

## International Master 2 Atmospheric Environment: Research Training 2017-2018

Laboratory: LOA

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CaPPA Work Package: FORMTEXTWP-5 Interactions Aerosols/Clouds/Climate

Morphological properties of cloud three-dimensional structures  
as inferred by satellite passive sensors

As around 70% of terrestrial surfaces are covered by clouds, as they play a key role in the hydrological cycle, as their interaction with atmospheric dynamic and radiation are complex and important, cloud covers are an essential component of the climate system. It is recognized that their interaction with the radiation field represents one of the largest uncertainties in climate model predictions.

The statistical representation in models of right cloud population properties constitutes one the barriers in atmospheric modelling. It asks the question of the quality and treatment of satellite observations allowing a global and differentiate analysis of cloud covers.

This research training aims to analyze the morphological properties of cloud covers as measured by the passive sensor POLDER aboard the platform PARASOL. By exploiting the differential absorption of solar radiation in gas absorbing bands, the instrument has offered the first three-dimensional description of cloudy atmospheres. The analysis of cloud morphology from these observations provides on case study interesting 3D cloud structures that should be evaluated, and it provides statistical laws of cloud morphology (eg scale invariant) that can potentially be assimilated in atmospheric modeling. Interaction with the atmospheric modelling community is an important part of this training.

**Key words:** cloud, morphology, satellite observation, atmospheric modelling