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Remote sensing of avifauna using the French meteorological radar network

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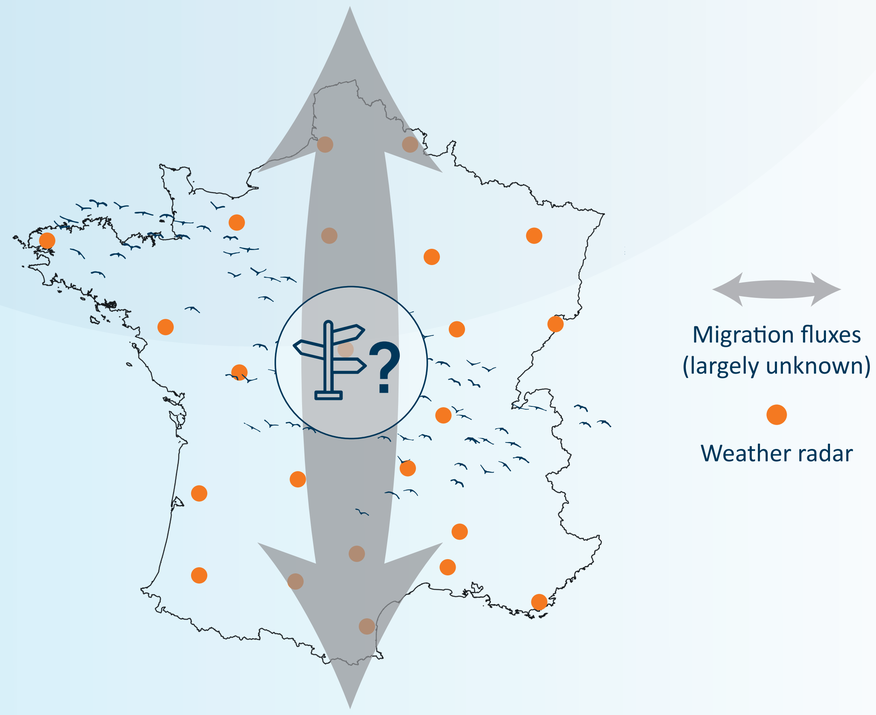
Context

- France is located at the **crossroad for billions of migratory birds in western Europe**. However, little is known about the routes taken by the species, even more so over-seas than on land.
- Following the current objectives in increasing low-carbon energy technologies, the **wind farm energy sector is in full expansion** in mainland France.
- An accurate tool for detecting birds over the entire territory is a strategic issue for project planning and issuing alerts of impending migratory bird passage

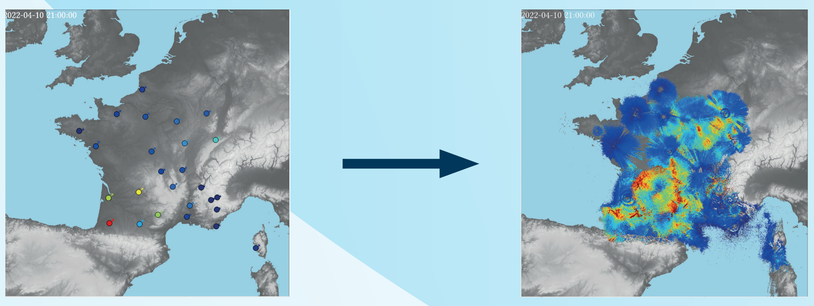


R&D objectives

- Develop a **near real-time observatory of migratory birds** at high resolution from the **French weather radar network**.
- Propose a tool to **forecast migratory passages**.

1 Bird quantification

Adapting and improving the existing methods for bird migration detection



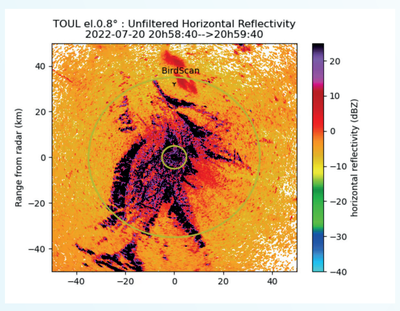
Increasing the resolution from one profile per radar to a 15km grid

Challenges:
- Radar echoes classification : cleaning-up of non-bio echoes
- Refine the geographical resolution

Improving the quantification of bird echoes within a radar resolution volume

Ornithological radar

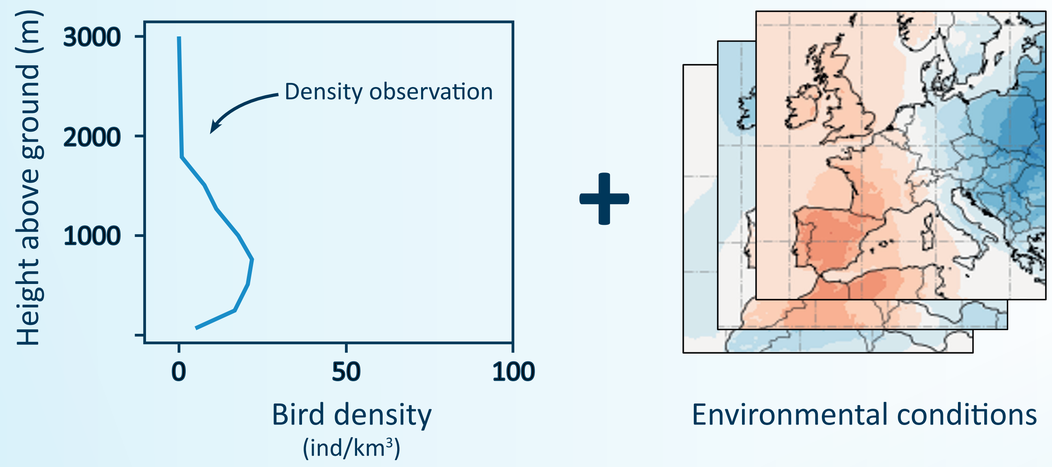
Weather radar



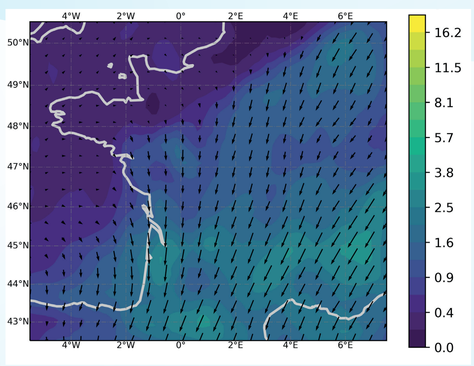
PPI from Toulouse weather radar and placement of BirdScan ornithological radar

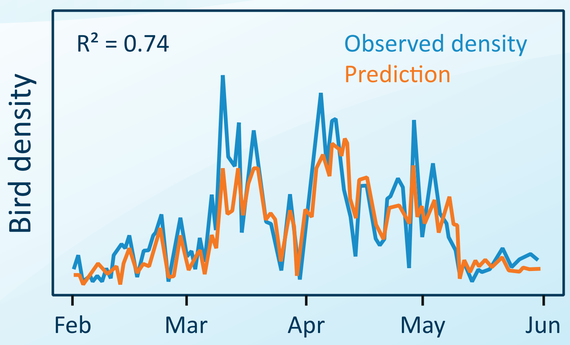
Challenges:
- Modelling of the polarimetric variables based on ground truth
- Large-scale calibration of the quantification

2 Predictive modelisation of bird flows



Deep learning





Expected results & products

This innovative work will help to fill the current knowledge gaps on **the migration behaviour of birds** in mainland France. Using high resolution data-set from the meteorological radar network method will enable to better quantify and classify birds flows. The aim of this project is to **provide an operational algorithm for detecting avifauna** and to assess our ability to offer a product for **displaying migration in real time and with forecasts several hours or days in advance**. The tool could also **serve as an early warning system of massive bird traffic for the wind energy sector, helping to prevent impacts on birds**.

SEMAFOR Consortium

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