



Latitude, Energy, and Time Variations of Energetic Neutral Atom Spectral indices Measured by IBEX

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We investigate the latitude, energy, and time variations of the globally distributed 0.5–6 keV energetic neutral atom (ENA) spectra measured by the Interstellar Boundary Explorer (IBEX) during the first 5 years of the mission. Our previous results based on the first 3 years of IBEX observations showed that the ENA spectral indices at the two lowest energies (0.89 and 1.47 keV) exhibit no clear trend with ecliptic latitude θ , while those at ~ 2.29 and ~ 3.41 keV exhibit a clear latitudinal pattern; flatter spectra occur above 60° latitude and steeper spectra occur $\pm 30^\circ$ of the equator. While these results confirmed the previously reported latitudinal organization of the ENA spectra and their remarkable similarity to that of the solar wind (SW) speed observed by Ulysses in the inner heliosphere, we also showed that, unlike previous reports, the ~ 0.5 -6 keV globally distributed ENA spectral indices could not be represented as single power laws over much of the sky, and that they depend on energy and latitude. In this work we extend the above results to include years 4 and 5 of IBEX observations and investigate if the spectral indices vary as a function of time. Finally, we discuss implications of our results on models and simulations that seek to map the IBEX ENA observations back to the latitudinal profile of the SW speed structure observed in the inner heliosphere. We also discuss the implications of these new results for observational requirements for upcoming missions like IMAP.