Roles of interplanetary magnetic flux ropes in space weather

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Coronal mass ejections sometimes eject plasma clouds into interplanetary space. The plasma clouds generate large-scale disturbances in the solar wind and strongly influence the space weather. Their most important effects include (1) generation of interplanetary shocks, (2) particle acceleration by the shock waves, (3) enhancement of solar wind-magnetosphere interaction by shock-strengthened solar wind, and (4) generation of magnetic storms by southward magnetic fields within the plasma clouds. The plasma clouds generally has a peculiar magnetic filed structure called the magnetic flux rope. This report shows how studies of interplanetary magnetic flux ropes can contribute to understanding of the above-cited subjects.