



Impact of air-sea interaction on the NH summertime atmospheric mean state, interannual variability and tropical-extratropical teleconnections

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The impact of air-sea interactions on the North Hemisphere summer atmospheric mean state, interannual variability and the Indian Summer Monsoon-Southern Europe teleconnection is investigated in two 45-year long experiments with the Met Office Unified Model. In the first coupled experiment, the atmosphere is allowed to freely interact with a high resolution mixed-layer ocean model. The diagnosed daily SSTs from this experiment are then used to force an atmosphere-only uncoupled experiment. In the coupled experiment, the summer-mean North Atlantic eddy-driven jet is shifted poleward and the subtropical jet is shifted equatorward compared with the uncoupled experiment. The coupled experiment also exhibits about half of the interannual variability of tropical precipitation compared with the atmosphere-only experiment and the coupled is much less biased against observations. It is also shown that air-sea interactions improve the model representation of observed tropical-extratropical teleconnections. In particular, the coupled experiment is able to capture the observed westward propagating Rossby-wave trains excited by the Indian Summer Monsoon, while in the uncoupled experiment the Rossby-wave response is more local.