

Title :

The stratospheric extension of the Canadian global deterministic medium range weather forecasting system and its impact on tropospheric forecasts.

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Abstract :

A new system which resolves the stratosphere was implemented for operational medium range weather forecasts at the Canadian Meteorological Centre. The model lid was raised from 10 to 0.1 hPa, parameterization schemes relevant to the stratosphere were introduced and a new radiation scheme was implemented. Because of the higher lid height of 0.1 hPa, new measurements between 10 and 0.1 hPa were also added. This new High Top system resulted not only in hugely improved forecasts of the stratosphere, but also in large improvements in medium range tropospheric forecast skill. Most of the stratospheric and tropospheric forecast improvement is obtained without the extra observations in the upper stratosphere. However, these observations further improve forecasts in the winter hemisphere. The large improvements in stratospheric forecast skill are found to be due to the higher lid height of the new model. The new radiation scheme helps to improve tropospheric forecasts. However, the degree of improvement seen in tropospheric forecast skill could not be entirely explained with these purely forecast experiments. It is hypothesized that the cycling of a better model within the data assimilation procedure provides improved initial conditions which result in improved forecasts.