Plasmaspheric drainage plume in the pre-noon sector observed by the Polar and IMAGE satellites during the magnetic storm of 11 April 2001

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During the early main phase of the geomagnetic storm on 11 April 2001, the Polar satellite was inside the magnetosphere in the pre-noon sector (~1000-1100 magnetic local time) and experienced a magnetopause crossing at L = ~6 because of the high solar wind dynamic pressure and strong southward interplanetary magnetic field (IMF). Just before the magnetopause crossing, Polar observed cold and dense plasmaspheric plasma, i.e., the plasmaspheric plasma was immediately adjacent to the magnetopause. Using simultaneous observations by the IMAGE extreme ultraviolet (EUV) imager, we confirm that the cold and dense plasma at Polar is due to sunward convecting plasmaspheric plasma associated with high geomagnetic activity and strong southward IMF. We compare the plasmaspheric mass densities determined from the ground magnetometer data at L = 2.3 for a magnetically quiet time interval and the magnetic storm time interval. We find that there is no significant difference between both intervals. This observation suggests that the enhanced sunward convection associated with the magnetic storm erodes the outer layers (L > 2.3) of the plasmasphere.