



## **Multi-satellite and ground station network observation of a substorm onset**

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With a favorable constellation of spacecraft and ground stations, a study is made on global manifestations of a substorm onset. The onset occurred simultaneously and conjugately in both hemispheres, confirmed by observations of the auroral breakup from IMAGE FUV-WIC and a sudden intensification of a westward electrojet from ground-based magnetometers. Concurrently with the onset, field-aligned and Hall currents in the auroral ionosphere are observed by CHAMP, which are consistent with the signature of a Harang discontinuity. Immediately after the onset a magnetic field dipolarization is clearly observed by Double Star TC-1 located near the central magnetotail and subsequently by the Cluster quartet. The observations can be explained by a dawnward propagation of the substorm current wedge at a speed of about 300 km/s.