Chair: Physics of Fluids Group

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Convection in Moist Atmospheres

Description

This master thesis is focused on understanding the key mechanisms of turbulence convection in moist atmospheres. In particular, the main goal is to numerically study the effect of moisture using two different models (Vallis et al., 2019; Mellado et al., 2010), and two different simulation methods. Overall, this study will light up an important aspect of the Earth's climate, as moisture is a key factor in the formation of clouds and precipitation.

The project will be carried out using both the direct numerical simulation (DNS) code AFiD, and a large-eddy simulation (LES) code, both in-house codes widely used by our group to conduct research. The student will learn how to run and postprocess simulations, which will be performed in EU supercomputers, and to research on key processes of the Earth's climate. In general, the flexibility of the topic allows for personal insights and suggestions by the students throughout the whole project. For example, at the discretion of the student, it will also be possible to extend the models to include the effect of radiative heating, of fundamental importance for clouds (Wood, 2012).

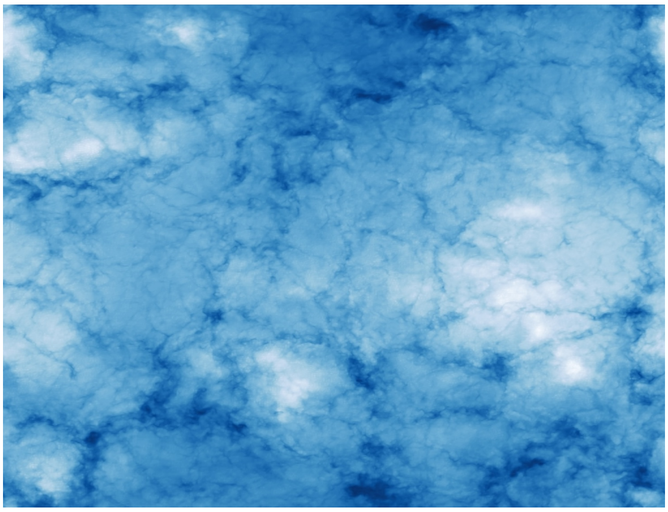

Figure 1: Top-view of a simulation of Stratocumulus Clouds using the LES code.

References

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