



## **A simple model of the structure of magnetic clouds downstream of Earth's bow shock**

Lucile Turc (1), Dominique Fontaine (1), Philippe Savoini (1), and Emilia K.J. Kilpua (2)

(1) Ecole Polytechnique, CNRS, Sorbonne Universités, UPMC Univ Paris 06, Univ Paris-Sud, UMR7648, Laboratoire de Physique des Plasmas, F-91128, Palaiseau, France (lucile.turc@lpp.polytechnique.fr), (2) Department of Physics, University of Helsinki, P.O. Box 64, 00014 Helsinki, Finland

Magnetic clouds (MCs) are a subset of coronal mass ejections which are known for their importance in driving geomagnetic storms. Yet little is known about their interaction with Earth's bow shock and their propagation into the magnetosheath, and spacecraft observations only provide us with a limited coverage of the magnetosheath. In order to have a more global view of the interaction of an MC with Earth's bow shock, we develop a simple model of the magnetosheath magnetic field, adapted to MC conditions. We show several example MCs, corresponding to different orientations of the MC's axis and leading to different shock configurations. We find that the MC's structure is roughly unchanged inside the magnetosheath when the shock is quasi-perpendicular, while it is strongly altered in the quasi-parallel regime, in agreement with the observations. We show that in some cases the magnetic field North-South component can reverse in some parts of the magnetosheath. Finally, we discuss the impact of the alteration of the MC's structure through the bow shock and in the magnetosheath on the reconnection regions and on the MC's geoeffectivity.