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# The impact of the desiccation of Lake Chad on the local meteorology: a model study

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Lake Chad was once one of the largest lakes in Africa with a surface area of about 25000 $km^2$. However, because of a series of droughts that began in the 1960's, the lake has shrunk to almost one-tenth of its maximum area. Also anthropogenic influences like the drilling of boreholes and large-scale irrigation systems have played their role in the demise of the lake. The disappearance of such a large open-water body in the semi-arid Sahel environment can be expected to have a noticeable effect on the meteorology in the surroundings of the lake. The impact could extend even further to the west as a lot of westward propagating convective systems pass Lake Chad in the rainfall season.

To test this hypothesis, three Lake Chad scenarios are applied in a regional atmospheric model that simulates the rainfall season of 2006 (July-September). The scenarios reflect the situation in the 1960's with a large lake, the present day situation and a possible future scenario where the lake is completely desiccated. The model used for this study is the Advanced Regional Prediction System (ARPS), developed at the University of Oklahoma. The model is already extensively used and validated for the Sahelian environment. The simulations are performed with a horizontal resolution of 15 km which is high enough to gain insight in possible alterations of passing convective systems.

Preliminary results show that the modelled total rainfall amounts compare well with best-estimate precipitation images from the Tropical Rainfall Measurement Mission (TRMM). The shrinking of Lake Chad seems to have a significant influence on the distribution of the rainfall around the lake whereas total rainfall amounts are hardly changed. Further away from the lake, the impact seems to be limited. In a deeper and wider analysis of the model results, the mechanism behind the changes is investigated. Also the effect on a single passing convective system is explored.