Energetic O+ of ionospheric origin play a key role in the formation of the storm-time ring current. Significant populations of outflowing O+ have been observed escaping the ionosphere into the plasmasheet and tail lobes during geomagnetically quiet conditions; however, the net contribution of these particles to existing tail populations, and their effect on ring current development with the onset of geomagnetic activity, is unknown. Here we use global MHD/particle simulations of outflowing oxygen to examine the dynamics of ionospheric oxygen as it flows into the plasmasheet during the quiet period prior to the geomagnetic storm of January 10-11, 1997. Estimates of the distribution of ionospheric oxygen in the plasmasheet are made based on low altitude observations of the ions that forms the source of this population. We discuss the effect of dipole tilt on the lifetime and energetics of ionospheric oxygen in the tail, and examine the potential of these particles to contribute to the storm-time ring current.