

The Extratropical Transition of Choi-Wan (2009) and its role in the formation of high impact weather in North America".

J.H. Keller and C.M. Grams (presenting author)

Some days after the ET of Super-Typhoon Choi-Wan (2009), significant weather events were recorded in North America. An early autumn heat wave occurred along the West Coast, with record maximum 2m temperatures in California and the Pacific Northwest. In contrast, record minimum 2m temperatures were reported from stations in Colorado, Texas and New Mexico. Additionally, some regions in the southeastern US experienced record-breaking precipitation amounts.

Previous studies indicated the potential role of the transitioning TC in amplifying the downstream midlatitude wave train. However, these studies did not investigate the relative contributions of the transitioning TC and of a frontal wave, with which the TC merged during ET, on the development in the downstream midlatitudes. By conducting PV surgery experiments with the regional COSMO model, we are able to reveal the contributions of a) the TC, b) the frontal wave and c) the merger between TC and frontal wave to the amplification of the midlatitude Rossby wave train and the associated high impact weather in downstream regions.

Our study identifies the contributions of the synoptic systems, based on the eddy kinetic energy budget. A gradual contribution is found with the merger of Choi-Wan and the frontal wave resulting in the strongest amplification of the wave train, followed by the impact solely due to the TC. The high impact weather over North America, which resulted from the strongly amplified wave train would have been less in magnitude and shifted in space without the contribution of Choi-Wan.