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Long-term measurements of microphysical properties of marine stratocumulus and aerosols in a new ground-based station located at Tenerife Island (Friolera Peak Lab, 28.6ºN, 16.2ºW). First results.

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Clouds are one of the most important regulators of climate because they cover a great percentage of the Earth surface at any time and they interact with solar and infrared radiation. Nowadays one of the most important uncertainties affecting the climate models are the processes related with cloud-aerosols interactions. The aerosols act as cloud condensation and ice nuclei, so they can modify the clouds in many ways. In order to check the different parameterizations implemented to resolve these sub-grid processes, it is essential to account with an accurate database of microphysics cloud and aerosols properties. The Canary Islands are located in one of the most important marine stratocumulus regions in the world. The orography of some of these islands allows us to locate a suitable station to establish long-term programs to measure microphysical cloud and aerosols properties. With these aims, a new ground-based station has been installed in the North-East part of the Tenerife Island, Friolera Peak Lab. (28°33'1.16"N, 16°12'1.79"W, 720 masl), where the trade winds regime and the quasi-permanent thermal inversion layer configure a situation where the probability to find marine stratocumulus is high along the year.

In a first step two instruments have been installed: a FM100 DMT and an UFP 3031 from TSI, Inc. The FM100 is a robust cloud-particle spectrometer, and allows for computation and real-time display of particle concentration, median volume diameter, equivalent diameter, and liquid water content. The UFP 3031 provides continuous size distribution and number concentration of particles between 20 and 800 nm, with six channels of size resolution: 20-30 nm, 30-50 nm, 50-70 nm, 70-100, 100-200 nm and 200-800 nm. It is an instrument specially designed for long-term monitoring with minimum maintenance.

The first results obtained are presented showing that this station is situated in a very clean environment, with values for the number of ultrafine particles lower than 1000 particles/cm3 adding the six channels. An exception for this rule is clear when Saharan dust outbreaks reach the island. Thus it was recorded values that quadrupled the previous levels and reach peaks that exceed the 10000 part/cm3 during the last dust invasion in the second week of this year. Moreover, in cloudy conditions and a trade winds regime we observed for a minimal concentration of 300 droplets per cm-3, an effective diameter of these droplets about 10 microns. The continuous monitoring of these parameters in a long term schedule will permit to analize any impact of climate change on processes related with the interaction cloud-aerosols.