



## **A Physical Model of the Magnetosphere-Ionosphere coupling for two successive interplanetary shocks**

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When strong interplanetary shock interacts with the magnetosphere, the behavior of the current system is changed in magnetosphere and ionosphere. In this study, the dual SIs were triggered by the compressional region of two successive solar flares on August 1-3, 2010. They were corresponding to the interplanetary source between the two CMEs with outstanding high density impulse. One SI occurred during the northward IMF, while fifteen minutes later the other SI took place under southward IMF conditions. By using the geomagnetic data from 145 global observatories and data observed by multiple satellites, we compared the global distribution of the double SIs on the ground, in the Earth's synchronous orbit and in the inner plasmasphere, and discussed the variations of magnetosphere-ionosphere current system associated with the two kind of SIs. Finally, a physical model is presented which can explain the global structure of the geomagnetic response caused by two successive shocks.