Geophysical Research Abstracts,
Vol. 10, EGU2008-A-01681, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-01681
EGU General Assembly 2008

Influence of intraseasonal sea surface temperature anomalies on the West African Monsoon

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Convective anomalies over West Africa during the monsoon season are simulated as a response to sea surface temperature (SST) anomalies associated with the Madden-Julian Oscillation (MJO) over the equatorial warm pool region. An atmosphere-only global circulation model is used and forced with SST anomalies based on the dominant mode of convection over the warm pool during the Northern Hemisphere summer. The response is analysed using lagged composites. Positive (negative) SST anomalies have upward (downward) vertical motion and positive (negative) mid-tropospheric temperature anomalies leading to locally enhanced (reduced) convection approximately 3 days later. These mid-tropospheric temperature anomalies propagate eastwards as a Kelvin wave and westwards as a Rossby wave, reaching Africa approximately 10 days later. The positive (negative) temperature anomalies act to stabilise (destabilise) the troposphere resulting in suppressed (enhanced) convection over the Gulf of Guinea, extending over West and Central Africa. Possible mechanisms for the convective responses over Africa as a response to these SST anomalies are investigated.