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Analysis of double-step responses in the dayside magnetosphere

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We have analyzed double-step magnetic field enhancement caused by interplanetary (IP) shock impacts on the Earth's magnetosphere. The strecutres were observed by the GOES-8,10,11, and 12 spacecraft in the dayside geostationary orbit, particularly during northward interplanetary magnetic field (IMF) conditions. The double-step structures, similar to what is observed in the ground horizontal magnetic field (H) component at low latitudes, were observed preferentially on the dayside. Structures observed around 13.5 magnetic local time (MLT) displayed the steepest initial enhancement step, followed by a magnetic field strength decrease before the second enhancement step. At other dayside MLTs of the geostationary orbit, the initial response was smoother, and no decrease was observed before the second step. We suggest that this asymmetry in the decrease of the total magnetic field is caused by the pushing of the plasmaspheric ions observed by LANL-94 spacecraft over the geostationary orbit due to the magnetospheric compression.