Rossby wave trains as precursors to strong cyclones

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It has been shown in the past that Rossby wave trains can serve as precursors to strong surface cyclones. One famous case is the cyclone that led to catastrophic flooding over parts of Central Europe in August 2002. Using a composite analysis, we demonstrate that, on average, strong surface cyclones over Europe are associated with an extended and long-lived upper-tropospheric Rossby wave train. By projecting the upper tropospheric flow onto these Rossby wave patterns we quantify the statistical predictability of surface cyclones. Comparison with an earlier study for cyclones over the East Pacific Ocean shows noteworthy differences. It is suggested that these are related to the relative location of the target cyclones with respect to the storm track. We also investigated the skill of a particular numerical prediction system to forecast Rossby wave trains. It turns out that the model has a negative bias regarding the size and the strength of Rossby wave trains.