



In situ Observations of Heliospheric Current Sheets Evolution

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We investigate the Heliospheric current sheet observation time difference of the spacecraft using the STEREO, ACE and WIND data. The observations are first compared to a simple theory in which the time difference is only determined by the radial and longitudinal separation between the spacecraft. The predictions fit well with the observations except for a few events. Then the time delay caused by the latitudinal separation is taken in consideration. The latitude of each spacecraft is calculated based on the PFSS model assuming that heliospheric current sheets propagate at the solar wind speed without changing their shapes from the origin to spacecraft near 1AU. However, including the latitudinal effects does not improve the prediction, possibly because that the PFSS model may not locate the current sheets accurately enough. A new latitudinal delay is predicted based on the time delay using the observations on ACE data. The new method improved the prediction on the time lag between spacecraft; however, further study is needed to predict the location of the heliospheric current sheet more accurately.