

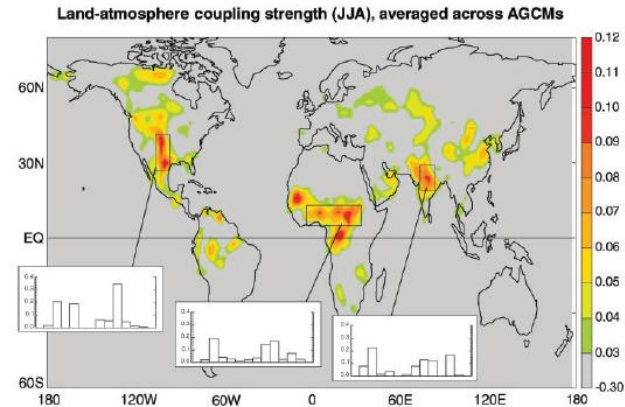
Land-Atmosphere Feedbacks and Internal Variability of Indian Summer Monsoon

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Motivation

- Land-atmosphere interactions are recognized as one of the important sources of variability of Indian summer monsoon rainfall (ISMR) (Ferranti et al., 1999; Koster et al., 2000, 2004; Takata et al., 2009).



- About ~50% of the interannual variability (IAV) of ISMR is explained by slowly varying large-scale influences (e.g. SST, snow cover etc.). The remaining half is governed by internal dynamics (Goswami and Xavier, 2005).
- Seasonal bias of the intraseasonal oscillation (ISO) anomalies contributes to the seasonal mean rainfall and explain about half of the amplitude of 'internal' IAV (Goswami and Xavier, 2005).
- Can the amplitude of ISOs be modulated by land-atmosphere interactions over the Indian summer monsoon region and lead to seasonal (JJAS) rainfall anomaly?
- Climatological ISO (CISO) represents a predictable component of the ISOs and explain about 30-40% of the IAV. Modulation of the amplitude of CISO may also lead to seasonal rainfall anomaly.

Hypotheses

- A strong (weak) active phase of ISO leads to a strong (weak) break phase during the ISM season and can contribute to seasonal rainfall anomaly.
- Internal rainfall variability generated at the pre-onset time (i.e. May to June) due to land-atmosphere interactions can modulate the CISO and contribute towards IAV.

To test the hypotheses

Model selected: RegCM3

Land surface model: BATS

Lateral boundary conditions : NCEP Reanalysis

Lower boundary : Reynolds weekly SST

- **Control simulation with RegCM3 (01Nov1981 till 31Dec2008)**
- **Fixed Boundary Condition (FBC) experiments (FBC-1982, FBC-1989)**
- **Sensitivity experiment with prescribed annual cycle of soil moisture.**