



Relationship between early autumn Arctic sea ice and East Asian wintertime transient eddy activity

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The Arctic sea ice is suggested with wide impacts on the winter climate over East Asia. In this study, the relationship between the early autumn Arctic sea ice and the wintertime transient eddy activity over East Asia is investigated. Our singular value decomposition (SVD) analysis between the Arctic sea ice concentration (SIC) and transient eddy kinetic energy (EKE) shows that with the decrease in SIC over the Siberia coast, Kara sea and Barents sea, the EKE around the Tibetan Plateau and the downstream regions increase significantly. This leading mode indicates that more than 60% variance of the wintertime East Asian transient eddy activity can be predicted from the SIC three month earlier. Possible dynamical processes responsible for the linkage between SIC and EKE are investigated. In the upstream of Tibetan Plateau, a branch of anomalous wave train is detected propagating southward from Ural Mountains to the North China and Tibet. In the downstream region of Tibetan Plateau, with the decrease in SIC, anomalous increase in synoptic eddy generation is found with the enhanced baroclinicity over the north slope of the Tibetan Plateau, which can result in the increase in EKE as well. Those two dynamical processes both act to enhance the transient eddy activity over East Asia.