VIRTUAL MOBILITY (VM) GRANT REPORT

This report is submitted by the VM grantee to VNS Manager, who will coordinate the approval on behalf of the Action MC.

Action number: CA18235-PROfiling the atmospheric Boundary layer at European scale

VM grant title: Mixed-layer height in complex terrain: comparing observations (STRATfinder) and high-resolution simulations (WRF)

VM grant start and end date: 10/09/2021 **to** 11/10/2021

Grantee name: Alessio Golzio

Description of the outcomes and achieved outputs (including any specific Action objective and deliverables, or publications resulting from the Virtual Mobility).

(max. 500 words)
The improvements to the STRATfinder code permits to follow better the aerosol layers that identify the MLH or the ABLH. In particular, the new version is fine-tuned to follow the boundary-layer behaviours during the morning and especially after sunset. This was made considering the dynamic of the atmosphere and the distribution of the TKE simulated by the WRF model. STRATfinder now considers the output relative to the previous day, which avoids discontinuities at midnight. Further efforts are needed to automate the MLH detection and determine the origin of the residual differences between the MLH from the ALC and from WRF.

Description of the benefits to the COST Action Strategy (what and how).

The collaboration is advancing the PROBE objectives in multiple ways. Given the presented research strategy aims at improving products from ground-based remote sensing (WG2) and to quantify better uncertainties associated with different methods (WG4) in the setting of complex topography (WG1), we see significant benefits for most working groups. Further, the project helps to advance measurement-model intercomparisons; different areas of interest are likely to benefit (including numerical weather prediction and air quality).

Description of the virtual collaboration (including constructive reflection on activities undertaken, identified successful practices and lessons learned).

(max.500 words)

During this VM I learned more about the ground-based detection of aerosol and in particular to the technique of retrieving some boundary layer properties using ALC. The collaboration with Dr Simone Kotthaus and Dr Henri Diémoz permits me to understand and learn different points of view in boundary layer observation and computation. To this frame, I brought my expertise in atmospheric modelling and both sides benefits of this collaboration. Furthermore, I participated in one workshop on boundary layer observation of the WG2 and introductory lectures on High-quality ABL observations.

The collaboration will continue in the future for the mutual interest in developing such tools (STRATfinder and WRF) over complex mountainous terrain. Moreover, we wish to set up a fully automated and operational version of STRATfinder and WRF over mountainous areas.