



The DIVA Platform as a Community-Driven Exploitation Hub for Ground-Based Network Data: Synergistic Validation of EarthCARE and Future Missions



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Motivation

Earth observation has a key role to understand the climate, which has an impact in human health and activities. Satellite measurements can help us to improve our knowledge of the climate, but its treatment is difficult due to the amount of data, complexity of the instruments and complexity of the measurements itself. Therefore, a validation of the satellite products is fundamental to ensure its quality.

Different ground-based networks (e.g. in Europe AERONET, EARLINET, PGN, etc.) are collecting long-term records of atmospheric information for, among other goals, satellite validation. These networks are facing several challenges like harmonization of the protocols, data handling, and data distribution. Initiatives to join and homogenize networks are on-going, like ACTRIS (Aerosols, Clouds, and Trace gases Research InfraStructure). However, there is still a lack of tools that allows the users to manipulate in a synergistic way all data together. The goal of the project is to create an online collaborative platform for scientific development and Cal/Val satellite activities. DIVA provides the user with a wide range of user friendly tools to access, read, handle data and scientific libraries ready to use. Scientist should do science, and DIVA is focused on reducing all technical overhead involved in the scientific development.

Building on existing capacities

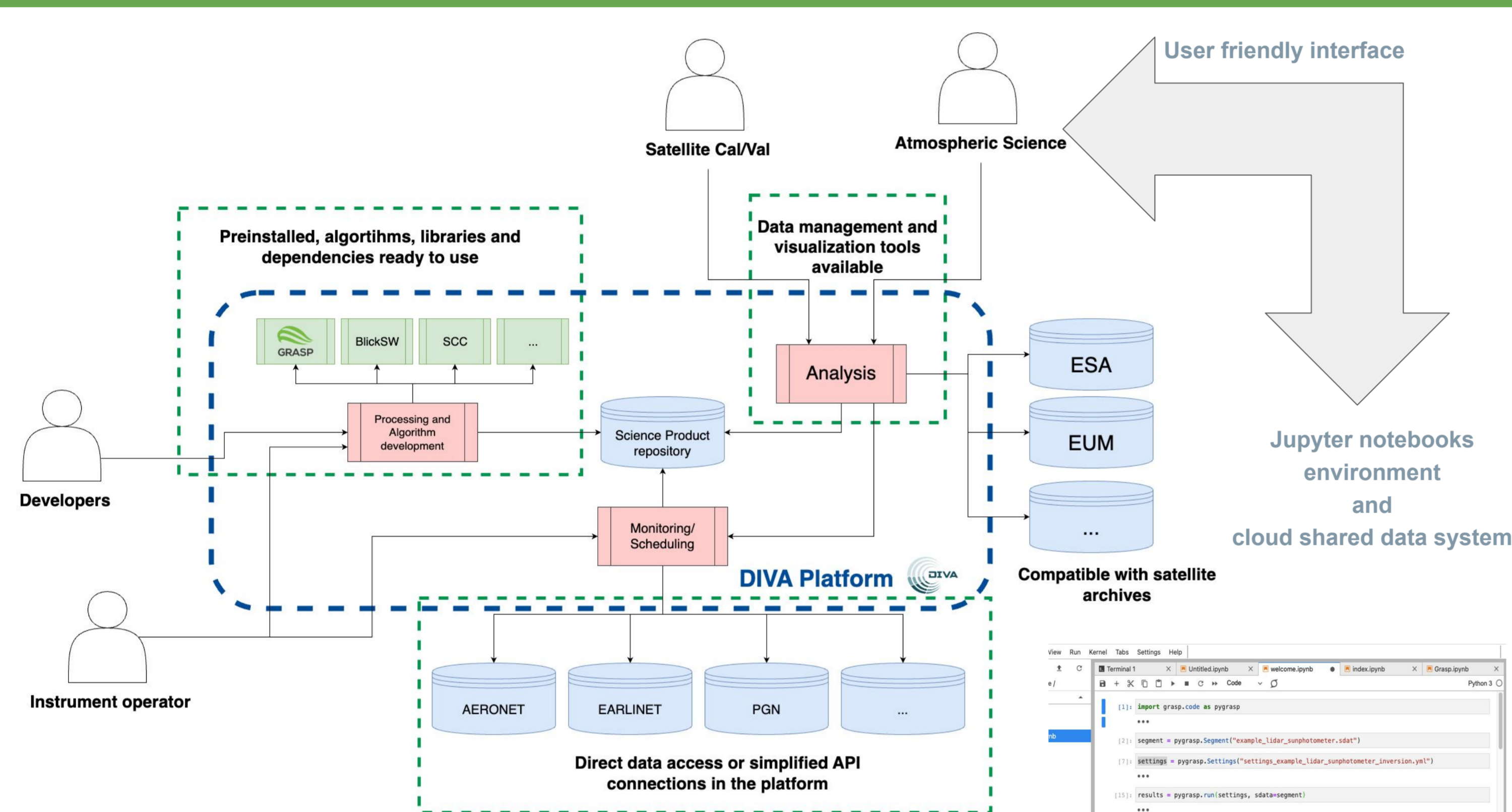
DIVA acts as a unified, harmonized interface designed to streamline data access by integrating with ACTRIS. It facilitates seamless connectivity to:

- EARLINET through ACTRIS ARES
- CLOUDNET through ACTRIS CLOUDNET CLU
- AERONET

Direct linkage to the EarthCARE archive, with future scalability for additional satellite missions. Current development phases aim to expand the platform's capabilities to include ACTRIS In-situ measurements, CAMS/ECMWF modeling data, and the GRASP product archive under the same centralized framework.



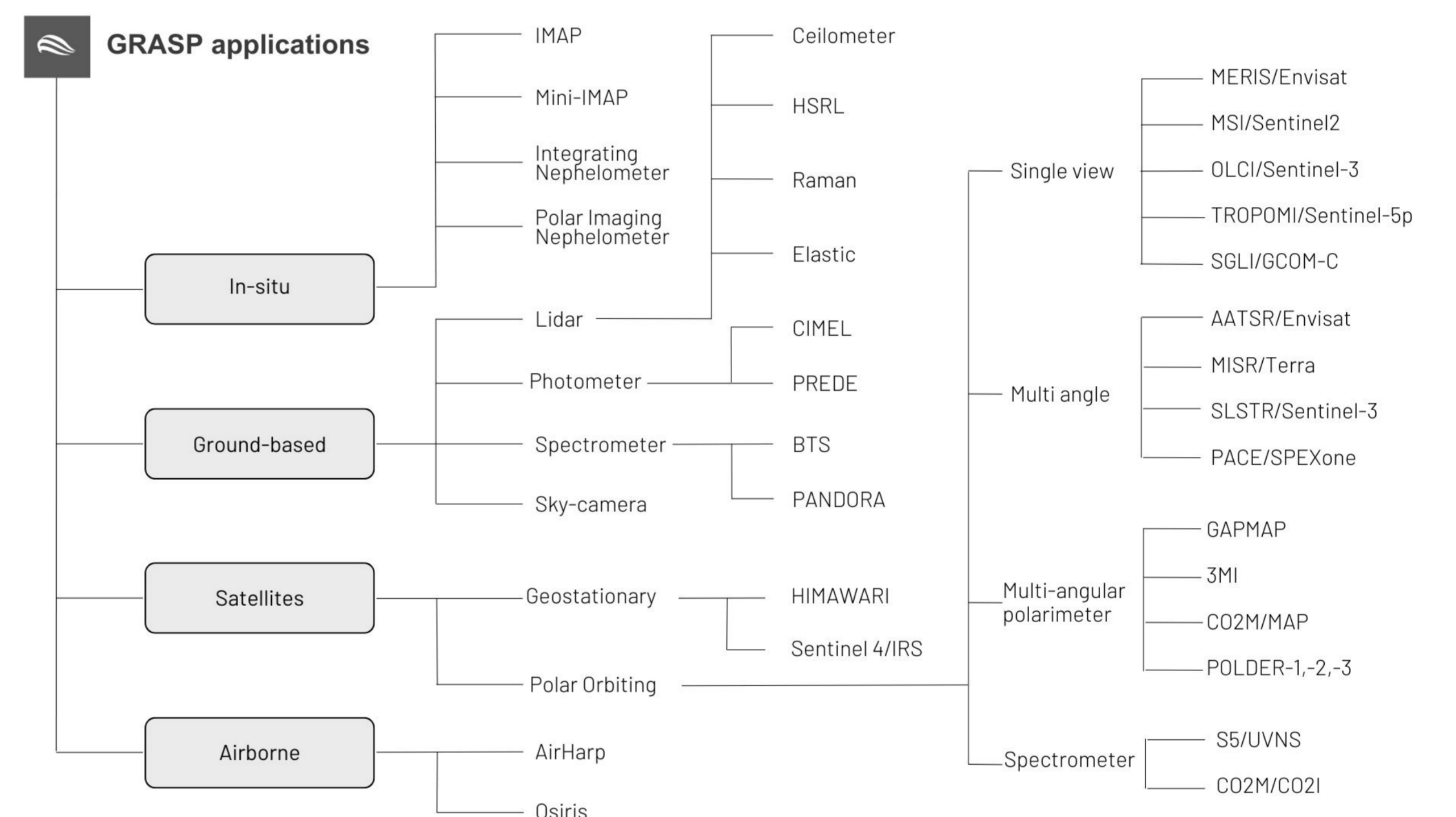
Platform Architecture



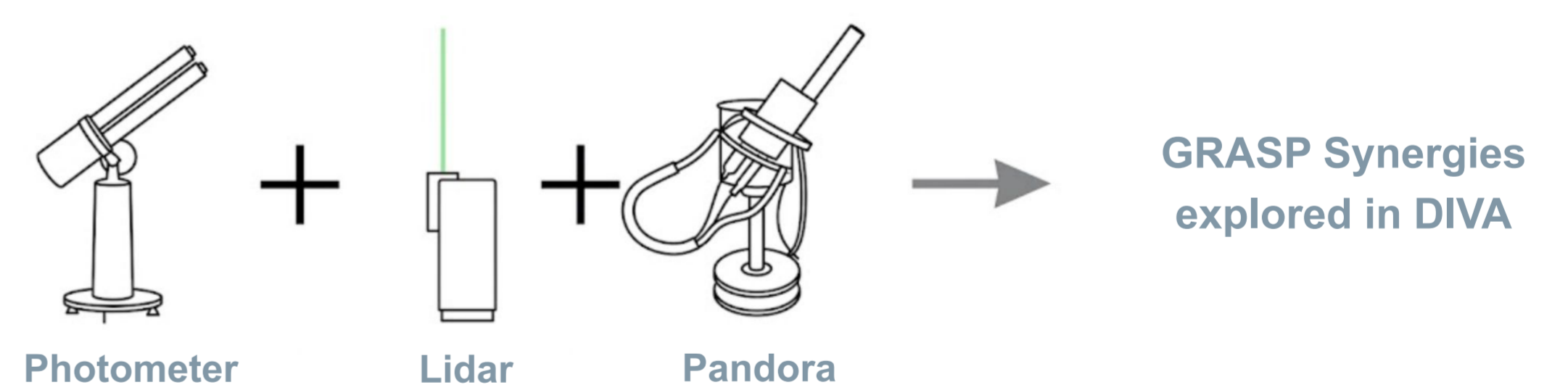
A Python API (work-in-progress) has been developed for GRASP which allows direct access to the retrieval code from a Jupyter Notebook. The interface allows GRASP input preparation, configuration, execution of the inversion code and handling of the results. The next steps envision a generalization of this interfaces for the rest of the algorithms of the platform.

GRASP Synergy results

GRASP (Generalized Retrieval of Atmosphere and Surface Properties) allows users to exploit data in a synergistic way, retrieving advanced properties from the combination of several instruments. The code is open source (www.grasp-open.com), counts more than 2000 users worldwide, has been already widely tested, and has become operational for several satellite missions. Within the current platform, DIVA is proposing an easy way to exploit the code without the need for installation or the difficulties of setting up software libraries, providing easy access to different datasets from ground and space.



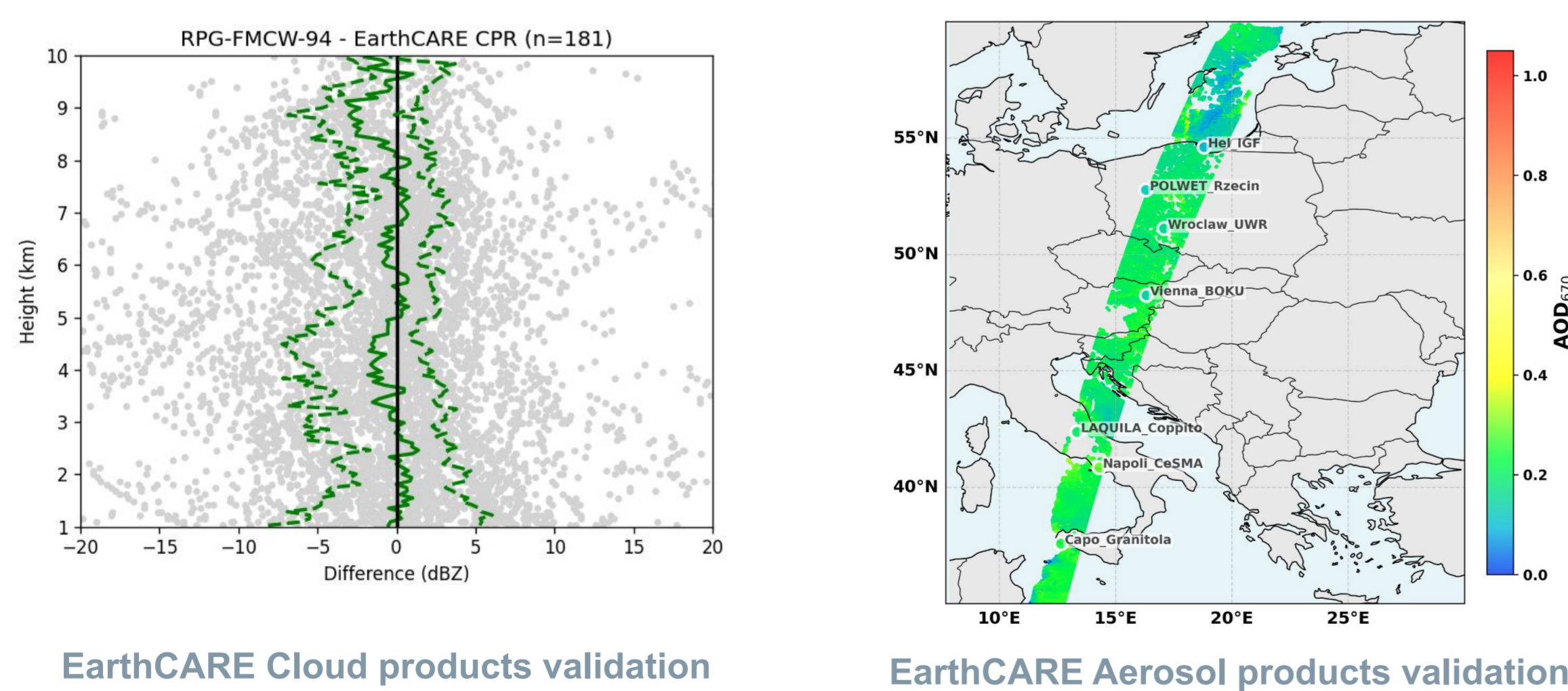
Several products have been already explored, from individual instruments like for example the applications of GRASP-AOD and GRASP-CCS to synergies such as GRASP/Photometer+Lidar or GRASP/Photometer+Pandora



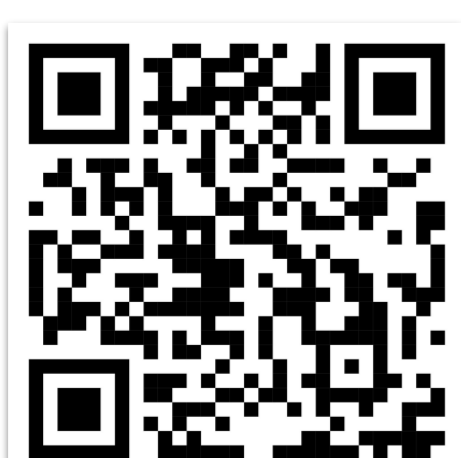
Following illustrations represent some examples of results generated within DIVA platform as a combination of ground data in GRASP algorithm:

EarthCare Cal/Val

EarthCare is the first satellite mission to use DIVA as part of the CAL/VAL activities. The unified data entry points regarding the EarthCARE instruments as CPR, MSI and ATLID plus the ground-based truth reference also available (CLOUDNET, AERONET and EARLINET) showcase the DIVA platform as a complete tool to perform Cal/Val activities and scientific development.



Join us!



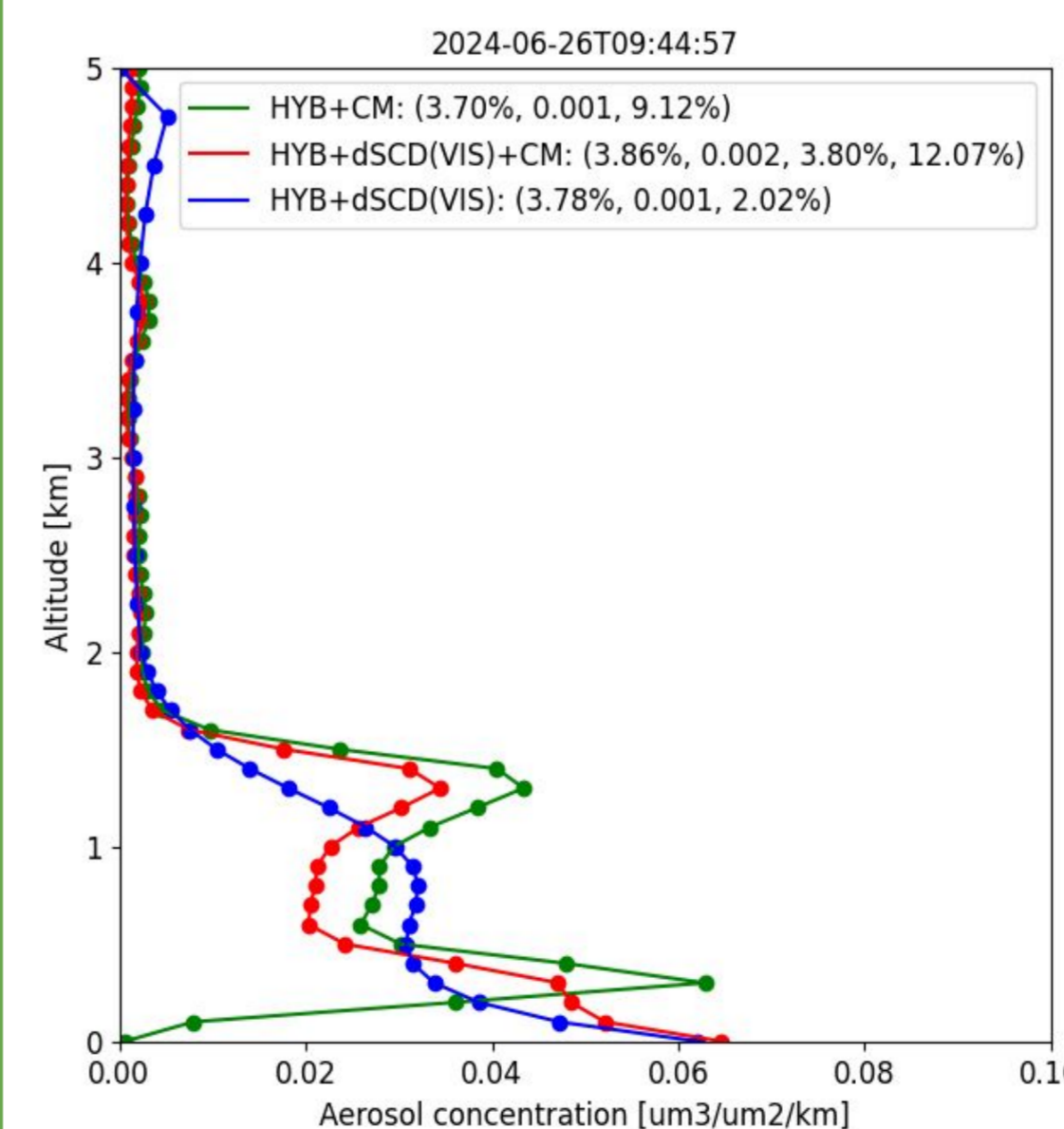
Register in the platform

Access the platform

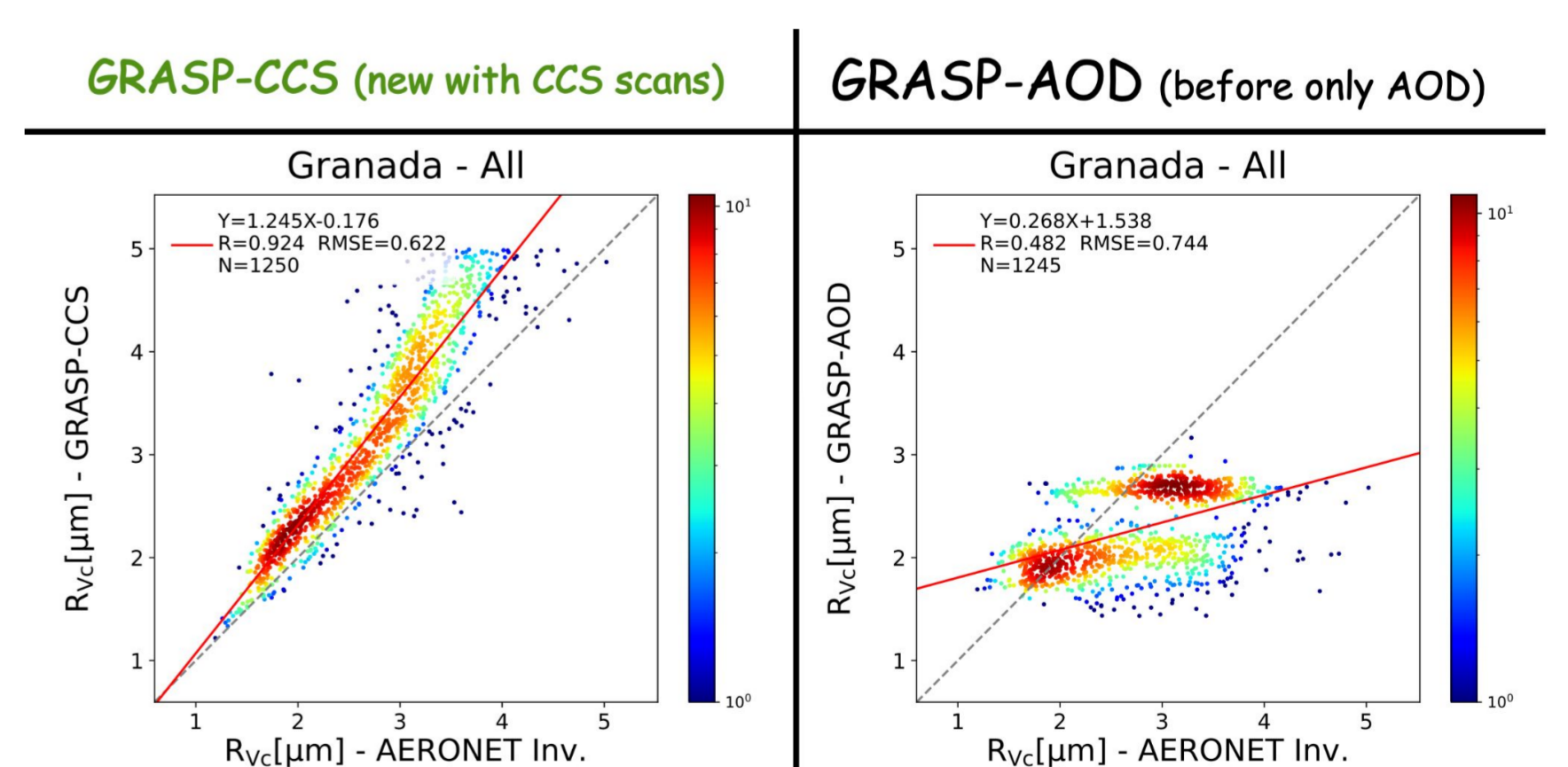
Acknowledgements:

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1. GRASP/Photometer+Pandora



2. GRASP/AOD vs GRASP/CCS



3. GRASP/Photometer+Lidar

