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Counter-propagating Alfven Waves in a 3D Global Solar Wind Model

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We have improved our previous data-driven, numerical model of the 3D global solar wind (van der Holst et al., Ap.J., 2010) within the Space Weather Modeling Framework (SWMF) to include the self-consistent modeling of counter-propagating Alfven waves and the associated turbulent energy cascade. This model uses a two-fluid approach for the separate electron and proton temperatures and addresses (1) coronal heating by Alfven waves that are reflected by the coronal inhomogeneities and then damped by turbulent energy cascade, and (2) solar wind acceleration from gradients of the Alfven wave and plasma pressures. We validate this model for the deep solar minimum Carrington rotation 2077 and the more recent rotation 2095. For these rotations, we will use the in-situ data from STEREO A/B and ACE/WIND satellites for comparing the multi-spacecraft view of cororating interaction regions (CIRs) near 1AU with the model output. Near the Sun, we compare the model electron densities of the streamer belt region with those obtained from the solar rotational tomography applied to LASCO-C2 white-light data of SOHO in the height range of 2.4 to 6 Rsun. Even closer to the Sun, we compare electron temperature and density of the model in the height range 1.035 to 1.225 Rsun, with those derived from differential emission measure tomography (DEMT) applied to STEREO A/B EUVI images.