

Role of energetic particles on the formation of depletion layer in the magnetosheath and IMF dependence: Case studies

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Magnetopause depletion layer (MDL) is characterized by the decreased density and increased magnetic field strength. Decreased plasma pressure in the depletion layer is balanced with the increased magnetic field pressure. Although MDL is reported to occur during other IMF orientations as well, it is most clearly observed when the IMF is strongly northward. We have studied the energetic particle events within the magnetosheath. In our events, we see that the high energy particles cause depletion in the magnetosheath plasma but the magnetic field does not necessarily increase. The existence of energetic particles plays important role in balancing the total pressure in these cases. While MDL is found very close the magnetospheric boundary layer, these events are seen anywhere in the magnetosheath owing to the presence of the high energy particles. There is no particular IMF depended pattern found in our preliminary search. We discuss the formation of depletion layers in the context of the energetic particle events and discuss their IMF dependence in our presentation.