



Sensitivity of Sahel precipitation to albedo changes as depicted by a regional climate model

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The idea of a long belt of new vegetation across the Sahel region in northern Africa to prevent desertification, generate precipitation, improve the soil quality, protect the biodiversity, etc., is tested using a number of regional climate model simulations.

The vegetation belt, centered at 15 degrees N, is simulated through a decrease in model albedo, using the DMI HIRHAM5 model at a 50 km resolution. The simulations performed can be divided into 1) ERA Interim driven experiments for the period 1988-2012 and 2) EC-EARTH global climate model driven time slice experiments (reference period 1976-2005 and scenario period 2071-2100) using the emission scenarios RCP 4.5 and RCP 8.5.

A number of experiments are performed, with different combinations of latitudinal extent of the green belt (between 1 and 2 degrees) and levels of numerical change in the albedo (between -0.06 and -0.03) with respect to a control run. The simulations show a significant change in the precipitation pattern and precipitation amount due to the altered albedo characteristics, especially south and southwest of the green wall, with areas experiencing an average increase in precipitation above 400 mm/year. The average precipitation for the region in the control run is 500 mm/year.