

Report on the outcomes of a Short-Term Scientific Mission¹

Action number: CA21119

Grantee name: Ioannidis Panagiotis

Details of the STSM

Title: Solar, aerosol and cloud related measurements to determine aerosol-cloud-solar spectral radiation interactions

Start and end date: 22/04/2025 to 22/05/2025

Description of the work carried out during the STSM

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

This mission included instrumentation installation, monitoring of daily measurements, instrumentation maintenance, troubleshooting, data handling, and preliminary analysis. More specifically, during the instrumentation installation phase, I assisted the team in the installation and configuration of most instruments. After the first phase, daily operations included routine cleaning and upkeep as well as daily measurements monitoring – ensuring proper data logging procedures were taking place and instrument alignment was correct throughout the day. Additionally, in the event of malfunctioning of an instrument or other technical issues, such as connectivity issues or calibration anomalies, they were addressed accordingly always in communication with the experts. During the collection of the required measurements, frequent backups and preliminary analysis was performed to assess measurement consistency and quality. Finally, on the last day of the mission I assisted on the deinstallation of the instrumentation and required packaging for it to be shipped on the institution of origin.

Description of the STSM main achievements and planned follow-up activities

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

The mission was technically successful in its aims and proved to be a source of field measurements and instrument operation experience. The experience and knowledge developed from the STSM will directly benefit ongoing research and future collaboration. The measurements obtained during the mission, which target aerosol-cloud-radiation interactions, will be of value to all HARMONIA Working Groups (WG). The satellite overpasses will allow for the opportunity of satellite validation, allowing the direct comparison of

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.

ground-based measurements and satellite data. This will contribute to enhancing aerosol retrieval methods and the quality of atmospheric data in general. Specifically, these observations will be valuable for WG1 and WG2, aimed at the homogenization and improvement of aerosol measurements. This encompasses harmonization of measurement techniques, calibration approaches, and completion of existing aerosol products by intercalibrations of instruments and improved data post-processing. Finally, by cross-validating observations made at different sites of the EarthCARE Campaign SKG 2025, the project ensures data accuracy and supplements HARMONIA's overall goal in reducing aerosol uncertainties in aerosol-cloud-radiation interactions.

In the future, the activities will focus on the detailed analysis and integration of acquired datasets towards enabling further scientific studies and intercomparisons. Calibration and quality control of the measurements acquired during the campaign would be one of the top-priority activities, in collaboration with other members of the campaign. The guaranteed datasets could then be used for enabling collaborative publications and presentations at upcoming international conferences. Together with HARMONIA's WG's, follow-up action will include refinement of the aerosol retrieval algorithms based on inclusion of remote sensing observations obtained during the mission. In particular, improvement of vertical aerosol profiles and specification of aerosol optical and microphysical parameters in different atmospheric conditions. In total, the mission outcomes lay a robust foundation for long-term research effort and capacity building actions within the HARMONIA community towards enhancing our understanding of aerosol-cloud-radiation interactions in a more harmonized and coherent framework.