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Rainfall and evapotranspiration climatologies for current and future climates in southern Morocco

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Using a statistical dynamical downscaling approach, high resolution climatologies for rainfall and evapotranspiration are obtained for a semi-arid research site in southern Morocco. The investigated area is located south of the Atlas mountains at the northern border of the Sahel desert. It has semi-arid climate with less than 100mm rainfall per year and includes a river oasis, fed by irrigation water, distributed from an artificial lake near the city of Ouarzazate (30˚56'N, 6˚54'W). The downscaling uses Circulation Weather Types (CWTs) as a measure for near surface wind fields calculated from NCEP Reanalyses sea level pressure (SLP) data for the period 1958 – 1997. The daily CWTs are correlated with daily rainfall data at an adjacent climate station (Ouarzazate) for the period 1978 – 1997. Nested meteorological simulations are then conducted for representative days for relevant classes, using the non-hydrostatic mesoscale model FOOT3DK (**F**low **O**ver **O**rographically structured **T**errain, **3**-**D**imensional, **K**öln Version). Climatologies for the current climate are calculated for the NCEP-Reanalyses period. Future climatologies are based upon ECHAM4/OPYC3 SLP data for the IS92b run period 2030 – 2089. Additionally, we will present results for climate simulations with the ECHAM5 model A1b run 3-member ensemble at the conference, which are currently processed.

The difference of NCEP Reanalyses and ECHAM4/OPYC3 control period SLP fields for the area of interest is larger, than the climate signal. Results should therefore be interpreted with caution. Nevertheless, we can use the climate trend in ECHAM4/OPYC3 data and apply this trend to the climatologies obtained from NCEP Reanalyses. Results show an increase of days with CWTs that favour rainfall in the region, that would lead to an increase of rainfall amount by 17% and of evapotran-

spiration by 5%. The changes included in this kind of analysis only cover dynamical changes and do not include the possible enhancement of rainfall per event due to enhanced air temperature and therefore possibly enhanced moisture transport.

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