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STEREO-A persistence model for solar wind speed forecasting and uncertainty assessment from the evolution of coronal holes

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We present the concept of a persistence model to forecast the solar wind speed at 1 AU, using the advantage of multi-viewpoint satellite data. The model is based on STEREO in-situ measurements for satellite positions eastward of Earth, shifted forward by a variable time span according to the angle of the STEREO spacecraft with Earth (∼2-10 days). The STEREO persistence model is applied on the time range 2008-2012 (STEREO-B) and 2017 (STEREO-A) and compared to a recurrence model based on ACE data forward shifted by a full rotation. In addition, the STEREO persistence model is modified by assessing the speed uncertainties that are caused by the evolution of coronal holes (CH). We derive the information on CH evolution by comparing CH areas extracted in EUV data from STEREO and Earth perspective. Compared to an ACE based persistence model, the performance of the new STEREO+CH persistence model which takes into account the evolution of coronal holes, is able to reduce the number of missed high-speed streams by about 23%, the false alarms by about 19%, and to increase the hit rate by about 12%.