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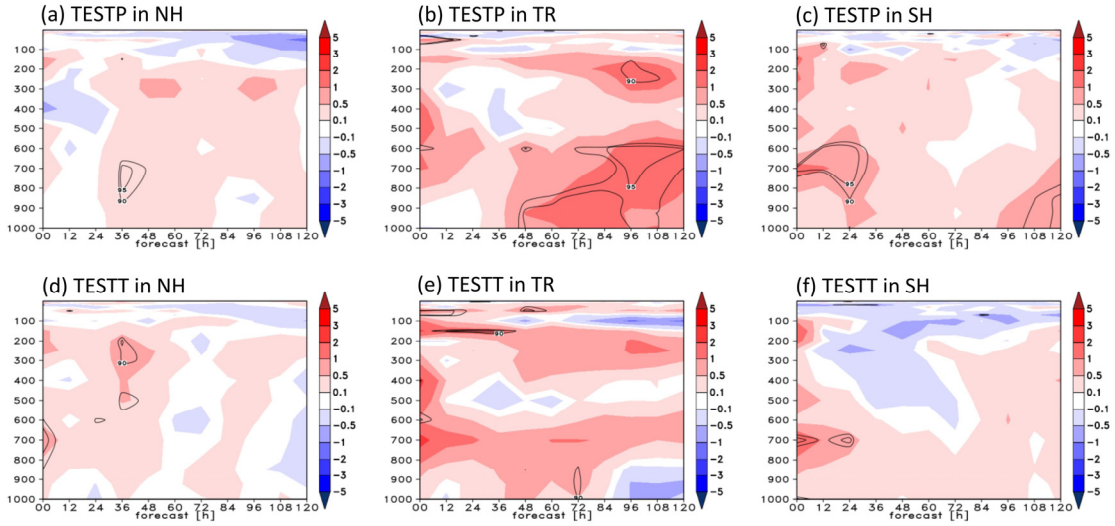

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Figure 1. Forecast impacts of DWL on polar-orbiting satellite (upper panels) and tropical-orbiting satellite (lower panels) as a function of forecasts up to 120 h in (a, d) the northern hemisphere, (b, e) tropics, and (c, f) southern hemisphere for the January experiments. Positive values indicate to forecast improvement by assimilating DWL.

- The impact of a future space-borne Doppler wind lidar (DWL) on numerical weather prediction (NWP) was evaluated by using an observing system simulation experiment (OSSE) based on a sensitivity observing system experiment (SOSE) approach.
- DWL on either polar- or tropical-orbiting satellites was overall beneficial for forecasts (Fig 1), with greater impacts for the January experiments than for the August experiments.
- Realistic aerosols and cloud simulations and a full-scale lidar simulator were produced to simulate DWL winds and their quality information. This information allowed us to develop sophisticated quality control and observation errors assignment in data assimilation system. The significance of these procedures was demonstrated in various data assimilation experiments.