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**DyFK-simulation-based formulaic representation of the effects of wave-driven ion heating and electron precipitation on ionospheric outflows** JAMES HORWITZ, WEN ZENG, The University of Texas at Arlington — There is great interest in the magnetospheric community in obtaining compact representations of the ionospheric outflow fluxes and their relationships to putative drivers. Recently, analyses of measurements by FAST and POLAR have led to best fit formulas for the measurement-based relationships of the outflows levels to parameterizations for electron precipitation and Poynting fluxes, which are expected to be among the principal drivers, or closely related to them, for the ionospheric outflows. In this presentation, we shall use the results of an extensive set of systematic simulation runs with our Dynamic Fluid Kinetic (DyFK) simulation code for ionospheric plasma field-aligned transport to obtain $O^+$ outflow flux levels versus precipitation electron energy flux levels and the peak spectral wave densities for BBELF waves which transversely heat ionospheric ions. We shall present spectrograms of the relationship of the ion outflow values to these electron energy flux and BBELF wave levels. A preliminary approximate formulaic representation at this time is: $\mathrm{Flux}_{O+} = 5(3.0\mathrm{x}10^9 + 0.02\mathrm{x}10^{13}\mathrm{f}_e^{1.4}\ \tanh(8\mathrm{D}_{wave}) + 0.2\mathrm{D}_{wave}^{0.6})$ where $\mathrm{Flux}_{O+}$ is the $O^+$ number flux in $\mathrm{m}^{-2}\mathrm{s}^{-1}$ at $3\mathrm{R}_E$ mapped to 1000 km altitude, $\mathrm{f}_e$ is the electron precipitation energy flux in ergs $\mathrm{cm}^{-2}\mathrm{s}^{-1}$, and $\mathrm{D}_{wave}$ is the wave spectrum density at 6.5 Hz in $\mathrm{mV}^2\mathrm{m}^{-2}\ \mathrm{Hz}^{-1}$. This work was completed under financial support by NASA grant NNG05GF67G and NSF grant ATM-0505918 to the University of Texas at Arlington.

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