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**WARM CONVEYOR BELTS : CLOUD STRUCTURE AND ROLE
FOR CYCLONE DYNAMICS AND EXTREME EVENTS**

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Abstract :

Warm conveyor belts (WCBs) are strongly ascending, cloud and precipitation producing airstreams in extratropical cyclones. The intense cloud-diabatic processes lead to tropospheric potential vorticity (PV) modifications in the lower and upper troposphere, which can have a profound impact on the evolution of the synoptic- and large-scale flow. In the early phase of the WCB ascent diabatic PV production leads to the formation of a strong low-level positive PV anomaly, while at upper levels a negative PV anomaly is generated in the WCB outflow. In this talk we will first look at WCBs in satellite observations from the CloudSat radar, in order to gain an observational perspective on their vertical cloud structure. The second part will address the question how WCBs and the associated low-level positive PV anomalies influence cyclone intensification. For a large climatological set of cyclones in Northern Hemisphere winter, it will be shown that diabatic PV production in WCBs is essential for the intensification of many explosively developing cyclones. Finally, we will turn our attention to the WCB-related negative PV anomalies produced in the upper troposphere. Based on the analysis of an extreme wintertime Arctic warm event, it will be illustrated that the low-PV air in the WCB outflow can interact with the extratropical waveguide and thereby contribute essentially to the formation of high-impact weather.