

10.3 Forcing data at WRF lateral boundary corner and its impact on storm intensification – a case study through mid-latitude cyclone Christian.

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Several studies have shown that lateral boundaries can strongly influence the results of regional climate and weather models. In this study, it was found that there are challenges in simulating the intensity of mid-latitude cyclones in WRF, based on the sea level pressure, relative vorticity, and wind speed, when the storm center enters near the corner of the outermost domain. Several methods were tested to improve the model result, including spectral and grid nudging techniques, a sponge layer adjustment, and the use of different forcing data. CFSv2 and ERA5 forecast products and an MPAS global run with a quasi-uniform mesh were used each with varying update frequencies. The results suggest that the intensification problem is independent of the forcing data, but highly dependent on the update frequency of the LBCs, and that sponge layer adjustments and nudging techniques do not fully correct this effect. This highlights the strong influence of temporal scales compared to the spatial scales in fast moving systems.