

### **Response of the East Asian Monsoon to Solar Cycle**

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This study find a special time period within the summer half-year and a special region in the East Asia from 1958 to 2012 when and where precipitation response is sensitive to solar cycle. And the time period has an explicit physical significance. It just corresponds to the typical East Asian monsoon rainy season (mei-yu season), characterized by a largescale quasi-zonal monsoon rainband (i.e., 22 May–13 July). The place is also a special region where the boundary of summer monsoon located during the rainy the season. The statistically significant correlation and the relatively explicit physical significance together strongly indicate a regular response of the East Asian monsoon to the 11-year solar cycle during the last five solar cycles. During the high SSN years, the mei-yu rainband lies 1.2 degree farther north, and the amplitude of its interannual variations increases when compared with low SSN years. The robust response of monsoon rainband to solar forcing is related to an anomalous general atmospheric pattern with an up–down seesaw and a north–south seesaw over East Asia. The up–down seesaw is related to the stratospheric ozone and the tropopause westerly jet and the north-south seesaw to the onset of the tropical monsoon and a SST anomaly in a key region of the western Pacific.