

Tidal variability in NOGAPS-ALPHA

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Diurnal and semidiurnal tides in the mesosphere exhibit variability on day-day-day and weekly timescales. This variability has been linked to tropospheric convection, and to interactions with wintertime planetary waves. In recent years there have been many studies suggesting ionospheric responses to sudden stratospheric warming (SSW) events, and tides are thought to be one of the key agents that couple these two regions. However, the time scales involved in SSW are too short for defining tidal diagnostics from precessing satellites such as TIMED. One way to circumvent the limitations imposed by the satellite sampling is to use an assimilative model that naturally captures the relevant physics that produces tides.

Recently, a new version of the The Navy Operational Global Atmospheric Prediction System (NOGAPS) Advanced Level Physics High Altitude (ALPHA) has been developed that is initialized by the assimilation every 6 hours, but uses the physics based forecast model to provide output on a 1-hourly cadence. This product allows global definitions of diurnal, semidiurnal and higher-order tidal harmonics on a day-to-day, or at least week-to-week basis. This presentation will highlight tidal variability during Northern hemisphere planetary wave activity in winter of 2009. We also demonstrate possible links between high-latitude tides and polar mesospheric clouds.