Geophysical Research Abstracts
Vol. 15, EGU2013-11189, 2013
EGU General Assembly 2013

Impact of a projected future Antarctic sea-ice reduction on the West African Monsoon

Juergen Bader, Aiko Voigt, and Davide Zanchettin
Germany (juergen.bader@zmaw.de)

Several model and observational studies have demonstrated a strong relationship between Sahel rainfall variability and sea-surface temperatures anomalies during the 20th century. However, this relationship does not explain Sahel rainfall changes in model projections of the 21st century. This raises the possibility that other forcing factors might become predominant at the end of the 21st century. Here, simulations with the atmosphere general circulaton model ECHAM5 are performed to investigate to which extent reductions in Antarctic sea ice affect Sahel rainfall during boreal summer. To this end, the model is forced by the present and a projected future seasonal cycle of Antarctic sea ice with sea-surface temperatures outside tha Antarctic sea-ice region kept constant. Reducing the Antarctic sea ice leads to an equatorward shift of the tropical rainbelt over sub-Saharan Africa. The shift entails a strong decline of summer Sahel rainfall and a substantial rainfall increase along the Guinea Coast. The shift is associated with an atmospheric bridge that does not require changes in tropical sea-surface temperatures. While Antarctic sea-ice reductions clearly impact Sahel rainfall in our idealized ECHAM5 simulatons, they do not seem to substantially influence Sahel rainfall in the ECHAM5 CMIP3 A1B simulation.