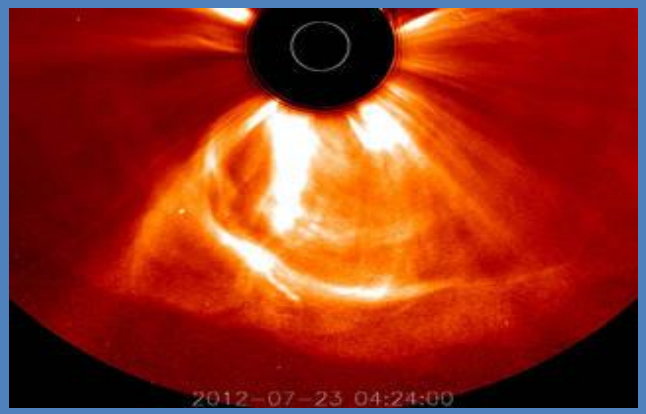
New Study Tests Effectiveness of Using STEREO Heilospheric Imagers in Space Weather Forecasting Research



The image above captured on July 23, 2012 shows a CME that left the Sun at the unusually fast speeds of over 1,800 miles per second. Credit: NASA STEREO

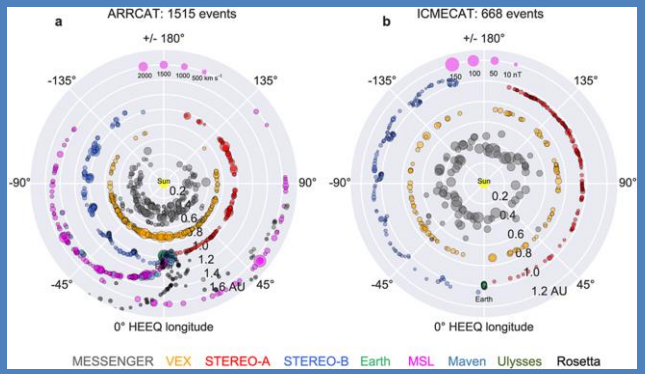


Figure caption: (a) each of the dots denote the speed of CME events in the catalogue used, as predicted at the locations of spacecraft (color coded). (b) Actual in situ measurements of magnetic field as measured by spacecraft. Credit: Möstl et al

NASA STEREO mission data on over **1300 coronal mass ejection (CME) events** were used in a recent study in the *Space Weather* journal testing the effectiveness of using ***heliospheric imagers*** in predicting space weather events at various vantage points in space. These results provide new research that could help develop forecasting models that better predict space weather at Earth, other planets and that could even support NASA activities such as a human exploration at Mars.

The STEREO data was sampled over a period of eight years and included information on CME speed, direction, and the width of areas affected by a CME event. The researchers incorporated this information into a model, which allowed them to produce hindcasts of the likelihood that a CME would have encountered a planet (and, if entirely likely, what time the encounter would have taken place). They found that of all the CMEs the model would have predicted, only about a third of them were actually detected by in situ measurements obtained throughout the inner solar system (the rest would have been false alarms).

But even though these hindcasts were far from perfect, those that were not false alarms were accurate to within about 2.5 hours compared to the actual time the solar activity hit Earth. Furthermore, the researchers found that prediction accuracy did not decrease depending on the imager's distance from Earth. The results have important implications for space weather missions carrying a heliospheric imager at the various Sun-Earth Lagrangian points (e.g., L5 or L1) other locations within the solar system.