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Ensemble forecast of CMEs and background solar wind

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The ensemble forecasts of CMEs and background solar wind is presented, mainly based on the operational solar wind prediction system of space environment prediction center in China. This system is mainly composed of three modules: 1) a photospheric magnetic field extrapolation module, along with a Wang-Sheeley-Arge (WSA) empirical method, to obtain the background solar wind speed and the magnetic field strength on the source field; 2) a modified Hakamada-Akasofu-Fry (HAF) kinematic module for simulating the propagation of solar wind structures in the interplanetary space; and 3) a module for coronal mass ejection (CME)detection and parameter derivation using the ice-cream cone model based on coronagraph images. An ensemble forecasting method can enable a sensitivity analysis for forecast accuracy, and thus improve the accuracy significantly.