Abstract Submitted
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Formation and transport of entropy structures in the magnetotail simulated with a 3-D global hybrid code[1] YU LIN, Auburn Univ, SIMON WING, JHU/APL, JAY R. JOHNSON, Andrews Univ, XUEYI WANG, JOE D. PEREZ, LEI CHENG, Auburn Univ — Global structure and evolution of flux tube entropy S, integrated over closed field lines, associated with magnetic reconnection in the magnetotail are investigated using the AuburN Global hybrid codE in three dimensions (3-D), ANGIE3D. Flux tubes with decreased entropy, or bubbles, are found to be generated due to the sudden change of flux tube topology and thus volume in reconnection. By tracking the propagation of the entropy-depleted flux tubes, the roles of the entropy structure in plasma transport to the inner magnetosphere is examined with a self-consistent global hybrid simulation for the first time. The value of S first decreases due to the shortening of flux tubes and then increases due to local ion heating associated with wave turbulence around the fast flows as the bubbles are injected earthward by interchange-ballooning instability, finally oscillating around an equilibrium radial distance where S is nearly the same as the ambient value. The pressure remains anisotropic and not constant along the flux tubes during their propagation with a nonzero heat flux along the field line throughout the duration of the simulation. The correlation of these bubbles with earthward fast flows and specific entropy s is also studied.

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