During a stratospheric warming the middle atmosphere winter polar vortex typically evolves from a fairly zonally symmetric circulation (zonal planetary wave zero) to either a displaced vortex (zonal planetary wave one) or a split vortex (zonal planetary wave 2), or some combination. The altered circulation and temperature structure subsequently influences the vertical propagation of tidal modes from their sources in the troposphere and stratosphere, from absorption of solar radiation by water vapor and ozone, respectively. The analysis of a small number of events is already showing an apparent consistency between the tidal response in the lower thermosphere in spite of the very different evolution of the amplitude of stratospheric zonal planetary wave fields. In particular, the migrating ter-diurnal wave number three (TW3) appears to increase in amplitude in the lower thermosphere. The increase in the ter-diurnal tidal amplitude is such that it can rival the amplitude of the more typical semi-diurnal wind fields. The dynamo action of the wind fields subsequently drives a change in the diurnal variation of the electrodynamics. The phase of the typical upward plasma drift at the magnetic equator tends to move to earlier local times, the magnitude also increasing, and then gradually returns to later local times as the amplitude also gradually diminishes. A whole atmosphere and ionosphere/electrodynamical model has been used to analyze the dynamical and electrodynamical response to several stratospheric warming with a goal to exploring the physical processes in the connections between meteorology and space weather.