

PhD position (October 2025 – September 2028)

Impact of climate change on low-level jets in the English Channel and North Sea region: contribution of artificial intelligence

Keywords	Atmospheric dynamics; Low-level jet; weather reanalyzes; supervised machine learning
Project summary	Low-level jets (LLJs) are low-altitude layers of air where the wind is enhanced. This pretty common phenomenon (~15 % of the time in Dunkerque) can impact aviation, wind energy production, pollutant dispersion and maritime traffic. Different types of LLJs exist in Dunkerque, notably the land/sea breezes, the channeling of air masses in the Dover Strait, or LLJs generated by the passage of a meteorological front. As a beginning, the PhD student will seek to determine if the different types of LLJs are properly rendered in the weather reanalyzes of the European Center for Medium-range Weather Forecast (ECMWF), building upon previous work of the team (analysis of several years of wind profiles from a Doppler lidar and case study simulations using the mesoscale weather model WRF). This will allow to define detection criteria and numerical parameter characterizing the different LLJ types on the weather reanalyzes data, thus build a training ensemble. The PhD student will then develop, with the team support, an automatic classification algorithm using supervised machine learning, to detect the different types of LLJs on the weather reanalyzes. Finally, this algorithm will be applied on long time-series (the ECMWF reanalyzes go back to 1940) and the results will allow to study the evolution of the frequency of occurrence of the different types of LLJs in the climate change context.
Qualifications	The candidate should have a Master's degree in climate sciences or meteorology, or a Master's degree in physics with a major in environment or climate. Skills in data analysis and computer programming (Matlab or equivalent) are mandatory, as well as a good level in English. <i>!\ Applications with a Master specialty distant from the subject (e.g. quantum physics or nanomaterials) have infinitesimal chances to succeed.</i>
Application	Candidates are invited to send their application by email on May 25 th 2025 by the latest. The application should include a CV, the transcript of grades for the Master diploma, a description of past research activities during lab training periods, a cover letter and the name and contact details of two referees (teachers, training tutors) that could be contacted. The scholarship will be granted after validation of the candidate's record by the university post-graduate school (which will also interview the candidate) and by the funding organism.
Salary	1800 € monthly net wages before taxes. Casual teaching is possible if the level in French is sufficient.
Dates	From October 1 st 2025 to September 30 th 2028.
Lab location	Laboratory of Physics & Chemistry of the Atmosphere (LPCA) University of Littoral-Opal Coast (ULCO) 189A, avenue Maurice Schumann, 59140 Dunkerque, France
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