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The European Network for the Radar surveillance of Animal Movement (ENRAM)

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The aerial migration of animals has an enormous impact on ecosystem services, population dynamics, community interactions, flight safety, quality of meteorological products derived from weather radar, and the spread of pest insects and vector-borne diseases. At the same time, it is very challenging to monitor these movements of animals through the aerospace. A promising recent development has been the use of radars for monitoring the migration of birds, bats, and insects. However, a coordinated approach that would enable us to combine data from large numbers of radars was lacking. Filling this gap was the main aim of COST action ES1305: European Network for the Radar surveillance of Animal Movement (ENRAM).

Within the framework of this COST action, an existing algorithm for deriving bird migration altitude profiles from weather radars was adapted to be used on weather radars from the European operational radar network OPERA, consisting of ∼200 radars. Bird profiles are currently operationally generated for about 70 weather radars from this network, and this number is increasing.

Measurement campaigns have been set up to compare outputs of several types of dedicated bird- and insect radars at several key migration sites across Europe. For these campaigns, comparisons with the output of the bird profile algorithm have also been made. This has allowed us to quantify the quality of such dedicated radars in different circumstances, and to understand the reasons for variations in them. These measurement campaigns have also been extremely important for validating the weather radar bird profiling algorithm.

The larger the number of weather radars for which bird profiles are generated, the more challenging it becomes to analyze these data. We have therefore invested in visualizing bird migration derived from a network of weather radars. These visualizations provide insight into migration patterns that would otherwise not be clear from the data, and are hence extremely important for analyses of such data.

The availability of continental-scale data on bird and insect migration can help answering questions that could not be addressed without these data.

The synthesis of this COST action is the mapping of an autumn bird migration event across Western Europe as observed by ∼70 weather radars.