**Investigation of the diurnal cycle of stratocumulus clouds at the northern coast of Chile**

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Marine stratocumulus clouds of the eastern Pacific play an essential role in the Earth's energy and radiation budget. Parts of these clouds off the west coast of South America form the major source of water to the hyper-arid area at the northern coast of Chile. Within the DFG collaborative research center 'Earth evolution at the dry limit', for the first time, a long-term study of the vertical structure of clouds and their environment governing the moisture supply to the coastal part of the Atacama is available.

Three state of the art ground based remote sensing instruments were installed for one year at the airport of Iquique/Chile (20.5°S, 70.2°W, 56m a.s.l.) in close cooperation with Centro del Desierto de Atacama (Pontificia Universidad Católica de Chile). The instruments provide vertical profiles of wind, turbulence and temperature, as well as integrated values of water vapor and liquid water. Instrument synergy provides vertical cloud structure information.

We observe a land-sea circulation with a super-imposed southerly wind component. Highest wind speeds can be found during the afternoon. Clouds show a distinct seasonal pattern with a maximum of cloud occurrence during winter (JJA) and a minimum during summer (DJF). Clouds are higher and vertically less extended in winter than in summer. Liquid water path shows a diurnal cycle with highest values during night and morning hours and lowest values during noon. Furthermore, the clouds contain much more liquid water in summer. The turbulent structure of the boundary layer, together with the temperature profile, can be used to characterize the mechanism driving the cloud life cycle.

**Meteorological Observations in the Atacama from a new climate stations network**

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The Atacama is one of the driest regions on earth and thus forms a natural laboratory for different science fields as e.g. astronomy, space science, exobiology or geology. The collaborative research center CRC1211 'Earth evolution at the dry limit' of the German science foundation (DFG) brings together some of these fields to gain new insights in evolution of life, land surface processes and climatology.

Despite the outstanding characteristics of the Atacama there is a lack of meteorological observations in the region. For that reason, the CRC1211 set up a network of 15 climate stations. It covers the region from about 19.7°S to 25°S from the coast to the slope of the Andes and is organized in 3 transects covering the focus areas of the project.

The network was completed in March 2018. A first analysis of the data will be presented. A distinct wind system is present at all stations with strong westerly winds from noon to late evening and weak easterly winds in the night and morning hours. In parallel to this diurnal cycle, water vapor shows a regular pattern indicating a significant transport of water vapor into the desert. Fog occurs frequently in the coastal mountain range and decreases further inland.