

Report on the outcomes of a Virtual Mobility¹

Action number: CA21119

Grantee name: Víctor Estellés Leal

Virtual Mobility Details

Title: Synergies of algorithms towards better quality aerosol products

Start and end date: 5/10/2023 to 14/10/2023

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)

During the VM there have been an extensive collaboration and exchange (by email, shared documents, and other virtual platforms) between Dr. M. Campanelli, Dr. A. di Bernardino and myself, in order to contribute towards the analysis and elaboration of deliverable D2.1. During the VM period, our effort has been focused mainly on the identification, description and analysis of possible synergies of algorithms towards the improvement of the aerosols data quality, based on different proposals that were discussed during first year meetings from the HARMONIA Action. Some of the work described already took place during the Action, and lines of research have been proposed to continue with these tasks during the following years.

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)

As planned in the VM application, the activities of this VM were coordinated with Dr. Monica Campanelli (CNR-ISAC) and Dr. Annalisa di Bernardino (University La Sapienza), and fully contributed to the elaboration of the Deliverable D2.1 “Report on synergistic approaches towards better quality products” of HARMONIA WG2.

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 GH for payment of the Grant.

The review of recent published or ongoing analysis about algorithm and measurements synergies and harmonisation led us to identify several possible lines of improvement work that will be explored during the following years, thanks to sharing the databases listed in the created census, establishing collaborations between members, and granting mobility opportunities. Specifically, we have identified 7 different research lines towards aerosol properties retrieval improvement:

- 1) Further development and validation of in-situ improved calibration techniques, because they are a key aspect for the accurate and reliable retrieval of aerosol properties in international networks such as SKYNET;
- 2) Adaptation of GRASP inversion method to standard instruments from international networks such as SKYNET or GAW/PFR, as it has become a reference algorithm for aerosol properties retrieval and therefore, very interesting for network-independent homogenisation of aerosol products;
- 3) Comparison and validation of sun-photometer algorithms by use of simultaneous in-situ observations, using data from existing field campaigns, and including in the analysis all the inversion methods possible;
- 4) Validation of night time AOD obtained by different types of lunar and stellar instruments, as the lunar algorithms still have room for improvement, so the provided data will be very important to fill gaps in our knowledge of the aerosol dynamics during night-time;
- 5) Harmonization of algorithms between low-cost instruments and sky-cameras and well established references, as the use of low-cost instruments is spreading for environmental applications and there is a need to provide homogeneous and reliable data;
- 6) Development and validation of cloud screening methods for sun-photometric databases, as the existent methods are not always completely consistent, especially in situations where cirrus clouds are present;
- 7) Improvement of the gas absorption correction process, as it has been shown that in polluted atmospheres the high concentration of some of these gases can lead to non-negligible biases in the reported aerosol data.

Different collaborations between HARMONIA members were identified in order to address the listed proposals during the coming years of the Cost Action. More detail will be given in the extended VM report and in the Deliverable D2.1.