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C3IEL, the Cluster for Cloud evolution CllmateE and Lightning mission to study convective clouds at high spatial and temporal resolutions

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The French-Israeli space-borne C³IEL (Cluster for Cloud evolution, Cllmate and Lightning) mission aims at providing new insights on convective clouds, at high spatial and temporal resolutions, close to the scales of the individual convective eddies. The mission will simultaneously characterize the convective cloud dynamics, the interactions of clouds with the surrounding water vapor, and the lightning activity.

The C³IEL mission consists in a short-baseline (~150 km) train of 2 synchronized nano-satellites. Each nano-satellite carries a visible camera (670 nm) for cloud imagery at a spatial resolution of ~20 meters, near-infrared water vapor imagers (1.04, 1.13 et 1.37 μm) measuring in and near the water vapor absorption bands, and a lightning imager (777.4 nm) and at least one photometer (777.4 nm).

The scientific objectives of the C³IEL mission, i.e. documenting the 3D evolution of the clouds' surface, entrainment of water vapor, and electrification, will be first reminded. Then, we will introduce the satellite train configuration, the different sensors of the mission and the innovative and different observational strategy that will be applied during daytime and nighttime. We will then detail the expected observations and products, including the ones related to lightning.