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Impacts of ice active bacteria on the precipitation production of a convective storm.

Magali Andraud, Marie Monier, Nicholas Good, Andrea Flossmann, and the BIOCLOUD team
LaMP, OPGC, Universite Blaise Pascal-CNRS, Clermont-Ferrand, France (monier@opgc.univ-bpclermont.fr)

Ice Crystal formation is a key process to trigger precipitation and therefore to impact cloud life time. Ice Crystal formation can undergo several thermodynamical processes and remains a microphysical process that we poorly understand. Ice crystals have been observed to form at very high temperature (between O°C and -5°C). In this range of temperature, the only candidates, we know, that can initiate formation are some bioaerosol particles such as bacteria.
The BIOCLOUD project aimed to isolate ice active bacteria in the atmosphere and to test in realistic atmospheric conditions their ability to form cloud droplets and to initiate ice crystals formation. For that purpose, campaigns were performed in the AIDA chamber in Karlsruhe, Germany. This chamber reproduce cloud formation conditions. Bacteria ability to form droplets was evaluated with DMT-CCN counters. The data collected were analysed to provide efficiency of CCN activity and IN activity for 5 strains of bacteria collected in cloud water at the summit of the puy de Dome.
Bacteria were found not very hygroscopic but their large size allowed them to be excellent CCN. In the AIDA chamber, once condensation occurred, some ice crystals were formed and IN efficiency was quantified. We used these preliminary results to constrain droplet and ice crystal nucleation parameterization in our microphysical module. DESCAM model (Detailed Scavenging Model) was used in a cylindrical model, to evaluate how bacteria impact the development of a cumulonimbus cloud and its precipitation production.