# Report on the outcomes of a Virtual Mobility[1]

**Action number: CA24135**

**Grantee name: Benedikt Gast**

## Virtual Mobility Details

Title: Design and planning of a fluorescence intercomparison study between different EARLINET stations

Start and end date: 18/09/2026 to 09/10/2026

## Description of the work carried out during the VM

Description of the virtual collaboration and activities carried out during the VM, with focus on the work carried out by the grantee. Any deviations from the initial working plan shall also be described in this section.

*(max. 500 words)*

The main objective of this Virtual Mobility (VM) was the design and organizational planning of a larger collaborative fluorescence intercomparison study between several EARLINET stations in the framework of EARLICOST WG1b on fluorescence lidar. In the follow-up to the fruitful WG1b meeting at the EARLICOST general assembly in Athens, Benedikt Gast (the grantee) and Kelly Voudouri discussed and summarized the outcomes of the WG1b meetings during Year 1 of EARLICOST in a dedicated online meeting. In this context, a special focus was put on the organizational planning of the planned collaborative fluorescence intercomparison activities and the assessment of the suitability of the wildfire smoke and mineral dust events in the summer of 2025 and spring of 2026 that were proposed for station intercomparison. We identified the need to query the individual stations regarding the availability of fluorescence measurements during the proposed intercomparison events. Furthermore, we drew up a timeline for the first steps to undertake to kick off the intercomparison activities and fluorescence database efforts.

After this meeting, the grantee coordinated this timeline with Sol Fernández Carvelo and Georgia Peletidou, who both volunteered to lead action groups on the intercomparison activities and fluorescence database efforts during Year 2 of EARLICOST. The next steps were agreed upon, and the roles and responsibilities were clarified.

[1] This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the Grant Holder Manager to verify the grant documents compliance and proceed with the payment.

Furthermore, the grantee has started an initial pilot study for the intercomparison of aerosol fluorescence measurements from two neighbouring stations at Lindenberg and Leipzig (both Germany) for a wildfire smoke event in early June 2025, together with Jens Reichardt.

In a final step, the grantee drafted a strategy paper on how to implement the intercomparison activities within the EARLICOST community. This strategy paper includes the proposed work plan that was agreed on during this VM as well as the framework of an action group structure, which will be used to structure the work for the intercomparison efforts and towards the database of fluorescence properties.

## Description of the VM main achievements and planned follow-up activities

Description and assessment of whether the VM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the VM. Agreed plans for future follow-up collaborations shall also be described in this section.

*(max. 500 words)*

The main achievement of this VM is the strategy paper for the planned collaborative intercomparison efforts. It channelled the WG1b discussions of the first year into an organizational framework for the station intercomparison efforts so that they are ready to be immediately put into action in Year 2 of EARLICOST. This framework includes a ready-to-work action group structure that will allow an efficient and targeted workflow for the collaborative intercomparison efforts.

A timeline for the kick-off and first steps of the dedicated WG1b action groups has been agreed upon and the responsibilities of the leading persons have been clarified. An exemplary pilot intercomparison of the neighbouring stations at Lindenberg (spectrometric fluorescence measurements) and Leipzig (discrete broadband fluorescence measurements), for a wildfire smoke event in early June 2025, has been started, though it could not yet be finished. However, the spatio-temporal aerosol structures at both stations appear to be promisingly comparable.

Constraining the comparability of the fluorescence products from discrete broadband and spectrometric fluorescence lidars at different stations represents a first step towards deliverable D1.2 (the establishment of a database of aerosol and cloud fluorescence properties) of EARLICOST.

Thus, by preparing and organizing the station intercomparison efforts, this VM has addressed primarily the research coordination objective *O2. Improve, and harmonize, the most innovative features in lidar technology*, in which the fluorescence database is a key deliverable and the comparison and assessment of different fluorescence lidar configurations is an explicitly defined target. Secondarily, also the capacity building objectives *O1. Promote networking with respect to the technology and science activities within and outside the Action* (via knowledge exchange, sharing of best practices and diffusion of the fluorescence lidar technique within EARLINET and ACTRIS) and *O2. Improvement, and harmonization when appropriate, of the most innovative features in lidar technology* have been served.

The intercomparison of aerosol fluorescence measurements at different stations encourages the sharing of fluorescence lidar data and the comparison of the used instrumental setups and calibration methodologies. Via assessing the comparability of the different instrumental setups, these efforts prepare the ground for future cooperation on the scientific exploitation of fluorescence lidar observations within the EARLICOST community. As these intercomparison efforts were designed and organized within this VM, this VM contributed to the EARLICOST core pillar *"Spreading Excellence and Promoting Open Science"*.

Furthermore, the intercomparison efforts encourage Young Researchers and Investigators (YRIs) to connect and collaborate with each other, as many colleagues working on the fluorescence lidar technique are young researchers. Within this VM, it was agreed that 3 YRIs (including the grantee) will take leading roles in the intercomparison and fluorescence database efforts, which is increasing the level of

participation and visibility of young researchers within EARLICOST. Thus, also the core pillar *"Empowering Young Researchers and Innovators (YRIs)"* of the EARLICOST Objectives and Strategy was addressed by the activities within this VM.

Once carried out, these intercomparison efforts (which have been designed and organized within this VM) may lead to a joint community publication on the comparability of broadband and spectrometric fluorescence lidar measurements at different EARLINET stations within Europe.