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Interactive comment on "Observations and simulation of intense convection embedded in a warm conveyor belt – how ambient vertical wind shear determines the dynamical impact" *by* Annika Oertel et al.

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Review of Observations and simulation of intense convection embedded in a warm conveyor belt – how ambient vertical wind shear determines the dynamical impact

by

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Summary:

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Discussion paper

This paper documents the observed occurrence of convective and stratiform features in an intense ETC that occurred during the NAWDEX field campaign. This storm was observed multiple times using airborne high altitude radar, and was also simulated using a convection permitting mesoscale model. The paper very effectively blends the observational and modeling analysis to diagnose the occurrence of convection in the storm, and presents a comprehensive analysis of the dynamic, thermodynamic, and cloud features. The authors find interesting differences between the occurrence and properties of moderate vs strong convection, and comparison vs an earlier anlyzed case indicates there is significant storm-to-storm variability.

This is a very well written and comprehensive analysis, and I found little to criticize. I have only a few questions and suggestions, and detail these below.

Questions / comments:

1. According to the online documentation, the MIRA-36 radar includes doppler velocity. I was curious as to what the observed updraft strengths in the radar observations were? If Doppler observations are available, it would be very interesting to see these plotted alongside of the reflectivity plots.

2. A very minor request - in Fig. 1 it would be helpful if there were text located above each column of sub-figures indicating the date/time of analysis.

3. The authors use observations from the WWLLN. I am curious as to whether the WWLLN observations extend north of 40 degrees latitude? If so, was lightning detected in the warm frontal region at any time during the storm development?

4. I thought it was interesting that the intense convection plotted in Fig. 6 appeared to occur within the warm front at earlier times, then shifted southward to along the cold front later (as the parent storm propagated northward). I wonder if, at later times, the strong convection to the south effectively stabilized the WCB air that later entered the region with moderate convection? Is it possible that, had there not been convection

along the CF, that the convection in the WF near the cyclone center might have been stronger? I am thinking of this from the perspective of a thermodynamic (or perhaps available convective available potential energy) budget. . .

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