



Turbulent layers detection from ground based lidar observations

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Atmospheric gravity waves and turbulence generate small-scale fluctuations of wind, pressure, density and temperature in the atmosphere. These fluctuations represent a real danger for commercial aircrafts and are known under the generic name of Clear Air Turbulence (CAT). They are not resolved in weather forecast models and are therefore unpredictable. A ground-based Rayleigh lidar was designed and implemented to remotely detect and characterize the atmospheric variability induced by gravity waves and turbulence in vertical scales between 40m and 300m. Field measurements at Observatoire de Haute-Provence (44N, 6E, France) have shown that the built lidar device was actually able to detect episodes of turbulence. Turbulence parameters C_n^2 and CT^2 evaluated from lidar data were in agreement with published values deduced from VHF radar measurements. This is to our knowledge the first Rayleigh lidar system able to detect Clear Air Turbulence in the free troposphere. The built lidar device may serve as a test bed for the definition of embarked CAT detection lidar systems on board airliners.