Predicting the magnetic flux rope fields at the Sun-Earth L1 point

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Forecasting of coronal mass ejection magnetic flux rope fields at L1 is a long-standing challenge and one of the major problems in space weather forecasting. We attempt to make progress by using two approaches: 1) machine learning approaches (e.g., linear regression, lars lasso, RANSAC, or random forest), and 2) analogue ensemble methods. For our study, we take events observed at the Wind, Stereo-A and Stereo-B satellites from the ICME list created within the EU-project HELCATS. We analyse different scores (e.g., RMSE, or the skill of the model) of the presented methods. Further, we investigate how well the flux rope field can be anticipated when the first few hours of the flux rope have already been observed at L1.