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A global view of the magnetospheric composition

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Plasma dynamics in the inner magnetosphere are greatly affected by variations in the ion composition. The ratio of hydrogen to oxygen has been shown to be highly dependent on geomagnetic activity. To investigate this dependence, we examine the timing and the injection mechanisms as well as the loss of O+ from the ring current during the storm of August 6, 2011.

Since a global view of the oxygen injection is not yet possible to obtain using observations only, modeling of the global magnetosphere opens up the possibility for global viewing of ring current composition. TWINS ENA imagers have the capability to distinguish between the major ion constituents of the ring current. Composition measurements from TWINS together with global magnetospheric simulations using the Space Weather Modeling Framework (SWMF) are used to investigate the global dynamics and energization of ions throughout the whole magnetosphere. In addition, we address the impact the inner magnetosphere ion composition has on the physical processes that dominate this region.