Oxygen Injections Into the Ring Current: Tail and Ring Current Observations Combined

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We are investigating the circulation of O+ in the magnetosphere by using a combination of POALR/TIMAS in situ oxygen plasma and IMAGE/HENA neutral oxygen remote sensing measurements during the Fall months of 2001 and 2002. HENA observations of the inner magnetosphere / ring current show that significant quantities of oxygen are typically only observed during geomagnetic storms, and that they are delivered in bursts by substorm activity. It also appears, that the first substorm of a storm is not necessarily rich in oxygen. Isolated non-storm substorms, on the other hand, typically show little contribution of oxygen. With TIMAS located in the tail lobe and the plasma sheet for extended amounts of time we can locally determine the oxygen content and oxygen dynamics associated with those storm-time substorms. This gives us a better understanding and correlation between the observed ring current content and the associated tail content and dynamics.