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Modelling Namibian dust emission in the framework of AEROCLO-sA

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The southwestern coast of southern Africa is one of the driest regions in the world. It is not surprising that the arid to hyperarid conditions there lead to a very low expanse in vegetation cover and to a huge amount of barren sediments that are prone to wind erosion. In fact, a number of studies have already proven the importance of southern African dust sources for the atmospheric dust load from both, large scale features like salt pans as well as small geomorphologic features like ephemeral river basins along the coastline.

Adjoined to the AEROCLO-sA campaign, the EUFAR funded project ALLDUST-SA (Alluvial Dust Sources – a Sub-Basin Analysis) took place in Namibia in August and September 2017 and focused on the precise localization of dust sources in Namibia using LIDAR measurements.
The study consists of two parts: The first part makes use of different LIDAR systems operating onboard the SAFIRE F20 aircraft during the campaign and at ground-based sites in Namibia, as well as satellite dust and AOD products. We will present first results on the spatio-temporal variability of active dust sources and the vertical distribution of dust in the atmospheric column.
In the second part, we will show how the gained knowledge on the localization and characteristic of dust sources in Namibia can be implemented in dust-emission-models: As a first attempt, an offline dust emission model is used to reproduce the activity of Namibian dust sources by determining and including surface characteristics that are responsible for the variability in dust emission. Like this, the study provides a first step towards a better representation of southern African dust sources in dust emission models and for a better estimation of the total atmospheric aerosol load in the region.