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Title: Subseasonal-Seasonal Predictions of the Asian Monsoon in the NCEP Climate Forecast System Version 2
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Abstract:
Major features of subseasonal-seasonal prediction of the Asian monsoon in the NCEP Climate Forecast System version 2 (CFSv2) will be discussed. The summer monsoon, winter monsoon, and the annual cycles of monsoon phenomena over South Asia, East Asia, and Southeast Asia will be addressed. The quasi-biweekly oscillation over tropical Asia and the Mei-yu climate over East Asia are also investigated. Several aspects of monsoon features including the relationships between monsoon and ENSO (including different types of ENSO: eastern Pacific warming and central Pacific warming), extratropical effects, dependence on time leads (initial conditions), regional monsoon features, and comparison between CFSv2 and CFS version 1 (CFSv1) are particularly emphasized.^M
Large-scale characteristics of the Asian summer monsoon including several major dynamical monsoon indices and their associated precipitation patterns can be predicted several months in advance. The skill of predictions of the monsoon originates mostly from the impact of ENSO. It is found that large predictability errors occur in first three lead months and they only change slightly as lead time increases. The large errors in the first three lead months are associated with the large errors in surface thermal condition and atmospheric circulation in the central and eastern Pacific and the African continent. In addition, the response of the summer monsoon to ENSO becomes stronger with increase in lead time. ^M
The CFSv2 successfully simulates several major features of the East Asian winter monsoon and its relationships with the Arctic Oscillation, the East Asian subtropical jet, the East Asian trough, the Siberian high, and the lower-tropospheric winds. Surprisingly, the upper-tropospheric winds over the middle-high latitudes can be better simulated than those over the tropics, and the CFSv2 can better depict the major features of precipitation compared to surface temperature. Overall, the winter monsoon can be predicted several months in advance. ^M
Compared with CFSv1, there are apparent improvements in the CFSv2 for simulations of the climatology of precipitation, monsoon circulation, and large-scale monsoon variations, for both winter monsoon and summer monsoon. The annual cycle of tropospheric temperature in CFSv2 is also more reasonable than that in CFSv1. However, the South Asian summer monsoon is not well simulated in the CFSv2. There are large biases in precipitation over the eastern equatorial Indian Ocean in CFSv2. In both versions, the western Pacific subtropical high is weaker than observed. While warm biases appear in the northern Pacific in both versions, the cold bias in Asian continent in CFSv1 is replaced by a warm bias in CFSv2. ^M

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