



Link between warm conveyor belts and fronts and the impact on extreme rainfall

Jennifer Catto (1), Erica Madonna (2), Hanna Joos (2), Heini Wernli (2), Irina Rudeva (3), and Ian Simmonds (3)
(1) Monash University, Melbourne, Australia (jennifer.catto@monash.edu), (2) IAC, ETH Zurich, Switzerland, (3) University of Melbourne, Melbourne, Australia

The various dynamical features within extratropical cyclones have been shown to be very important for the precipitation produced by these systems. Warm conveyor belts (WCBs) and fronts are both strongly associated with total and extreme precipitation in the midlatitudes. Here we have brought together two automated feature detection methods to answer questions on the frequency of matching of fronts and WCBs, whether this depends on frontal type or height of WCB, and the impact this matching has on extreme precipitation events.

We find that WCBs and fronts are strongly related in the midlatitudes – annually 60% of WCBs are associated with cold fronts and around 50% associated with warm fronts, and a fairly large proportion associated with both together. The frequency of linked WCBs and fronts shows a strong seasonal cycle. In some regions warm fronts are more strongly linked to WCBs than cold fronts. To the east of Australia in particular, there are often WCBs not associated with fronts at all. Fronts that co-occur with a WCB are much more likely to produce an extreme precipitation event.