NUMERICAL MODELLING OF STEALTH SOLAR ERUPTIONS AND COMPARISON WITH IN–SITU SIGNATURES

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Coronal Mass Ejections (CMEs) are huge expulsions of magnetized plasma from the Sun into the interplanetary medium. A particular class of CMEs are the so–called stealth CMEs, i.e., solar eruptions that are clearly distinguished in coronagraph observations, but are not associated with clear signatures close to the Sun, such as solar flares, coronal dimmings, EUV waves, or post–flare loop arcades. Observational studies show that about 60% of stealth CMEs are preceded by another CME whose solar origin could be identified. In order to determine the triggering mechanism for stealth CMEs we are using the MPI–AMRVAC code developed at KU Leuven. We simulate consecutive CMEs ejected from the southernmost part of an initial configuration constituted by three magnetic arcades embedded in a globally bipolar magnetic field. The first eruption is driven through shearing motions at the solar surface and the second is a stealth CME, both being expelled into a bimodal solar wind. We analyze the parameters that contribute to the occurrence of the second CME. Furthermore, we compare the simulated signatures of the CMEs with the in–situ data from ACE spacecraft at 1AU. This study aims to better understand the triggering mechanism of stealth eruptions and improve the forecasting of their geomagnetic impact.