Expansion of the Heliosphere

IBEX Data Release 13

http://ibex.swri.edu/ibexpublicdata/Data_Release_13/

This data release incorporates IBEX data products from the publication McComas et al. (2018) *"Heliosphere Responds to a Large Solar Wind Intensification: Decisive Observations from IBEX"*. Compton-Getting (CG) corrections have been applied to the data to account for the speed of the spacecraft relative to the direction of arrival of the ENAs. It includes the subset of additional CG maps used in the paper which were not included in the 7 year data release. See the 7 year data release website for additional file descriptions.

Abstract: Our heliosphere — the bubble in the local interstellar medium produced by the Sun's outflowing solar wind — has finally responded to a large increase in solar wind output and pressure in the second half of 2014. NASA's Interstellar Boundary Explorer (IBEX) mission remotely monitors the outer heliosphere by observing energetic neutral atoms (ENAs) returning from the heliosheath, the region between the termination shock and heliopause. IBEX observed a significant enhancement in higher energy ENAs starting in late 2016. While IBEX observations over the previous decade reflected a general reduction of ENA intensities, indicative of a deflating heliosphere, new observations show that the large (~50%), persistent increase in the solar wind dynamic pressure has modified the heliosheath, producing enhanced ENA emissions. The combination of these new observations with simulation results indicate that this pressure is re-expanding our heliosphere, with the termination shock and heliopause already driven outward in the locations closest to the Sun. The timing between the IBEX observations, a large transient pressure enhancement seen by Voyager 2, and the simulations indicates that the pressure increase propagated through the heliosheath, reflected off the heliopause, and the enhanced density of the solar wind filled the heliosheath behind it before generating significantly enhanced ENA emissions. The coming years should see significant changes in anomalous cosmic rays, galactic cosmic radiation, and the filtration of interstellar neutral atoms into the inner heliosphere.

Plots and Data Directories

Yearly Maps, Ram Direction	**Yearly Maps, AntiRam Direction**
These maps include data recorded from times when the aperture was pointed towards the hemisphere of the spacecraft's motion. The maps do not include survival probability corrections. Compton-Getting maps adjust values after correcting for the speed of the	These maps include data recorded at times when the aperture was pointed away from the hemisphere of the spacecraft's motion. The maps do not include survival probability corrections. Compton-Getting maps adjust values after correcting for the speed of the

spacecraft in relation to the direction of arrival of the ENAs. The data directories: Prior years hvset_noSP_ram_cg_2016 hvset_noSP_ram_cg_2017	spacecraft in relation to the direction of arrival of the ENAs. The data directories: Prior years hvset_noSP_antiram_cg_2016

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