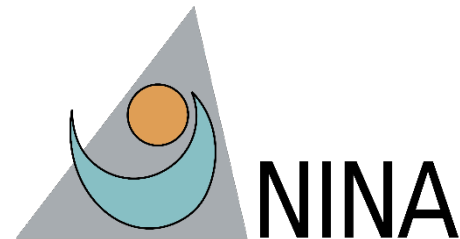


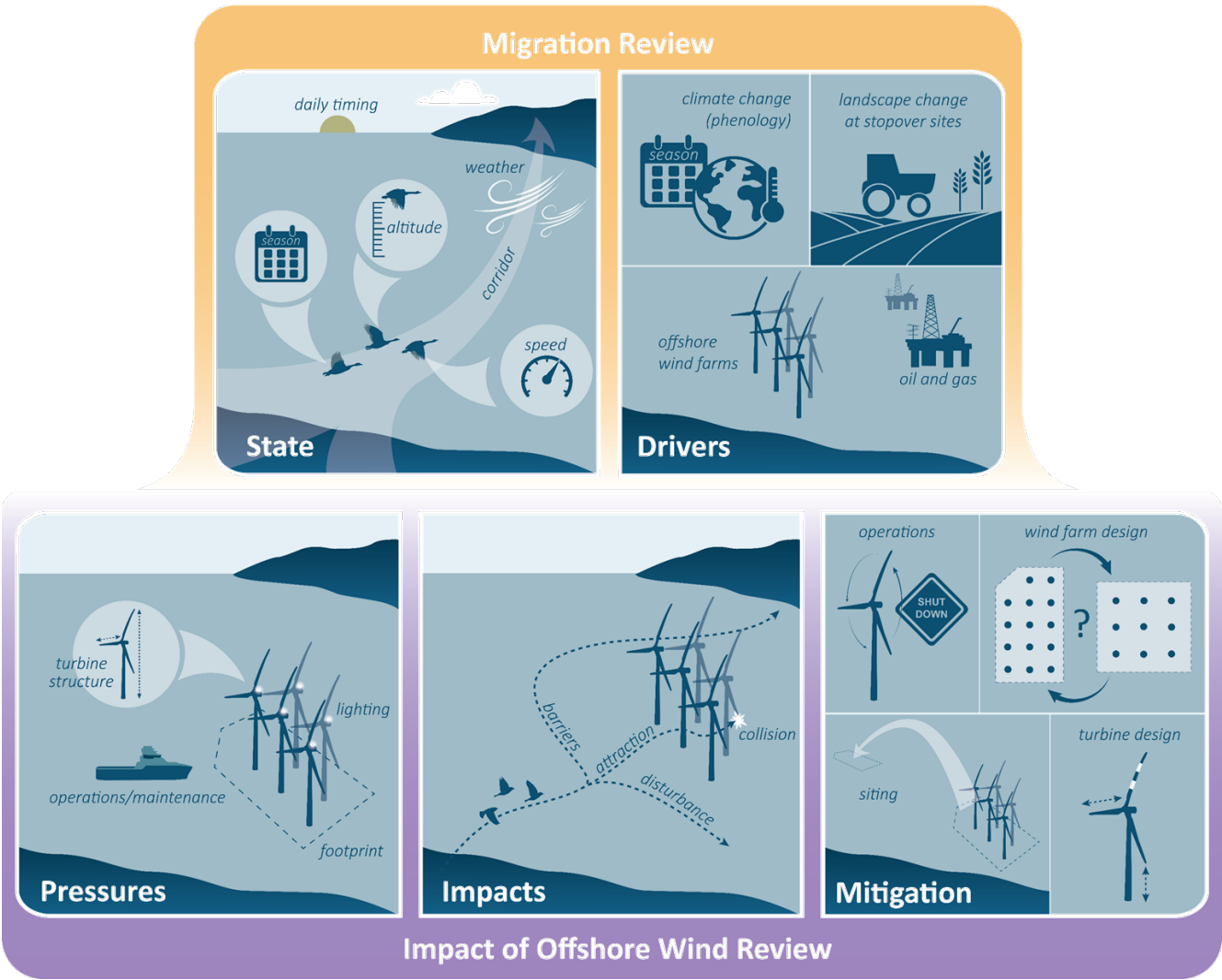
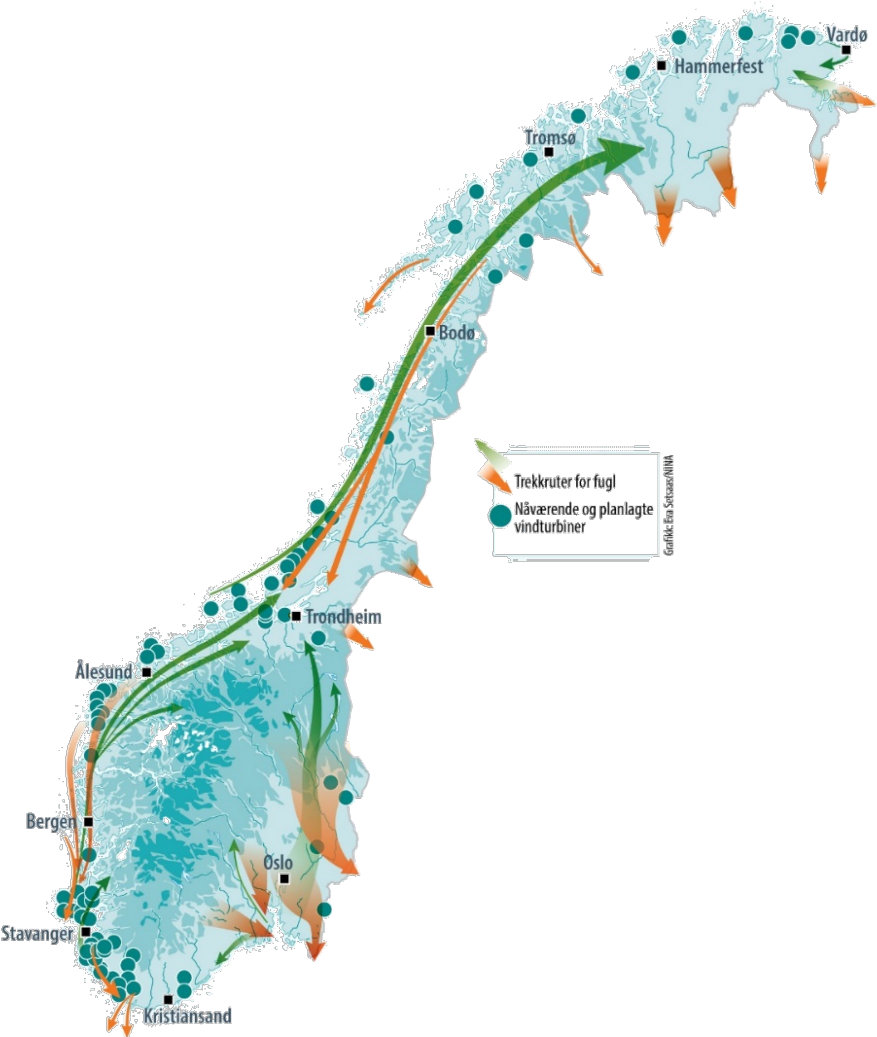
Visualizing avian migration across Norway supporting sustainable coastal and offshore wind energy development



NINA

Norwegian Institute for Nature Research

The challenge



The VisAviS project



Mapping avian migratory flyways in Norway

Visualizing migration patterns using radar technology

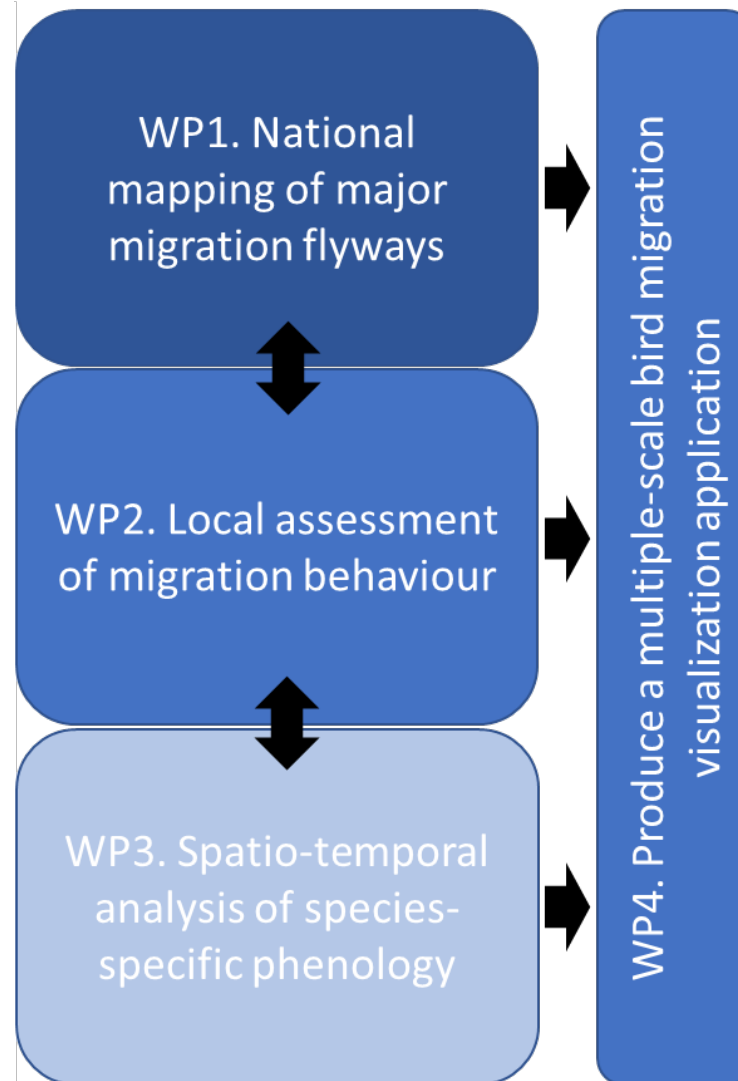


UNIVERSITY
OF AMSTERDAM



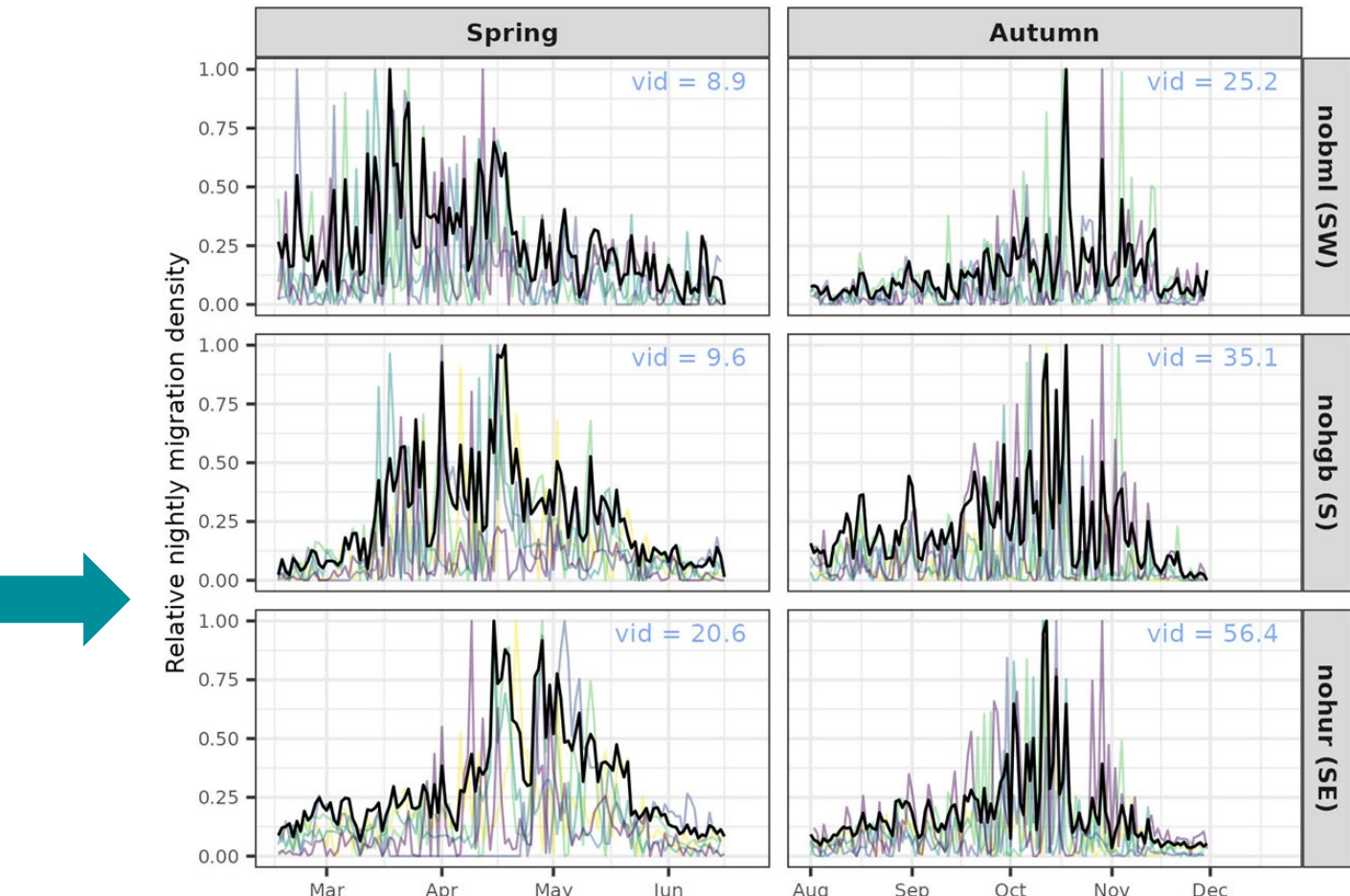
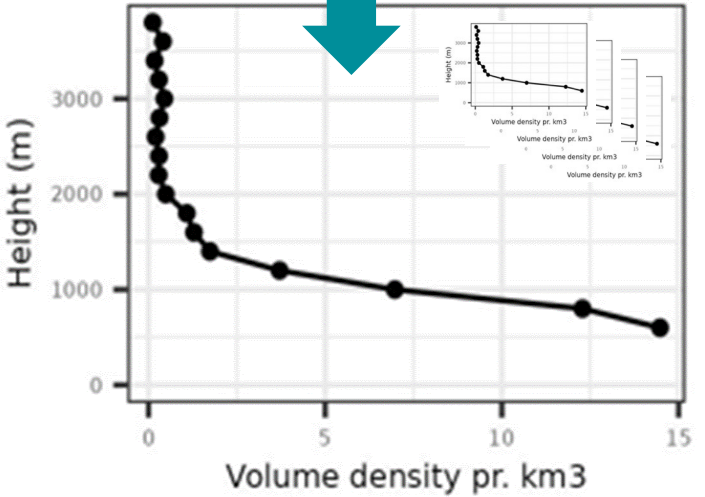
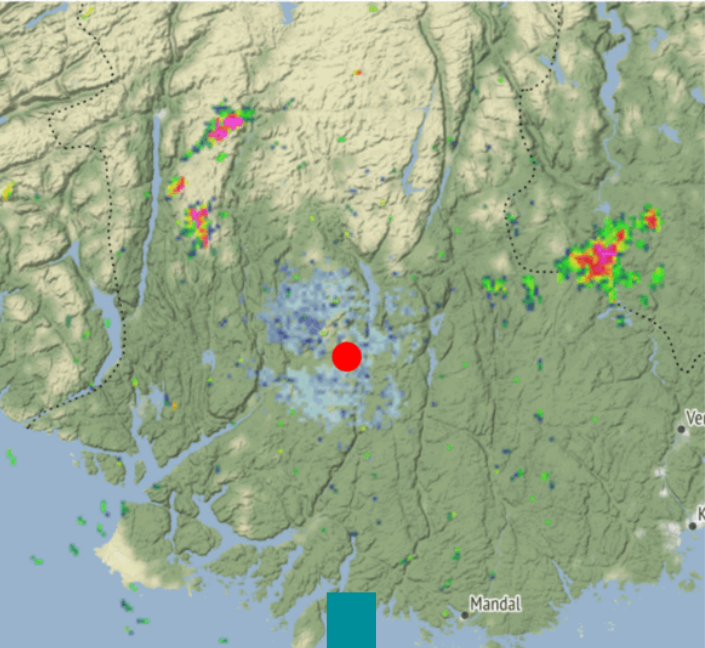
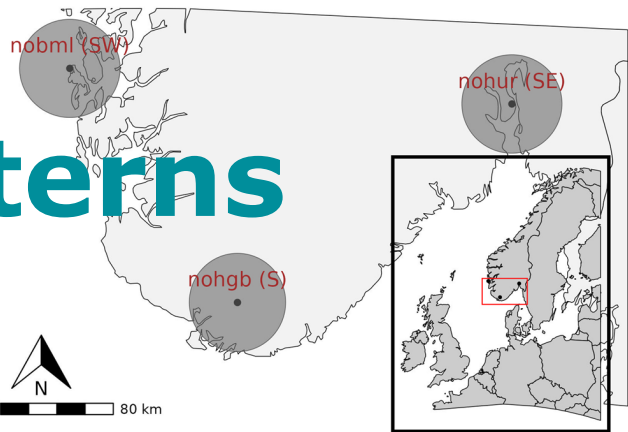
Meteorologisk
institutt

The Research
Council of Norway

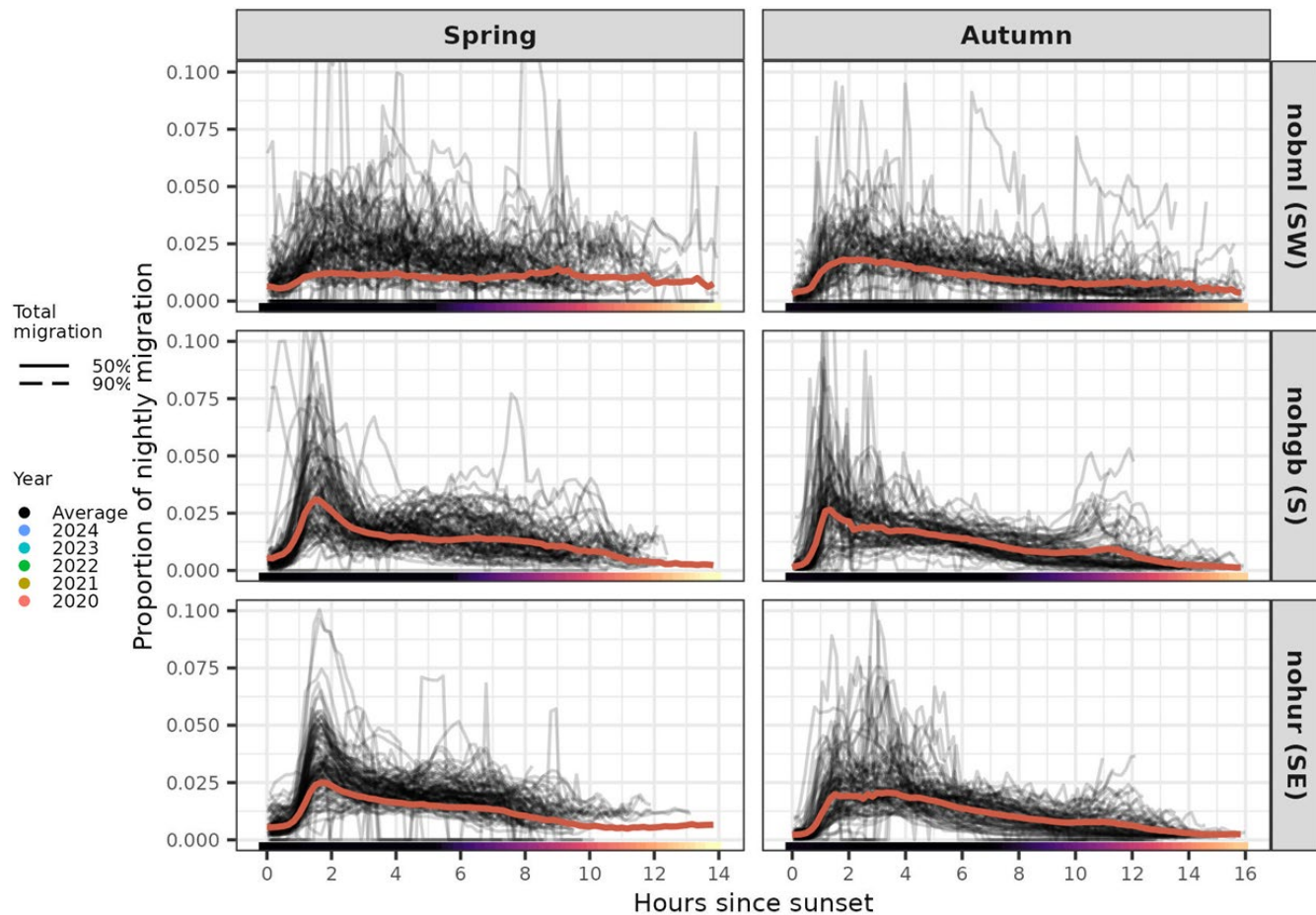
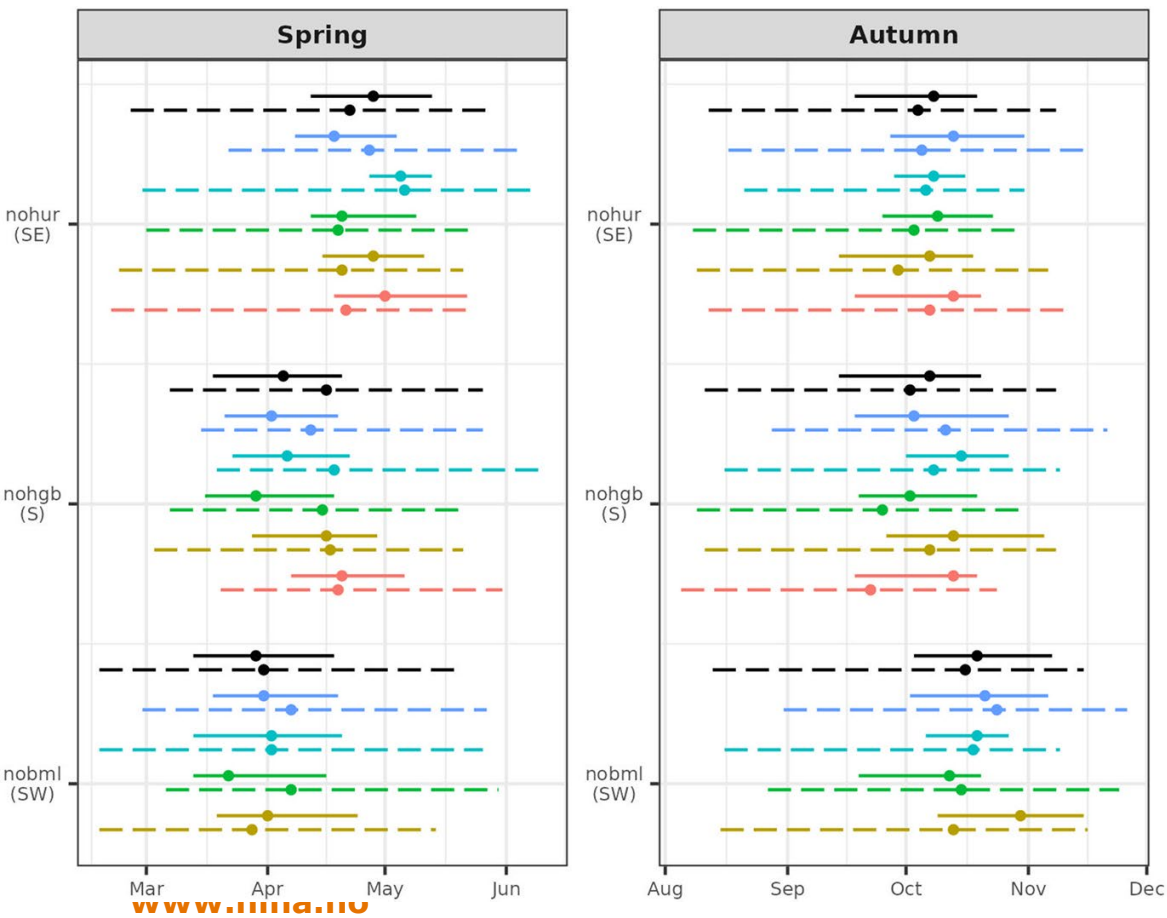
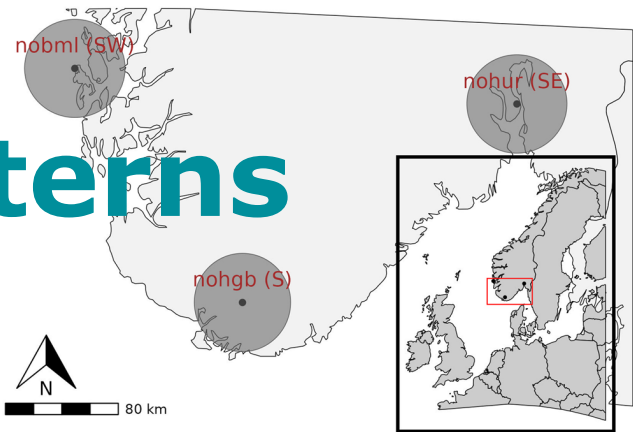


1

Weather radar migration patterns

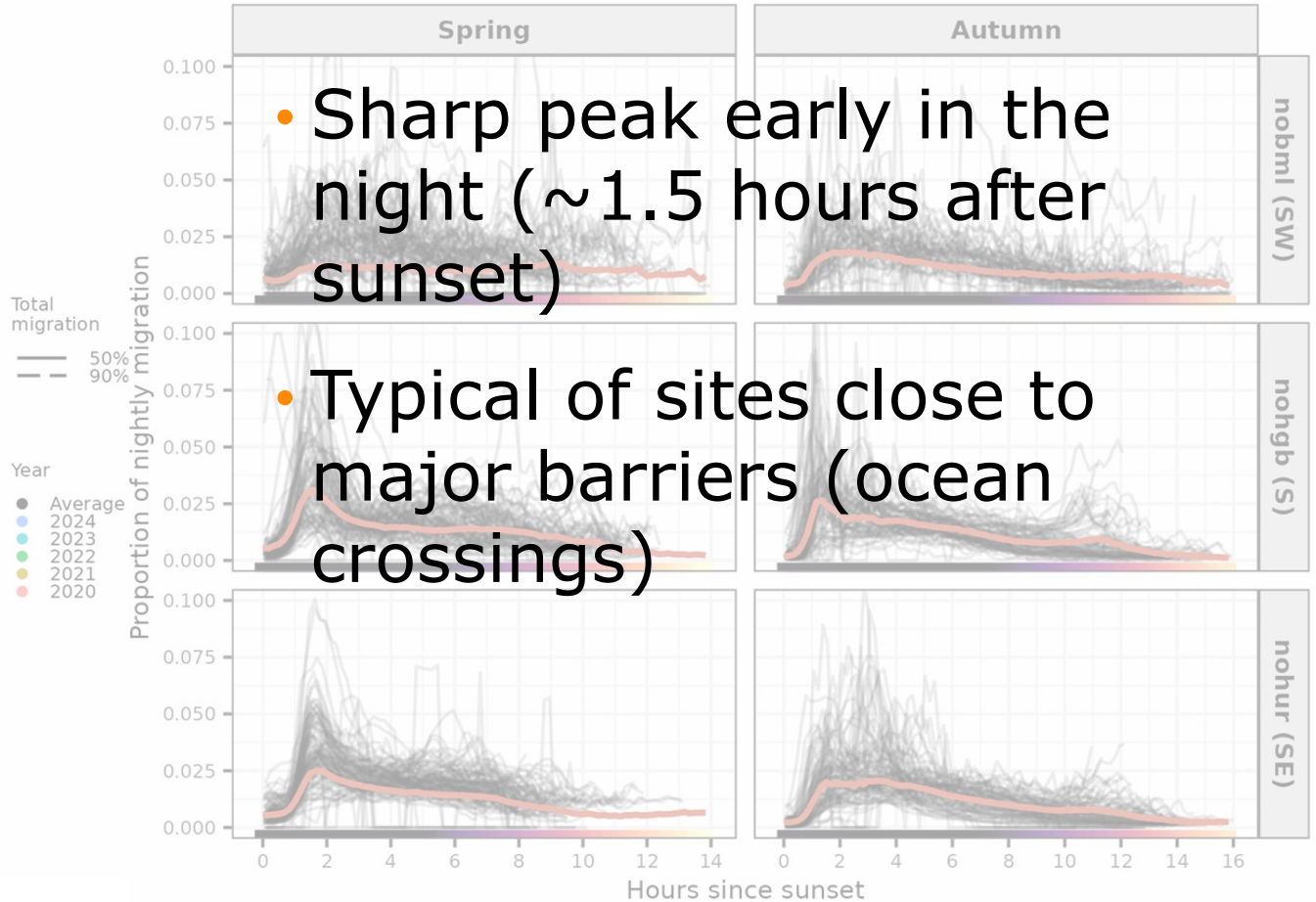
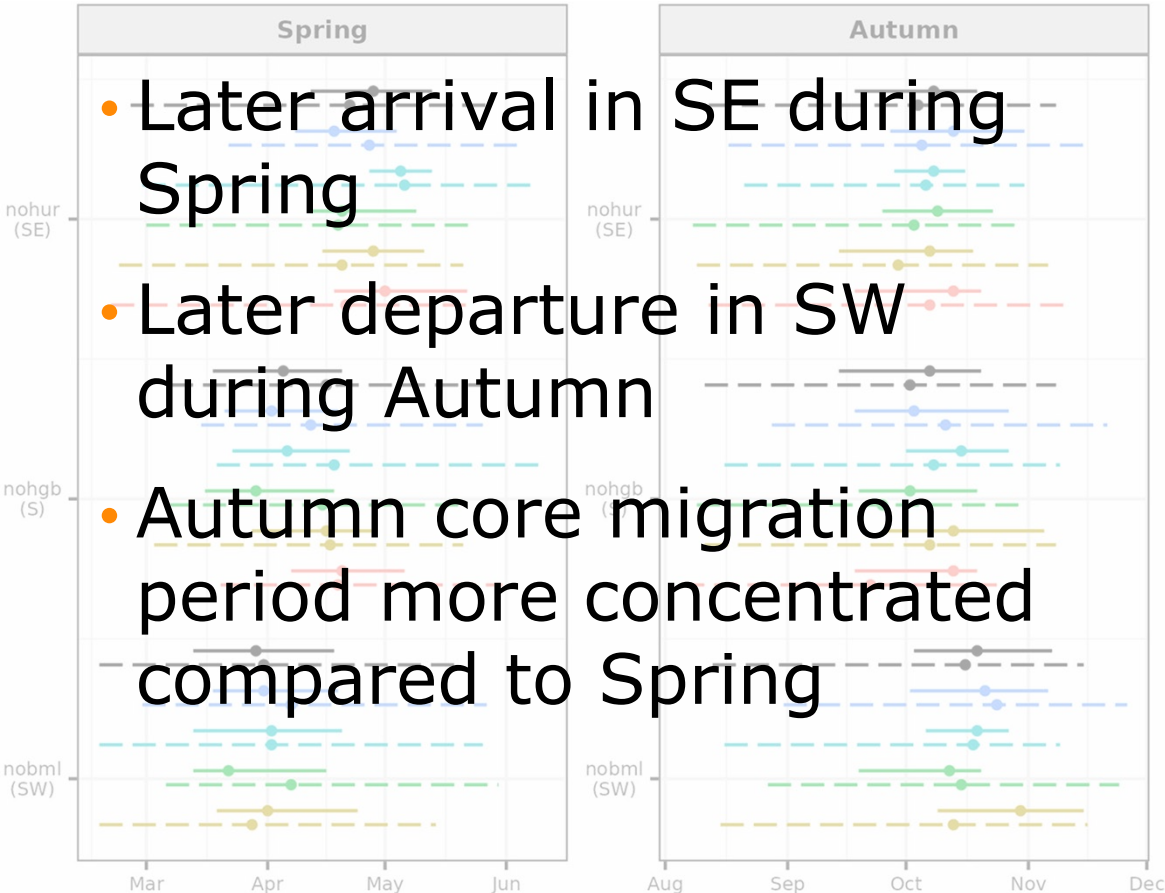
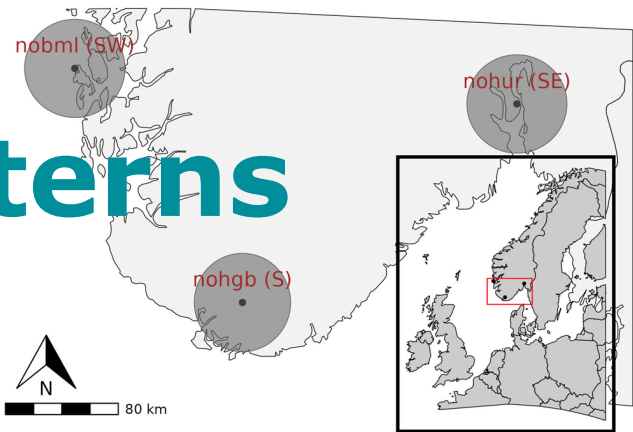


Weather radar migration patterns



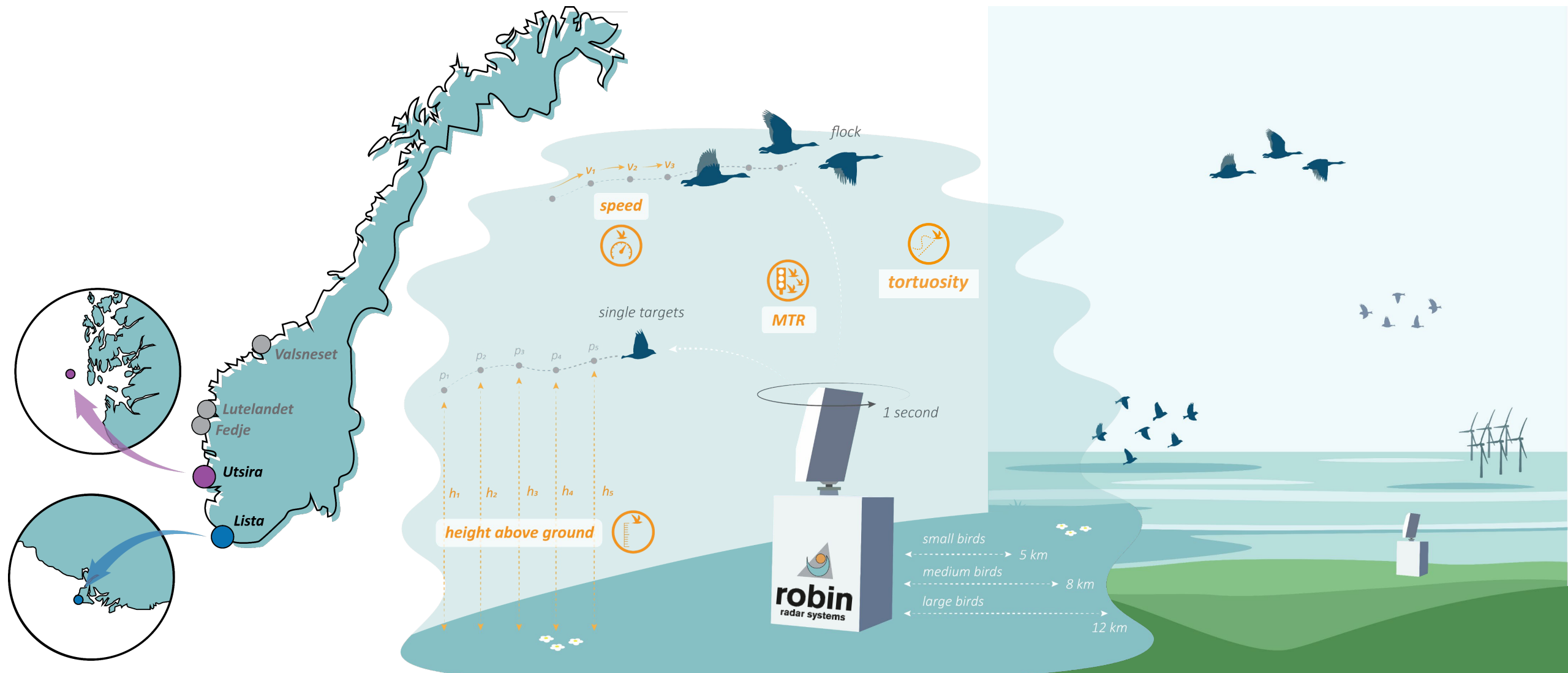
1

Weather radar migration patterns

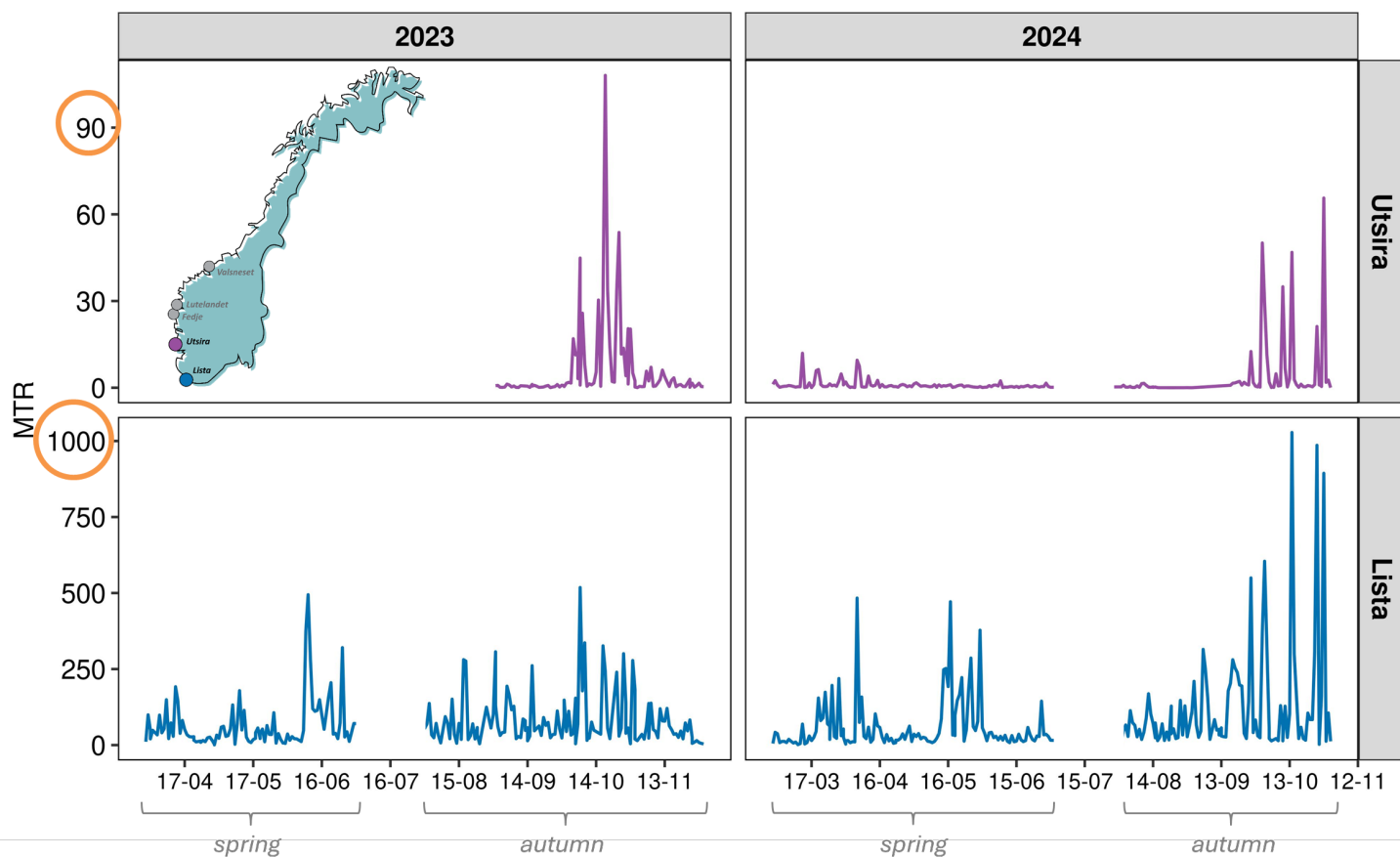
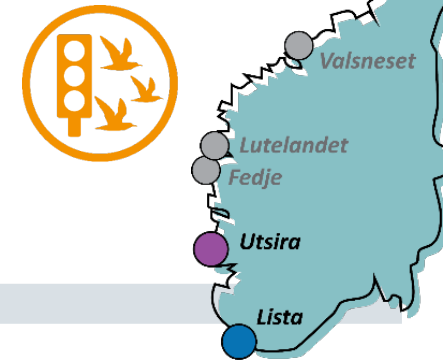


2

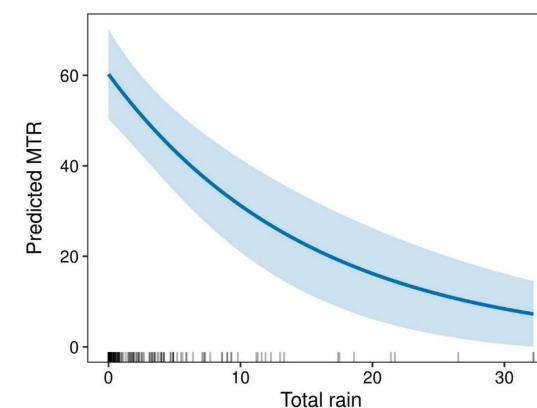
Bird radar migration behaviour



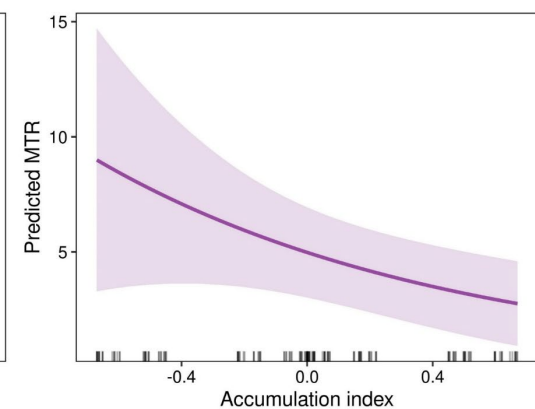
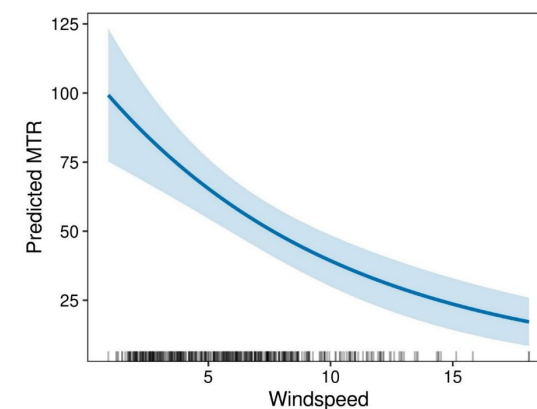
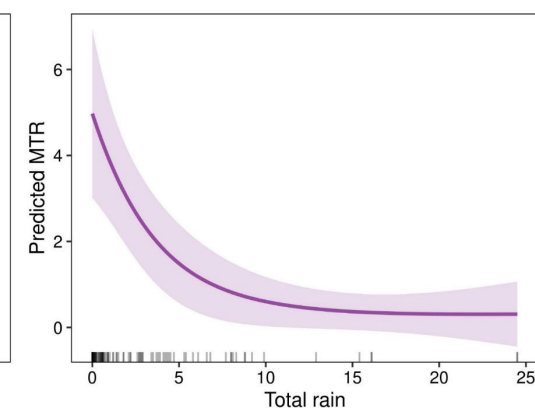
Bird radar migration behaviour



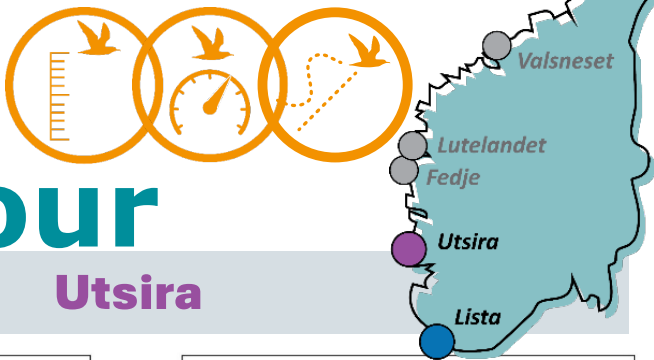
Lista



Utsira

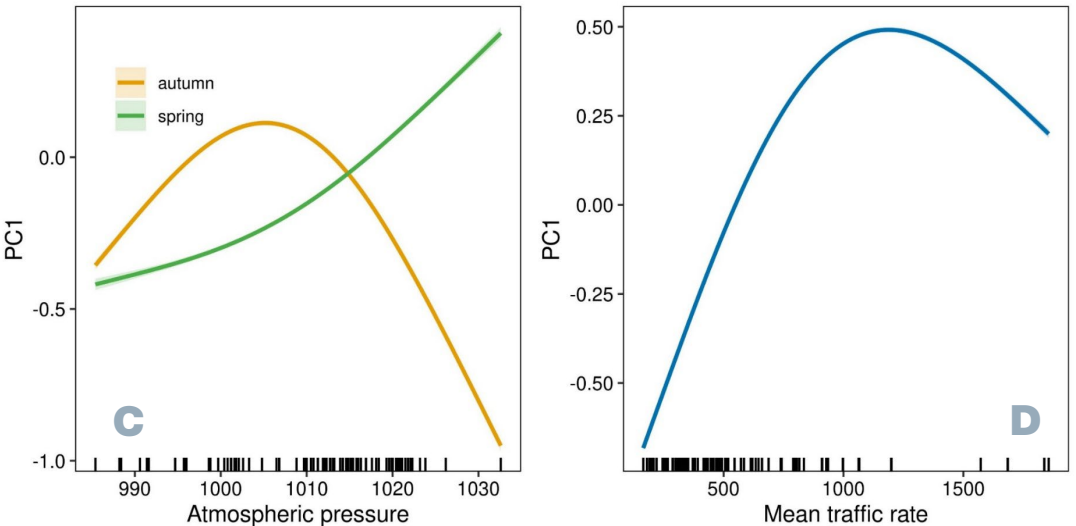
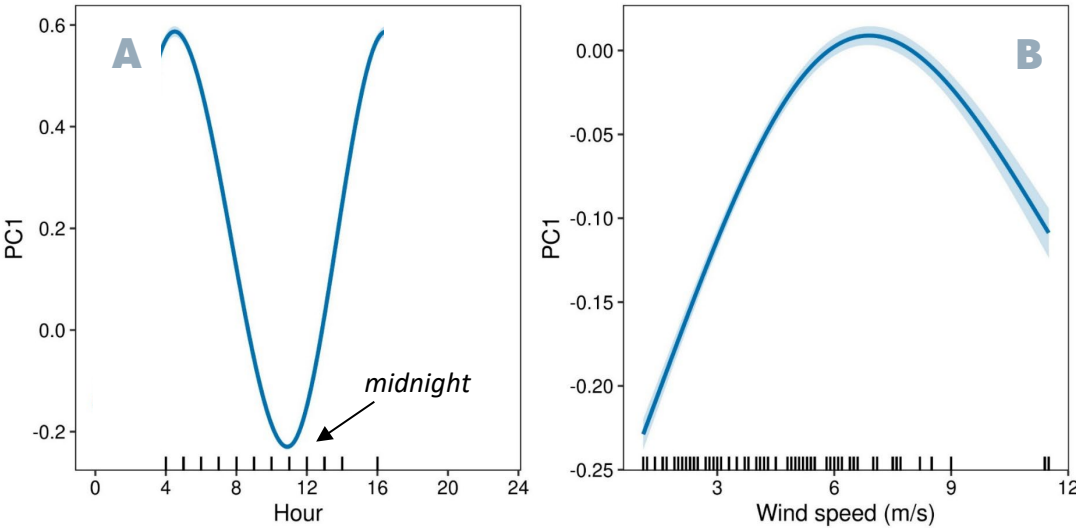


Bird radar migration behaviour



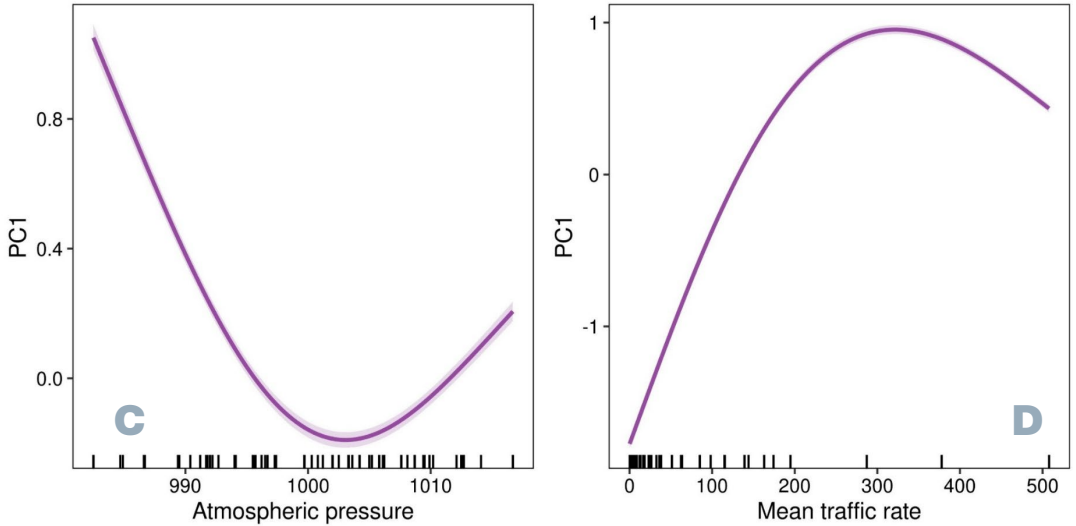
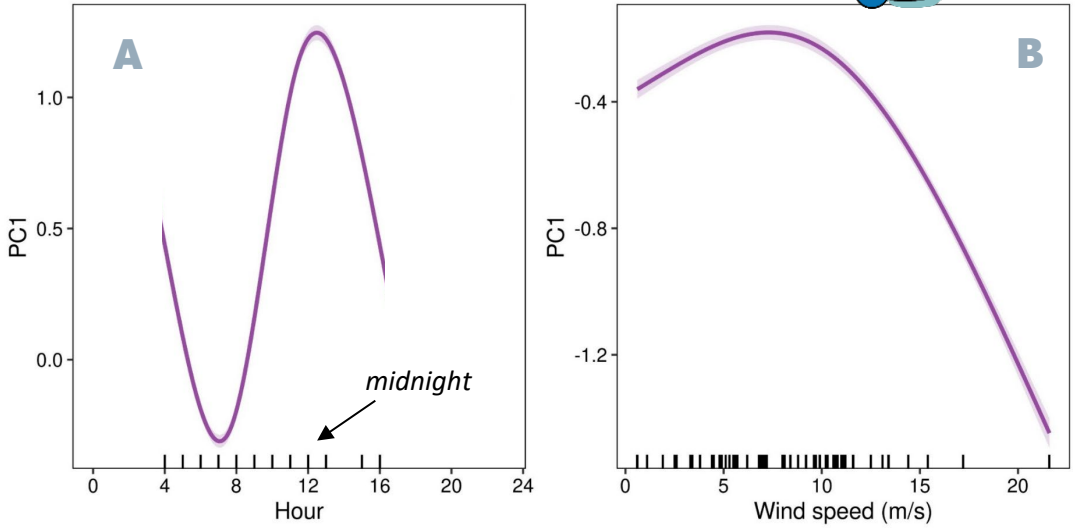
Lista

Utsira

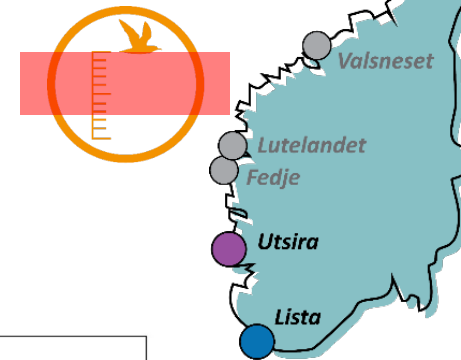


High,
fast &
straight

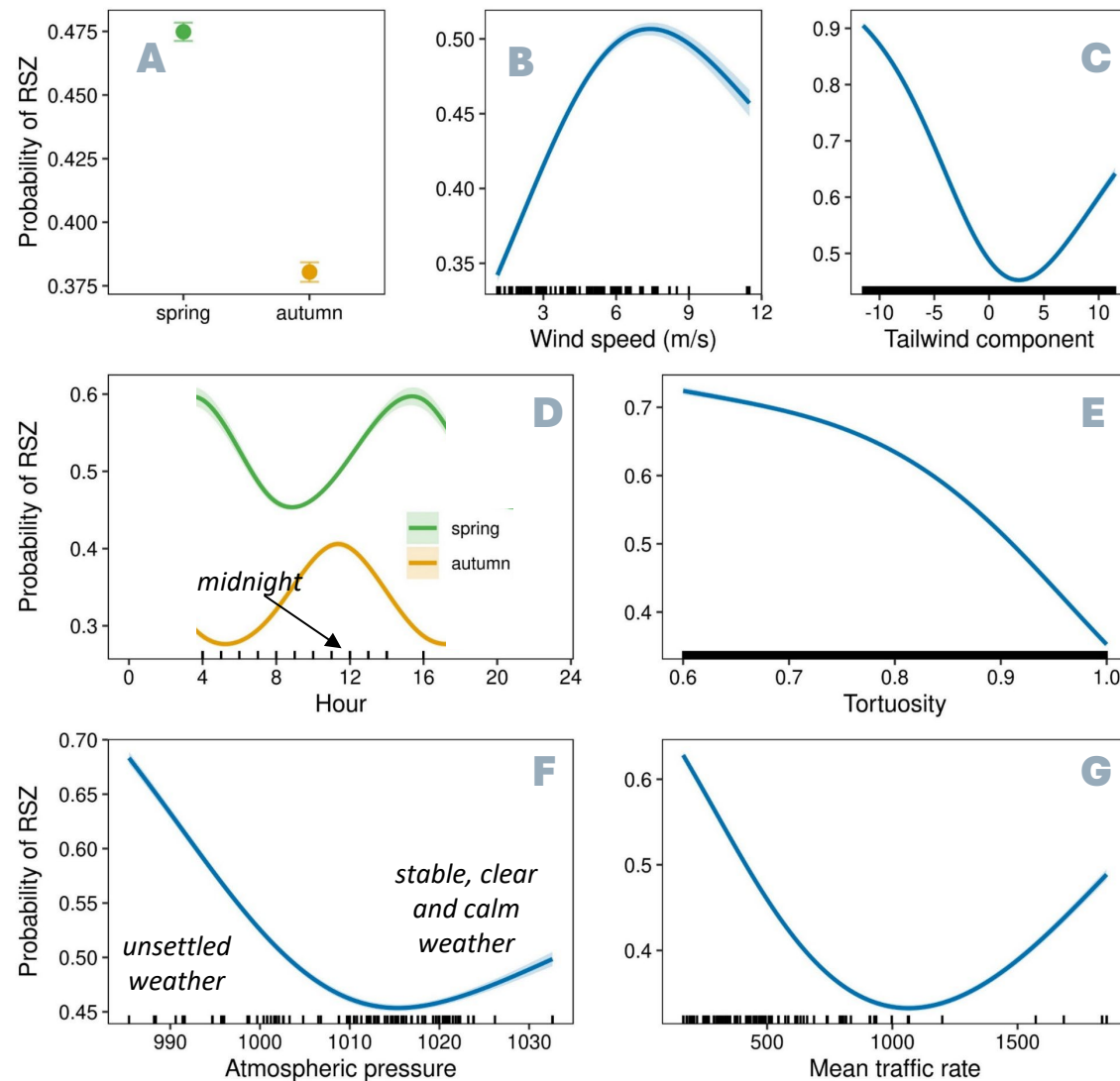
Low,
slow &
tortuous



Bird radar migration behaviour



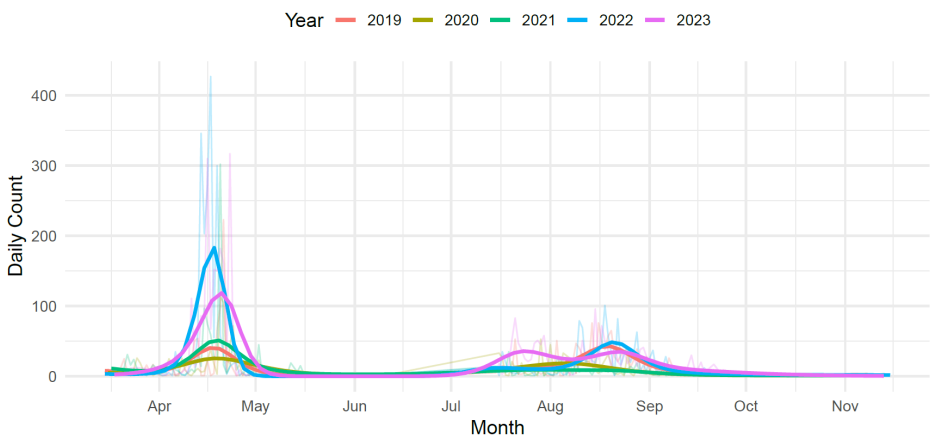
% within the rotor swept zone (0-200m)



Citizen science migrating species

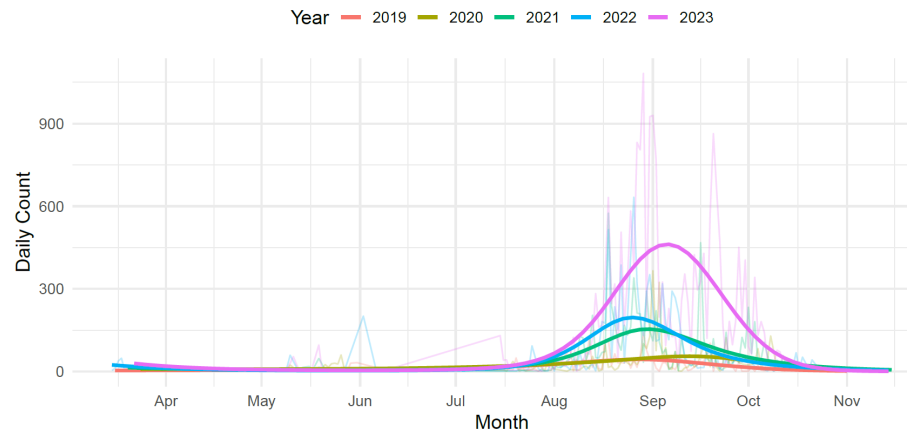
Curlew – Seasonal Pattern of Daily Counts (2019–2023)

Raw counts (light) with smoother



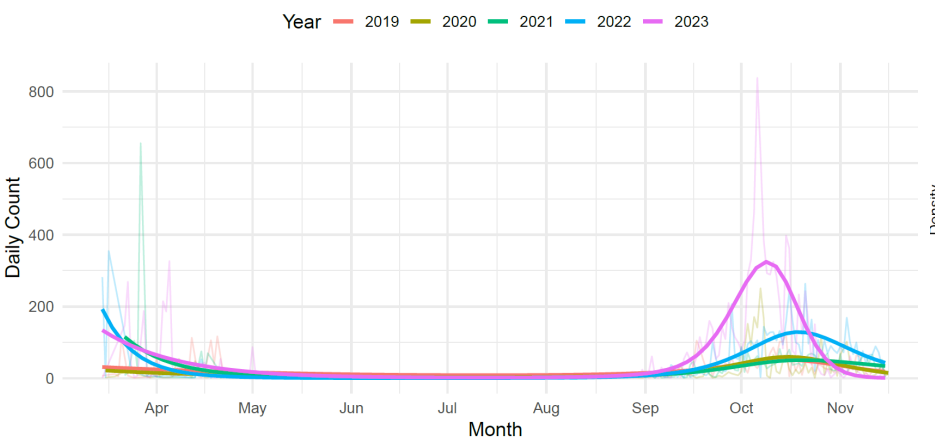
Dunlin – Seasonal Pattern of Daily Counts (2019–2023)

Raw counts (light) with smoother

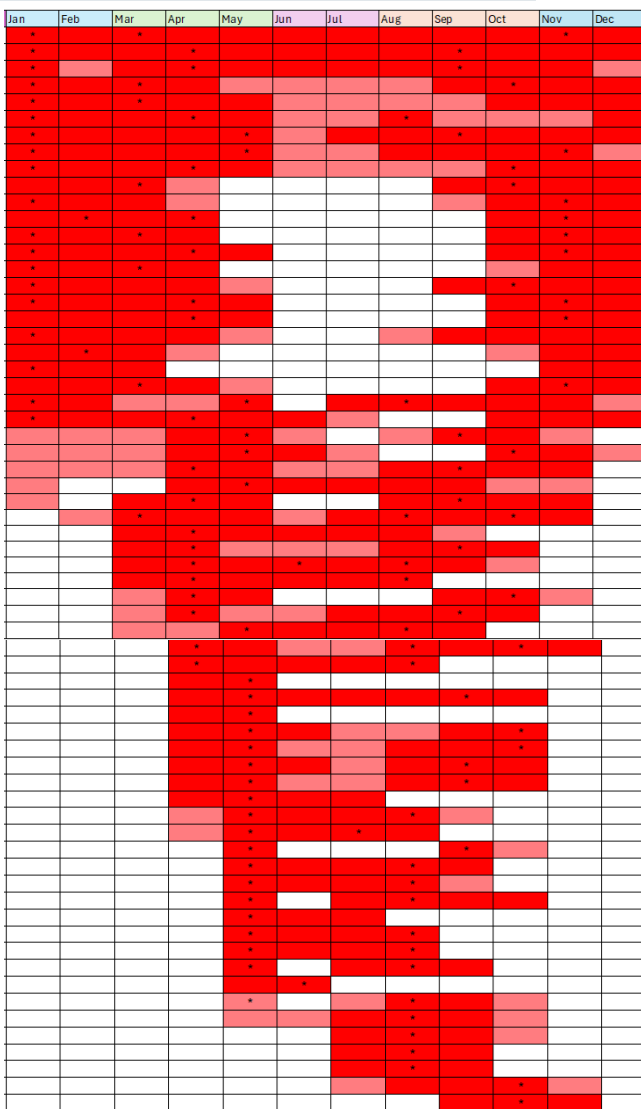
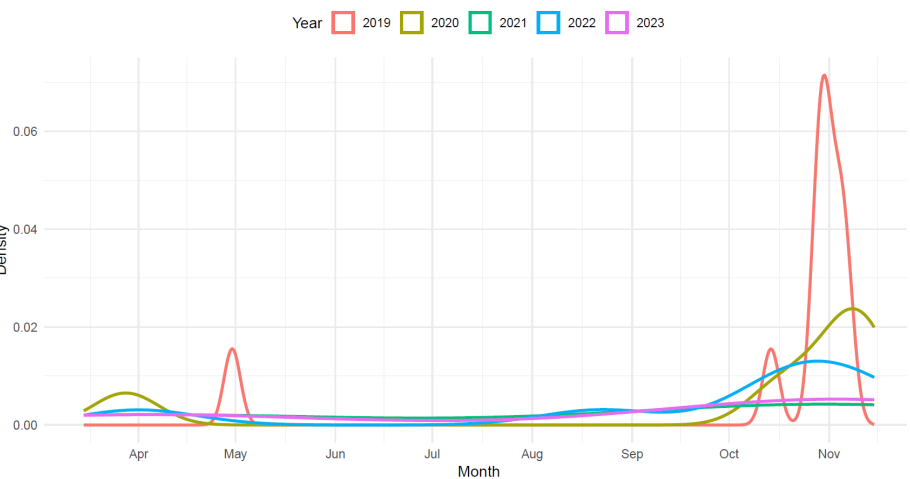


Wigeon – Seasonal Pattern of Daily Counts (2019–2023)

Raw counts (light) with smoother

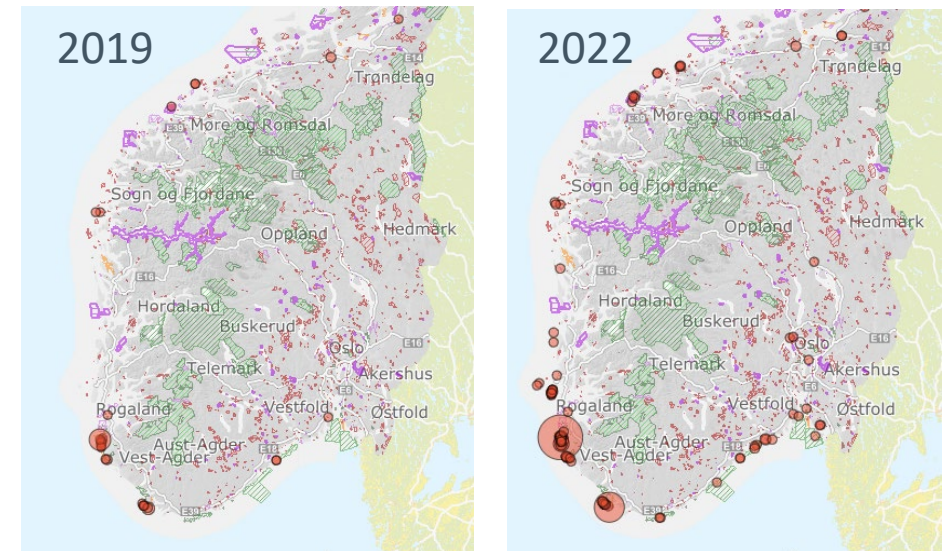
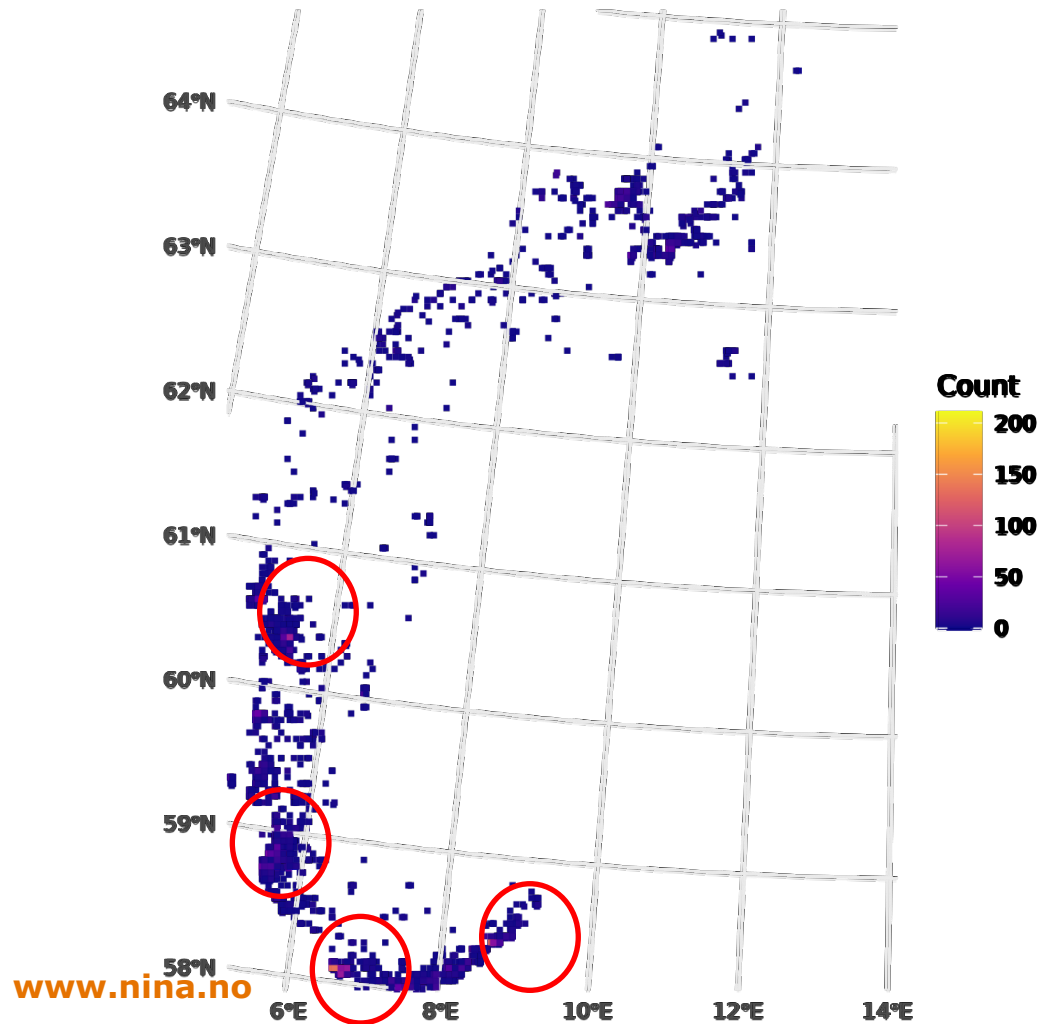


Sangsvane – Daily Count Distribution



Citizen science migrating species

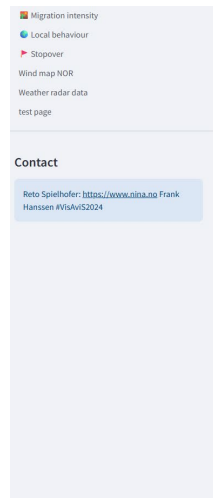
Observations: 2024-01-08



*Occurrence of migrating sanderlings
in Southern Norway in 2019 and
2022 (March-June). From Artskart*

birdRisk – visualizing migration risk

Open-source web application to consolidate the VisAviS outcomes



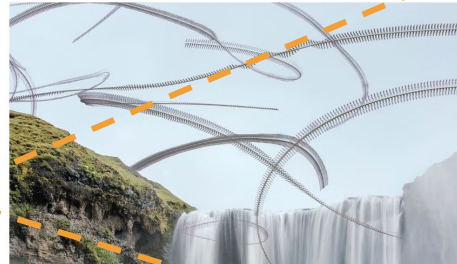
birdRISK

The tool should be designed to support the planning and concession process for onshore and offshore wind farms.

Click on the left sidebar menu to navigate to the different sub topics.

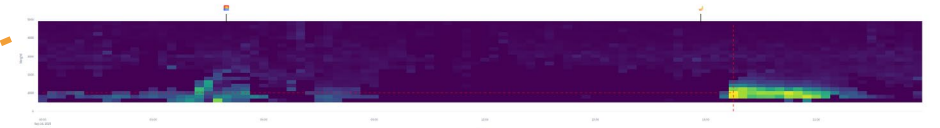
Different dimensions

In the VisAviS project, different aspects of bird migration, such as migration intensity (exposure), flight behavior (vulnerability) and probability of landing birds (risk) will be computed and visualized. Finally a bird migration risk map is produced informing infrastructure planning and other activities.



Height distribution of the 2025-09-16

Highest bird density values are for all birds flying at 1000 to 1500 m above ground



Percentage of birds within potential rotor swept area during the whole day



Descriptive statistics



Risk = Exposure • Hazard • Vulnerability

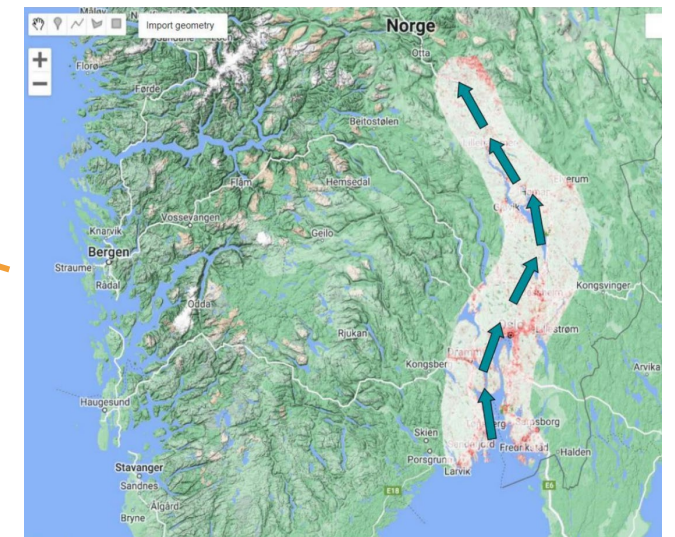
**weather
radar**

**bird
radar**

**citizen
science**

*Spatial
risk maps*

www.nina.no



Thank you

for your attention!

