Continuous global satellite measurements beginning in late 1978 show a decadal variation of total column ozone and temperature at tropical and subtropical latitudes that is approximately in phase with the solar cycle. Analyses of ozone profile and temperature records show that the solar cycle response in the tropics consists of a maximum in the upper stratosphere – apparently a direct photochemical and radiative response to UV forcing – and a second maximum in the lower stratosphere. The lower stratospheric maximum has a primarily dynamical origin and is mainly responsible for the decadal column ozone variation. Simulations by coupled chemistry climate models do not generally produce a double-peaked tropical ozone and temperature response except for those that are forced at their lower boundaries using observed sea surface temperatures (SSTs). Most current mechanisms for explaining a solar cycle variation in the lower stratosphere involve “downward control” from the upper atmosphere. However, it is also possible that “feedbacks from below” are a major contributing cause if there is a significant 11-year variation of the troposphere-ocean system. The troposphere-ocean response is forced directly by total solar irradiance changes and indirectly by solar UV effects on the stratosphere. Multiple linear regression analyses of Hadley Center SST, sea level pressure, and NCEP/NCAR Reanalysis data supporting the latter mechanism will be presented.