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2D method of detection of planetary boundary layer, clouds and rain.

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The Planetary Boundary Layer (PBL) height is a key but complex meteorological parameter to handle air quality modelers. Its diurnal variations induce vertical dilution of the pollutants at daytime, and concentrate them at nighttime. Urbanized cities in the world are exposed to atmospheric pollution events. To understand the chemical and physical processes it is necessary to describe correctly the PBL dynamics and height evolution.
For these proposals, a compact and rugged eye safe UV Lidar, the EZLIDAR™, was developed together by CEA/LMD and LEOSPHERE (France) to study and investigate structural and optical properties of clouds and aerosols and PBL time evolution.
A new 2D method of PBL detection, developed by Leosphere and based on image processing, is working on a large set of temporal profiles, typically 6 to 24 hours. It allows the use of the temporal correlation between the profiles and the integration of atmospheric parameters about PBL evolution in the detection algorithms.
This method, based on the gradient, is using a unique automatic threshold algorithm, that will adapt to any atmospheric conditions. No specific parametrisation is required before measurements and the final result is more robust than a profile per profile method.
We have validated our algorithm during the second campaign of the ICOS (Integrated Carbon Observation System) project. This campaign took place at Mace Head (Ireland) under very different and complicated atmospheric situations, with frequent showers, windy situations and no significant inversion layer.
Furthermore, this algorithm is able to detect accurately clouds and rain episode.