Effect of the background solar wind on the propagation of CME-driven shocks – a comparative global magnetohydrodynamic simulation

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We present a numerical simulation study of effects of the background solar wind on the propagation of coronal mass ejections (CMEs) in the inner heliosphere using a global magnetohydrodynamic (MHD) solar wind model of Wu et al. [2020]. We selected two CME events, one erupted on April 3, 2010 (CME03) and the other on July 12, 2012 (CME12), for this study. Both CME events were of halo type and propagated along the Sun-Earth line. While both CME events were fast (> ~800 km/s), analysis of coronagraph image data suggests that the CME12 is much faster than the CME03 initially (~1200 km/s versus ~900 km/s. However, in situ measurements at ~1 AU from the Wind spacecraft indicate that the Sun-to-Earth transit time of the CME03 is ~2 hr shorter than that of CME12. Our simulation result clearly suggests that the background solar wind play an important role in the CME transit time. We will present our result and explain in detail about how the background solar wind affect the propagation of CME in the heliosphere.