New GRASP core program version 2 with exposed flexibility allowing “In principle, yes!”

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Coupling of Earth observations and radiative transfer models allows us to estimate the atmospheric conditions including aerosol turbidity, surface type, gas amount. Recent decades, as the resolution of satellites increases, the amount of data increases and it desires a fast radiative transfer model. The general inversion software, GRASP (Generalized Retrieval of Atmosphere and Surface Properties) [1], is one of potential algorithms for Earth atmospheric and surface composition estimation. This software is capable of processing not only satellite observations, but also ground based observations such as SKYNET and AERONET sun-sky radiometers, lidar, and nephelometers which are often used for evaluation of satellite retrieval. Recently, we released the new major version which extends the capability and flexibility. This version solved the issue on the previous version by disentangling the code to each part of components such as inversion, particle single-scattering, lidar, radiative transfer, surface, molecular single-scattering, gas absorption, etc.
The new version is also including the following major scientific updates:

- Major refactoring radiative transfer model in terms of accuracy and acceleration;
- Truncation correction based on P^{n}IMS method [2] including sun-glint direction over ocean;
- Gas absorption calculation based on *k*-distributions [3];
- Pseudo spherical correction of Earth sphericity [4];
- DOAS measurements;
- Bio-optical model for water-leaving reflectance [5].

In the workshop, we will talk about the above mentioned updates and capability of recent version.

References

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Preferred mode of presentation: Oral