



## **Constrained water cloud generator**

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In the aim of building up a fast physical cloud generator satisfying a given cloud fraction, the compatibility of ambient profiles of thermodynamic parameters (temperature, pressure, humidity) with the generation of a stratocumulus cloud by solving of perturbed hydrodynamic equations is investigated.

The column model can be based on two kinds of assumption : on the one hand a thermodynamic constraint specifying a perturbation of water vapour pressure and on the other hand a dynamical constraint specifying an analytical vertical velocity profile. In the first case, the system of equations is solved with finite differences and produces a liquid water content and vertical velocity increasing linearly with height inside the cloud. In the second case, the solutions are found analytically and produce also a linear water content.

Both methods give results in good agreement with published measurements and sophisticated models. In particular, the slower temperature decrease with altitude in the cloud producing a growing difference with the ambient medium is retrieved from ECRIN96 campaign measurements, as well as the linear increase of the liquid water content. Further developments of this column model, including the effects of turbulence, three-dimensional motions, mixing with the surrounding medium, are proposed.