Flux transfer event in the subsolar region and near the cusp: Simultaneous Polar and Cluster observations

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The phenomenon called flux transfer events (FTEs) is widely accepted as the manifestation of time-dependent reconnection. In this paper, we present an observational evidence of a flux transfer event observed simultaneously at low-latitude by Polar and high-latitude by Cluster. This event occurred on March 21, 2002, when both Cluster and Polar were located near the local noon but with large latitudinal distance. Cluster was moving outbound from polar cusp to the magnetosheath, and Polar was in the magnetosheath near the equatorial magnetopause. The observations show that a flux transfer event was formed between the equator and the northern cusp. Polar and Cluster observed the FTE's two open flux tubes: Polar saw the southward moving flux tube near the equator; and Cluster the northward moving flux tube at high latitude. Unlike low-latitude FTEs, the high-latitude FTE did not exhibit the characteristic bi-polar BN signature. But the plasma data clearly showed its open flux tube configuration. Enhanced electric field fluctuations were observed within the FTE core, both at low- and high-attitudes. This event provides us a unique opportunity to understand high-latitude FTE signatures and the nature of time-varying reconnection.