



## **Statistical study of the geoefficiency of ICME events by accounting for their structure**

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In this study, we focus on the characteristics of ICME events as well as their efficiency to perturb the terrestrial magnetosphere. To do so, multi-epoch Superposed Epoch Analysis are used on a list of 306 events observed between 1998 and 2006. By applying it on three solar wind parameters (magnetic field, pressure and speed) and two magnetic indices (SYM<sub>H</sub> and AE), our method allows to observe the respective impact of shocks, sheaths and ICMEs and their combined effects on the magnetosphere. Moreover, since ICMEs tend to follow one another, we enlighten the effects of sequences of events. Our results show that the presence of a shock drive the geoefficiency of ICMEs events. If there is not, the events are expected to induce only weak or moderate magnetic storms. In the opposite case, the structure of ICMEs play a crucial role in the efficiency of the events. It is shown that, depending on their polarity, MCs are much more efficient than complex ejecta and that sequences of events increase their ability to perturb the magnetosphere. Statistical results show that complex ejecta preceded by a shock are more likely to occurs. In the meantime, shock-associated magnetic clouds involved in a sequence of events are the most disturbing structure for the magnetosphere.