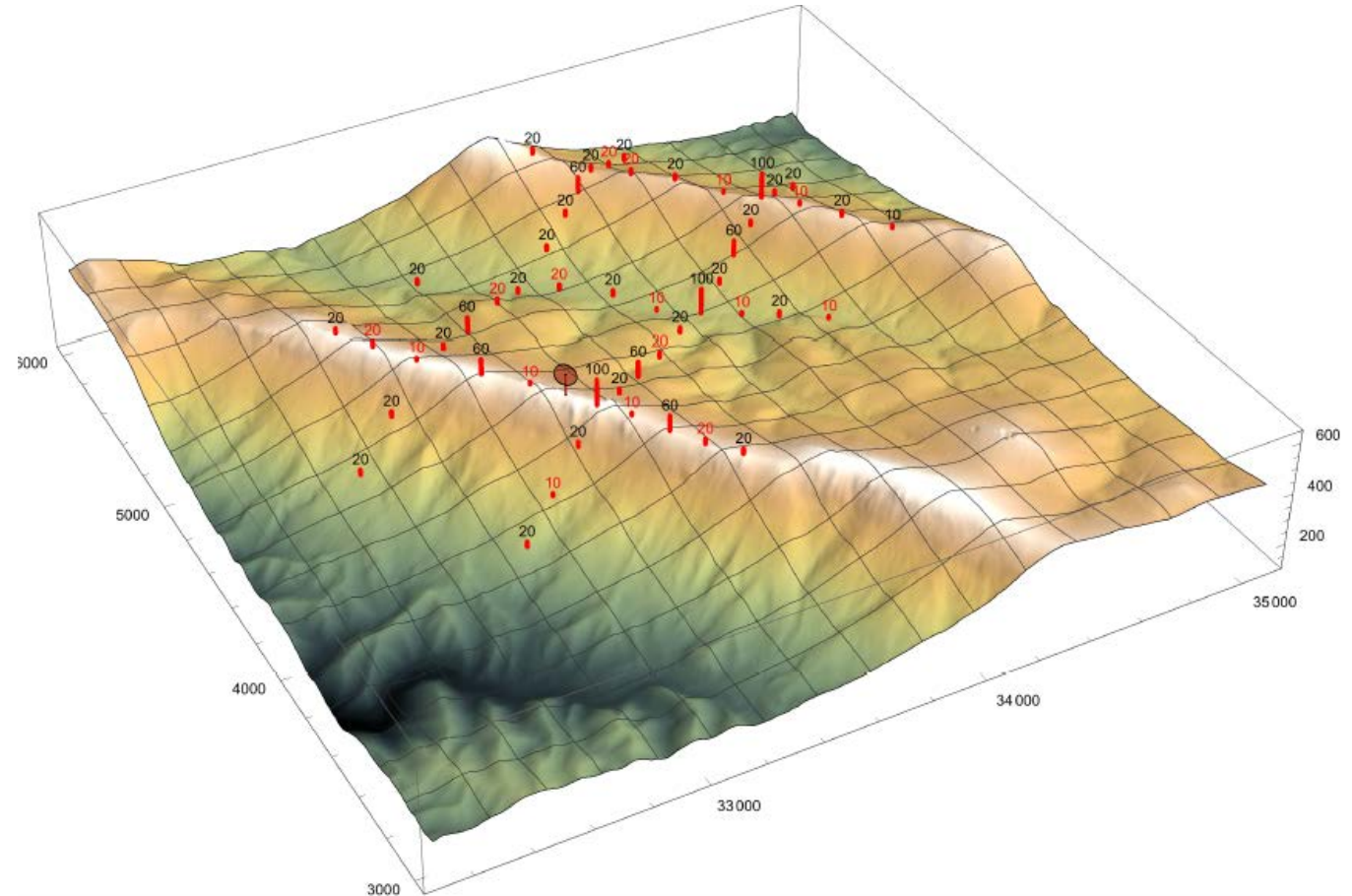


Experiment 6: Perdigão Double Ridge (Portugal)

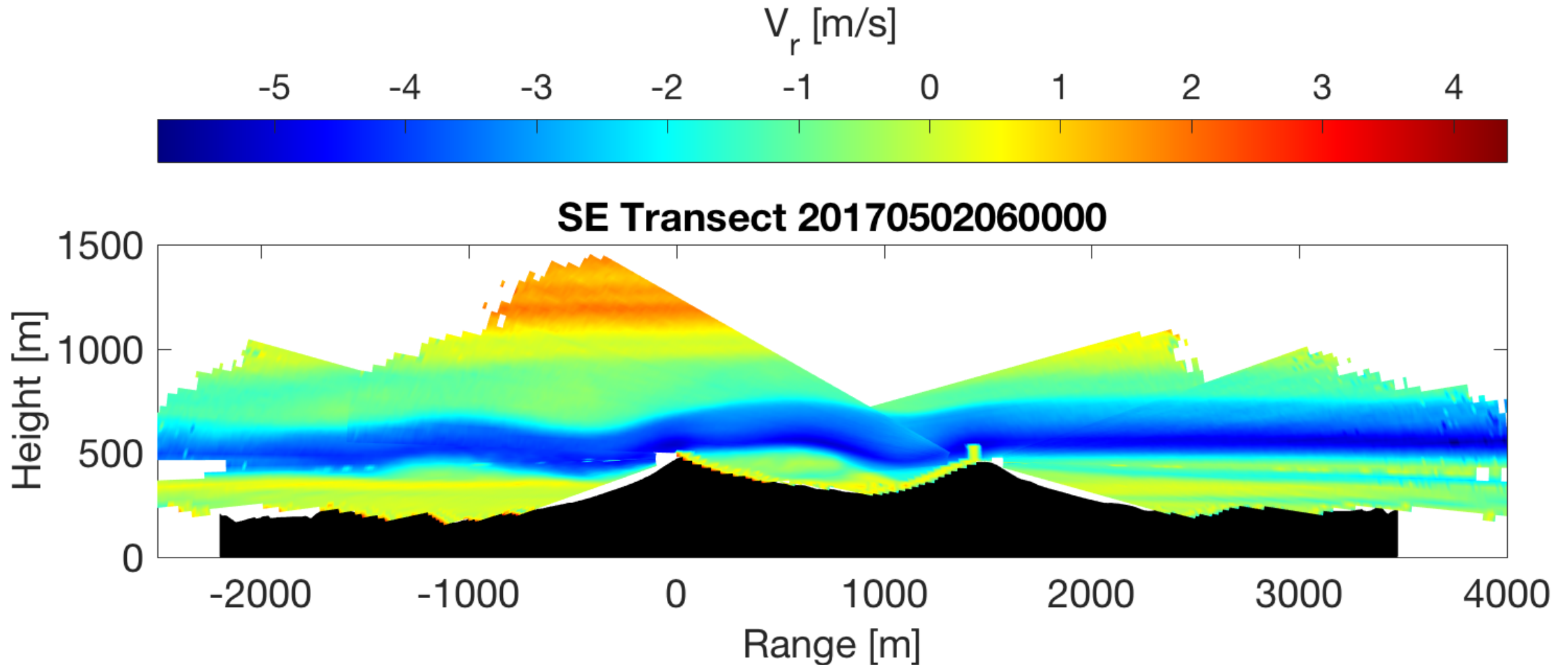


Experiment 6: Perdigão Double Ridge (Portugal)

- Complex flow with 2 ridges, valley, and a wind turbine
- Instrumentation:
 - 50 met-masts (10–100m with 180+ Sonic anemometers)
 - 20 scanning lidars
 - 7 profiling lidars
 - Radiosondes, tethered balloons
 - Etc..
- Scanning lidar measurements:
 - Scans following ridges (80m AGL)
 - Virtual masts
 - Transect scans through valley

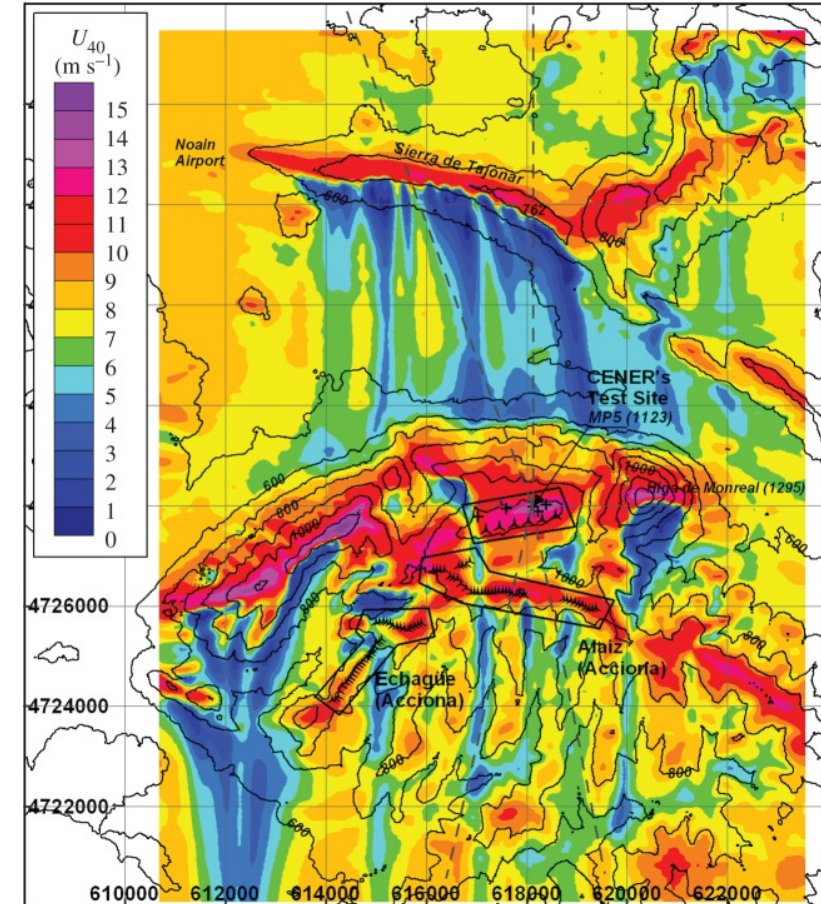


Transect Scan - 5 May 2017 @ 6:00UTC



Experiment 7: Alaiz Complex Terrain (Spain)

- Campaign started in November 2017 with 1 profiler
- 5 scanning lidars will be deployed in January 2018
- 4 existing 118m masts
- Mountainous site to be used for evaluating meso/micro coupling



40m wind CFD simulation

- Experiment data is open to NEWA partners (now), public (later)
- NEWA fileserver (ssh/scp): login.neweuropeanwindatlas.eu
 - Experiment data: /newa/WP2
 - Access is granted through Neil Davis <neda@dtu.dk>
 - Current data status:
 - RUNE
 - Fileserver: 3 x raw WindScanner files
 - SQL: Processed PPI, dual Doppler, virtual mast (WS), profiling lidars, wave & lidar buoy (by Guillaume and Elliot)
 - Østerild Balconies
 - Fileserver: 2 x corrected WindScanner files (by Elliot), animated videos of all periods (by Guillaume)
 - Perdigão
 - DTU & DLR processed & raw WindScanner data, [processed RHI plots](#)
 - [NCAR – Field catalogue](#)
 - Hornamossen, Kassel, Baltic ferry
 - Awaiting delivery/upload