ATOC LASP SEMINAR
Friday, April 27, 2018 at 1100am
Sievers Conference Room (SEEC S228)

ARCTIC AMPLIFICATION:

— The Role of Mixed-Phase Clouds —

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Within the last 25 years a remarkable increase of the Arctic near–surface air temperature exceeding the global warming by a factor of two to three has been observed. This phenomenon is commonly referred to as Arctic Amplification. The Arctic climate has several unique features, for example, the mostly low solar elevation, regularly occurring polar day and night, high surface albedo, large sea ice covered areas, an often shallow atmospheric boundary layer, and the frequent abundance of low–level mixed–phase clouds. These characteristics influence the physical and bio–geochemical processes (such as feedback mechanisms of water vapor, clouds, temperature, and lapse–rate), atmospheric composition (trace gases, aerosol particles, clouds and precipitation), as well as meteorological (including energy fluxes) and surface parameters. In addition, meridional atmospheric and oceanic transports and exchanges between ocean, troposphere, and stratosphere largely control the Arctic climate. Although many individual consequences of changes in the above parameters and processes are known, their combined influence and relative importance for Arctic Amplification are complicated to quantify and difficult to disentangle. As a result, there is no consensus about the mechanisms dominating Arctic Amplification.

To improve this situation the scientific expertise and competency of several German research institutes and three universities are combined in the framework of a Transregional Collaborative Research Centre TR 172. Observations from instrumentation on satellites, aircraft, tethered balloons, research vessels, and a selected set of ground–based sites are being integrated in dedicated campaigns and long–term measurements. The field studies are conducted in different seasons and meteorological conditions, covering a suitably wide range of spatial and temporal scales. They are performed in an international context and in close collaboration with modelling activities.

The presentation will give an overview of the activities conducted and planned within TR 172. Specifically the talk will be on the impact of Arctic mixed-phase clouds on the atmospheric energy budget, which is the focus of the ACLOUD measurement campaign. First results of the ACLOUD observations will be discussed in the talk.