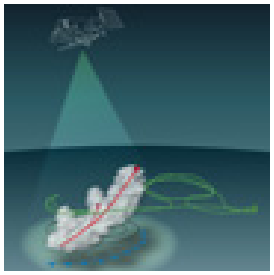

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# Revisiting the isentropic view of PV modification in warm conveyor belts

*Wednesday, 11 March 2020 11:10 (20 minutes)*

Potential vorticity (PV) provides a conceptual stepping stone from diabatic heating rates in warm conveyor belts to their impact on the large-scale flow. Given the diabatic heating rates, the associated modification of the PV field can be computed and the resulting PV anomalies used to understand both the local intensification of the parent cyclone and any downstream impacts on the larger-scale Rossby wave in which it is embedded. Determining the impact of the heating rates on the PV field is almost always done from a Lagrangian perspective following air parcel trajectories: WCB trajectories typically start in the atmospheric boundary layer with low PV, their PV increases whilst beneath the heating maximum, reaches a maximum mid-ascent, and then reduces to low values again in the upper troposphere. This framework provides a conceptually simple extension to the usual interpretation of PV under adiabatic conditions. However, it is not the only option when diabatic heating is acting. Here we explore the equally-valid, but much less widely used, approach of following the evolution of PV along isentropic trajectories. This approach is appealing because it makes a closer connection with Kelvin's circulation theorem, but is it useful? We take a pragmatic view and ask: can anything be learnt from the isentropic framework that we don't already know from air parcel trajectories?

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