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Very fast Response of the far Tail (255 Re) of the Earth Magnetosphere to weak substorm: a STEREO View

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From the end of February to the beginning of March 2007, STEREO-B was traveling away from the Earth at distances between 200 and 360 Re close to the magnetospheric tail allowing to study the dynamics of the far tail and of its boundaries in response to IMF changes and to magnetospheric activity. We present results obtained during nearly quiet conditions, corresponding to (very) small substorm disturbances (AE$<$100 nT) affecting high latitude ground stations. Using all sky cameras and STEREO data, we show that the far tail presents a surprisingly quick response to weak magnetospheric substorms indicating either that the substorm originate in the far tail or that the substorm effect propagate with a velocity higher than 2000 km/s from the inner magnetosphere. The tail response can be described as a shrinking propagating tailward. We examine the possibility of observing the effects of a rarefaction wave decreasing the tail lobe pressure.