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# Detecting vegetation-precipitation feedbacks in mid-Holocene North Africa from two climate models

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Abstract. Using two climate-vegetation model simulations from the Fast Ocean Atmosphere Model (FOAM) and the Community Climate System Model (CCSM, version 2), we investigate vegetation-precipitation feedbacks across North Africa during the mid-Holocene. From mid-Holocene snapshot runs of FOAM and CCSM2, we detect a negative feedback at the annual timescale with our statistical analysis. Using the Monte-Carlo bootstrap method, the annual negative feedback is further confirmed to be significant in both simulations. Additional analysis shows that this negative interaction is partially caused by the competition between evaporation and transpiration in North African grasslands. Furthermore, we find the feedbacks decrease with increasing timescales, and change signs from positive to negative at increasing timescales in FOAM. The proposed mechanism for this sign switch is associated with the different persistent timescales of upper and lower soil water contents, and their interactions with vegetation and atmospheric precipitation.

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