Dynamical and Hydrological Fingerprints of the East Asian Cold Surge over the North Pacific

Tianyu Jiang* and Yi Deng
School of Earth and Atmospheric Sciences, Georgia Institute of Technology, Atlanta, GA

Coupling of the North Pacific Hydrological Cycle to Synoptic and Subseasonal Atmospheric Variability

Cold Surge – Definition and Event Selection

Cold Surge Fingerprint in Tropospheric Geopotential Height

Cold Surge Fingerprint in Moisture Transport

Cold Surge Fingerprint in the Coastal Precipitation of North America

Wrapped up

Immediately following an East Asian cold surge in boreal winter, well organized high-frequency (synoptic-scale) and low-frequency disturbances are observed over the North Pacific. The low-frequency disturbances has generally larger amplitude and tend to propagate equatorward, in contrast to the high-frequency disturbances that show poleward propagation. Large-scale moisture transport over the North Pacific is greatly altered by these two groups of disturbances with the high-(low-)frequency disturbances leading to enhanced moisture convergence and surface precipitation over the Bering Sea an Gulf of Alaska (west coast of North America) 2-3 (4-5) days after the peak of the cold surge. The East Asian cold surge thus acts as a “remote” accelerator for the hydrological processes over the eastern North Pacific.

References:
