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On the role of the magnetopause for ring current closure

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Motion of charged particles in the Earth's magnetosphere sets up a number of current systems. One of the most pronounced systems in terms of current density is the ring current, caused by differential motion of ions and electrons around the Earth as a result of gradients in the dipolar like magnetic field. Using the extensive set of ground based stations in the SuperMAG collaboration, it has been possible to study new details of the Earth's ring current. These studies have revealed consistent local time asymmetries in the net current which suggest that part of the current closure takes place in in other regions of space. Current diversion through field aligned currents into the ionosphere has been suggested as one possible closure path. In the present work, we have used measurements from the Cluster spacecraft to evaluate the role of magnetopause surface currents for ring current closure. The statistical results reveal a dawn-dusk asymmetry also in the magnetopause currents, and thus an indication of ring current closure through the magnetopause.