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Constraining the nature of the slow solar wind with PSP/WISPR

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The nature of the slow solar wind, continuous or intermittent flow, is still debated; coronagraphs and heliospheric imagers regularly observe a spectrum of transient slow wind flows; e.g. instance blobs, jets. etc. A standard tool for the study of such flows, is the display of intensity as a function of time and elongation along a given direction, which is called a J-map. The launch of the Parker Solar Probe (PSP) mission in 2018, and the availability of high-quality up-close images of the corona by its Wide-Field Imager (WISPR) opened new exciting observational capabilities in solar wind research. Here, we report on simulations of synthetic WISPR J-maps constructed for various scenarios of transient solar wind release in terms of blobs. The methodology is based on Monte-Carlo simulations of blobs with varying numbers, release frequencies, speeds, and launch longitudes. We compare our synthetic J-maps with an observed WISPR J-map taken during the fourth solar encounter of PSP and use the observed daily count of tracks in this J-map in conjunction with our synthetic J-maps in order to place constraints on the variability of the solar wind flow properties of slow solar wind transient release in terms of blobs.

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