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## Impact of a new land surface package in Canadian numerical weather prediction system on the medium range weather forecast in the lower and upper atmosphere

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A new land surface package developed at Environment and Climate Change Canada (ECCC) has been evaluated in the context of the medium-range global deterministic numerical weather prediction (NWP) system. The evaluation is performed by comparison of NWP forecasts against near-surface and

atmospheric analyses. The new land surface package includes i) new databases to specify soils and vegetation characteristics, ii) improved initialization of land surface variables by the assimilation of space-based remote sensing observations, and iii) a more sophisticated land surface scheme.

Evaluation for the screen-level air temperature and humidity indicates that the new land surface package resulted in smaller STDEs and larger temporal correlation between forecasts and analyses comparing to the current operational configuration. The improvement is greater for humidity than for air temperature.

Upper-air evaluation indicates that the impact of the new land surface package on the Planetary boundary layer (PBL) is substantial but more mixed, with large spatial variability in terms of its effect.

This study also investigated the physical and statistical links between near-surface and upper-air forecast errors at the medium range.