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The evolution of toroidal magnetic clouds on their way from Sun to the Earth's orbit[1] TALON WEAVER, EVGENY ROMASHETS, CRISTIAN BAHRIM, Lamar University, S TEAM — We report studies about properties of magnetic clouds. These clouds are created from solar flares, propagate in interplanetary space and upon arrival to the Earth's orbit could interact with the magnetopause initiating geomagnetic storms. Our model considers three forces acting on the cloud during its propagation: the drag force from ambient solar wind plasma, diamagnetic force due to draping of interplanetary magnetic field, and the gravitational pull from the Sun (Romashets and Vandas, JGR, 2001). The solar source magnetic field maps provided by the Wilcox Solar Observatory are used to determine magnetic field magnitude at the point of ejection. The velocity of the ambient solar wind is interpolated in such a way that it agrees with plasma measurements at 1 AU. Density of solar wind plasma is determined from the continuity equation (i.e. the number of particles in equals to the number of particles out through any sphere of radius less than 1 AU); and it agrees with in-situ plasma measurement. The magnetic cloud expands because total pressure in interplanetary space decreases along the cloud's trajectory. Our model describes the relationship between the ratio of the major to the minor radii of the toroidal cloud and the helio-distance (Sun-Earth), and it will reveal the influence of parameters, such as the drag coefficient on the evolution of the magnetic cloud. Results for selected fast and slow magnetic clouds observed during 1998 to 2001 will be reported.

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