

## **Influence of Arctic sea-ice and greenhouse gas concentration change on the West African Monsoon.**

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The Sahelian precipitation are projected to increase in the CNRM-CM5 coupled climate model due to a strengthening of the land-Sea temperature gradient, the increase in the North Atlantic temperature and the deepening of the Heat Low. Arctic Sea-Ice loss impacts the low-level atmospheric circulation through a decrease in the northward heat transport. Some authors have linked the sea-ice loss to a poleward shift of the InterTropical Convergence Zone. Within the CMIP5 models the effect of these mechanisms are not distinguishable and it is difficult to understand the effect of the Arctic sea-ice loss on the West African Monsoon so far. We performed several sensitivity experiments with the CNRM-CM5 coupled climate models by modifying the arctic sea-ice extent and/or the greenhouse gas concentration. We then investigated separately the impact of Arctic sea-ice loss and greenhouse gas concentration increases on the West African Monsoon. The increase in greenhouse gas explains the northward shift and the strengthening of the monsoon. Its effect is stronger with a sea-ice free Arctic that leads to an increase in North Atlantic temperature and in Sahelian precipitation at the end of the rainy season (September-October). We argue that the decrease in sea-ice extent, in the context of the global warming, may moistens the Sahel during the rainy season by changing the pressure, winds and moisture fluxes at low-level.