



Analysis of the Asian monsoon response to ENSO in the Met Office GloSea4 seasonal hindcasts

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Seasonal forecasting of the Asian summer monsoon and its response to ENSO is of significant importance to the local population, but dynamical models often struggle to reproduce the observed response in particular years. Here we examine the seasonal response of the Asian summer monsoon to ENSO forcing in the Met Office's GloSea4 seasonal forecasting system over a hindcast period from 1992-2005, focusing on initialisation dates of 25th April and 1st, 9th May. El Nino case studies for 1997 (large amplitude, east Pacific) and 2002 (moderate amplitude, central Pacific) are examined. While long climate runs of this model show realistic Asian monsoon-ENSO teleconnections, the model struggles to reproduce the particular response seen in the observations for these two years. In 1997, the Asian summer monsoon featured near normal rainfall in observations, despite the large amplitude of the Pacific sea surface temperature anomalies; however, the hindcast simulates monsoon drought. In 2002, there occurred one of the worst monsoon droughts in recent decades, in spite of the moderate El Nino conditions. In contrast, the hindcast suggested anomalously strong rainfall over central India in some members. In both these cases, the observed anomalous subsidence over the Indian Ocean sector associated with El Nino is situated too far to the west in the hindcast, erroneously impacting or missing India in 1997 and 2002 respectively. We examine whether errors in the daily evolution of the coupled model SST field subsequent to the initialisation can be implicated in the poor hindcast skill. We hypothesize that systematic model biases in the equatorial west Pacific lead to the incorrect placement of the diabatic heating anomalies associated with El Nino during these years, to the detriment of the monsoon-ENSO teleconnection as found in other modelling studies.