

International Master 2 Atmospheric Sciences: Research Training 2022-2023

Laboratory: LPCA

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Eventually CaPPA Work Package: WP4. Improving the understanding of aerosol source distribution, transport and physico-chemical transformation using advanced merging of remote sensing with atmospheric modeling

Frequency and seasonality of Low-Level Jets (LLJs) over Dunkerque based on observations from a Doppler lidar

Low-altitude wind maxima, also called Low-Level jets (LLJs), are a common weather phenomenon encountered all over the world, under all types of climate and at all seasons. LLJs have a deep impact on pollutant dispersion, power generation by wind turbines and airport activities because the strong wind shear around the jet generates a lot of turbulence in the air flow.

A statistical study of the LLJs properties and conditions of occurrence has been performed using the observations from a compact Doppler lidar (Dieudonné et al., 2022; European Meteorol. Soc. Annual meeting, doi.org/10.5194/ems2022-33) which maximum range is limited to 290 m above ground level. Although the statistics suggest that most of the LLJs above Dunkerque are located close to the ground and were actually captured by the compact lidar, some case study observations show that LLJs can extend higher in altitude.

The purpose of this training is to analyze the observations from a farther-range lidar, also operating in Dunkerque, in order to extract the LLJ wind profiles, determine the jets' properties and perform a statistical analysis of their conditions of occurrence.

Key words: Atmospheric dynamics; Low-Level Jet (LLJ); Remote sensing; Doppler lidar