



A dynamical system approach for investigating cirrus clouds

Romy Ullrich and Peter Spichtinger

Johannes Gutenberg University, Institute for Atmospheric Physics, Mainz, Germany (spichtin@uni-mainz.de)

Cirrus clouds are important modulators of the radiation budget of the Earth-Atmosphere system. They constitute a typical multiscale system, which is difficult to understand. In order to investigate key features of the system a simplification might be of interest.

For this purpose we developed a simple cirrus cloud model based on bulk microphysics approaches, which were used for many former studies. The resulting model consists of a system of ordinary differential equations; thus, it can be investigated using classical methods for dynamical system analysis.

We investigated asymptotic behaviour of the system (i.e. critical points, limit cycles etc.) for different idealized situation. Additionally we compared the model results with results from detailed model simulations and in-situ measurements. Although we used a highly simplified model, the results agree very well, thus this approach might be helpful for investigating key features of cirrus clouds.