# DAWN-DUSK ASYMMETRY, ION SPECTRA AND SOURCES IN THE NORTHWARD IMF PLASMA SHEET

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The plasma sheet becomes cold and dense during periods of northward IMF, as a result of a large influx of magnetosheath ions. During these periods, plasma sheet ions often have two components: hot (magnetospheric origin) and cold (magnetosheath origin). The cold-component constituent of the two-component ions is hotter in the dawn than the dusk sector, consistent with in situ studies that suggest that the magnetosheath ions are heated during the entry process along the plasma sheet dawn flank. This temperature asymmetry leads to a dawn-dusk asymmetry in the ion spectral distribution. Because the colder magnetosheath ions are heated in the dawn flank, they are less distinguishable from the hot component, which leads to an increase in the ions having (apparent) one-component distribution in the dawn flank. As the duration of the hourly averaged IMF being northward ( delta t) increases from 1 to 10 hours, the occurrence of two-component ions increases from 65% to 83% in the dusk flank, but in the dawn flank, it remains relatively stable at around 45%. In contrast, the occurrence of ions best characterized by kappa -distribution increases from 25% to 35% in the dawn flank whereas in the dusk flank it remains relatively insensitive to delta t (10%). The occurrence of a one-component Maxwellian appears to be most pronounced in the region of the plasma sheet close to the midnight meridian, and these ions appear to be characteristics of the nominal plasma sheet ions. The dawn-dusk asymmetry observed in the cold magnetosheath ion profiles should provide constraints that can help determine the roles of various proposed magnetosheath entry mechanisms