



Role of the internal variability on Sahel precipitation change

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Projections of the West African Monsoon evolution is highly uncertain, due to i) scenario differences, ii) model parametrizations, iii) initial climate variability. We assess in this study the role of internal climate variability on the climate projections ; especially for short term projections, for which internal climate variability has a stronger impact. We used the large ensemble of the National Centre for Atmospheric Research (40 members for both historical and RCP8.5 emission scenario). We can accurately estimate the forced response (due to the external forcings) with the 40 members and separate the impact of the climate internal variability from the impact of the greenhouse gaz concentration increase.

The impact of the internal climate variability is stronger than the forced response for short term projections, and especially over the western Sahel. More precisely, internal climate variability can offset the impact of the external forcings over the Western and Central Sahel. We therefore concluded that short-term projections are not reliable over the Sahel. We then defined that 10 members, at least, are a minimum to estimate the forced response and to reduce the signal-to-noise ratio over the Sahel.