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Interplanetary type II radio bursts: STEREO observations and Monte Carlo Simulations

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Coronal mass ejections (CMEs) are responsible for most severe space weather events such as solar energetic particle events and geomagnetic storms at Earth. Type II radio bursts are slow drifting emissions produced by beams of suprathermal electrons accelerated at CME-driven MHD shock waves propagating through the corona and interplanetary medium. Here, we report a statistical study of 153 interplanetary type II radio bursts observed by the two STEREO spacecraft between March 2008 and August 2014. The shock associated radio emission was compared with CMEs from the HELCATS (Heliospheric Cataloguing, Analysis and Techniques Service) catalogue. We found that fast CMEs are statistically more likely to be associated with the interplanetary type II radio bursts. We have correlated frequency drifts with white-light observations in order to localize radio sources with a respect to a CME geometry. Our results suggest that interplanetary type II bursts are more likely to have a source region situated close to CME flanks than close to the CME nose. Finally, we performed Monte Carlo simulations to study a role of propagation on a visibility of interplanetary type II radio bursts.