Geophysical Research Abstracts
Vol. 18, EGU2016-5950, 2016
EGU General Assembly 2016
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Study of the spacecraft potential under active control and plasma density estimates using MMS observations and comparison with Cluster results.

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Each spacecraft of the recently launched magnetospheric MMS mission is equipped with ASPOC instruments, which actively control the spacecraft potential in order to minimize spacecraft charging effects. ASPOC operations typically reduce the spacecraft potential to values not higher than a few volts. Since the beginning of the mission, the ASPOC instruments were operational on several time intervals and thus we had the opportunity to study the behavior of the spacecraft potential under active control. Moreover, taking advantage of the fact that, on several of those intervals, ASPOC was not operating on at least one of the spacecraft, we derive photoelectron curves for the periods during commissioning phase and also perform reconstructions of the uncontrolled spacecraft potential for the spacecraft with active control and estimate the electron plasma density during those periods. We attempt to establish the criteria under which our methods can be applied and compare our results with previous ones derived using Cluster observations.