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Comparison of CME travel time models using expansion and single plane-of-sky speeds

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A big challenge in space weather forecasting is the prediction of arrival of an interplanetary disturbance at earth. Many attempts have been done, and some forecasting models have been proposed. We focus on two models, one presented by Gopalswamy et al. (2000) and other presented by Schwenn et al. (2001), both using coronal mass ejection (CME) speeds measured in the Large Angle and Spectroscopic Coronagraph (LASCO), aboard the Solar and Heliospheric Observatory (SOHO). Their main difference is the way of measuring the speeds, the former being the single plane-of-sky ejection speed, measured in the direction of maximum speed direction, and the latter being the lateral expansion speed of the coronal mass ejection, measured approximately perpendicular to the single plane-of-sky speed used in the former model. In order to evaluate both models correctly, we have used exactly the same set of observations, i.e. from January 1997 to mid April 2001. Also, the correlations between each coronal mass ejection observed by LASCO at the sun and an interplanetary disturbance arrival at earth observed by the Advanced Composition Explorer (ACE), was the same in both data sets. Differences and similarities will be presented. Our motivation to do this work was some discussions during the last 2 years about the validity and performance of this kind of space weather forecasting models.

Keywords: **coronal mass ejections**, **geomagnetic storms**, **space weather**

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