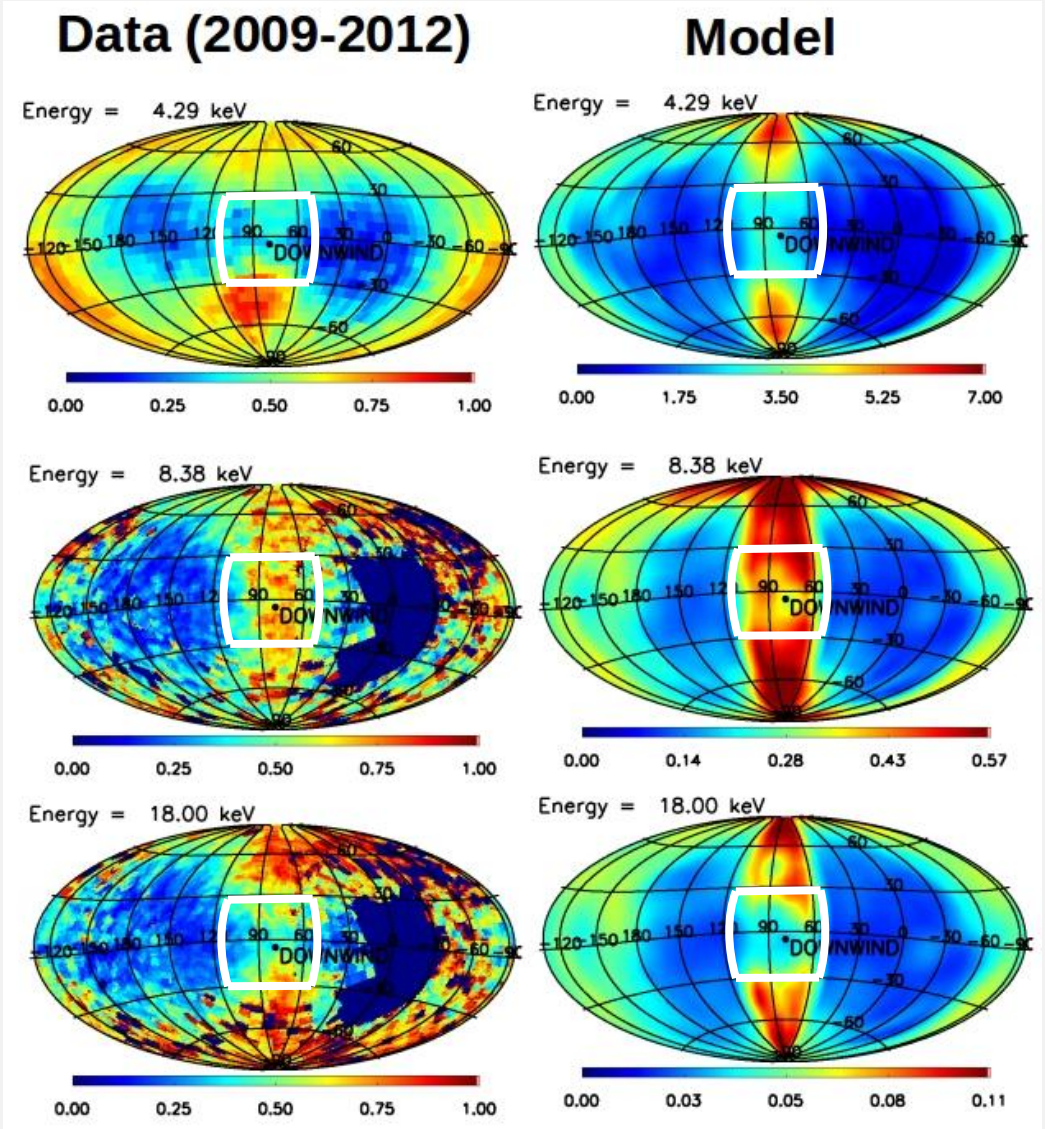
Observational Evidence for a Croissant-Shaped Heliosphere

- The shape of the heliosphere remains an open question, in particular if the tail has a short, split-tail (i.e. croissant-shaped) or a long, comet-like tail

- Another major puzzle is the existence of a global structure of enhanced energetic neutral atom intensity (known as the “Belt”) seen by Cassini/INCA: this Belt has a feature that shows up in the low-latitude tail that we refer to as the “Buckle” which emerges and disappears over a narrow energy range (white box in figure). The origin of the Buckle has been unexplored

- We find that, **unique to the croissant-shaped heliosphere**, **magnetic reconnection in the tail energizes ions** in the heliospheric current sheet ahead of the low-latitude heliopause

- This reconnection in the croissant-shape heliosphere can explain the Buckle -- **the Buckle is therefore an inherent signature of a short-tail heliosphere.**



Kornbleuth et al. [2025, submitted]