Reducing TC False Alarms in Canadian NWP

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The Canadian Global NWP system has had a strong over-prediction bias for tropical cyclones since the introduction of the GEM model ~15 years ago. The mid-2019 upgrade to the operational Global and Regional forecasting systems essentially eliminates this bias and leads to highly significant improvements in forecast skill for tropical and midlatitude regions. The basis for this upgrade is a modernization of the physical parameterization suite, with the majority of major schemes either replaced or heavily modified to improve the model's ability to represent physical processes in the atmosphere. One of the important changes is the inclusion of convective momentum transport (CMT) in all convection schemes: shallow, deep and mid-level. The successful introduction of CMT in the deep convection scheme requires careful treatment of across-cloud pressure gradients in the overshooting layer, but has a dramatic impact on tropical wind profile forecast skill. In addition to improving day-to-day guidance, it is the activation of deep convective CMT that reduces TC activity to near observed levels. In this study, we investigate this result from a physical perspective (e.g. impact on environmental shear and vortex dynamics) and compare it with the conclusions drawn from earlier implementations of CMT in other global modelling systems.