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The role of micro-organisms at the Earth's surface on cloud formation in the atmosphere

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This presentation reports results showing that substances produced by microorganisms might trigger the formation of cloud in the atmosphere, at least under certain conditions.

The Cloud Condensation Nuclei (CCN) efficiency of substances produced by microorganisms (bacteria, fungi, micro-algae ...) that are common at Earth's surface and in the oceans were studied. Their Köhler curves were determined experimentally by surface tension and osmometry measurements and found to have much lower critical supersaturations than any material studied so far, including inorganic salts.
Such substances were evidenced in aerosols from four different origins (coastal, marine, temperate forest, and Amazonian forest) and found to lower the surface tension of the aerosols below 30 mN/m in some cases, allowing them to be activated into cloud droplets before any other types of particles.

Microorganisms at the Earth's surface would thus be able to control cloud formation in the atmosphere under certain conditions. These results might explain previous observations, such as correlations between algae bloom and cloud cover. Most importantly, this work potentially identifies an important component of Earth's hydrological cycle and a new direct link between biosphere and climate.