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Simulated STEREO views of the Solar Wind Disturbances following the CMEs of 1 August 2010

Y. Zhang (1,2), A. M. Du (1), X. S. Feng (2), W. Sun (3), C. D. Fry (4), Y. Liu (5), C. S. Deehr (3), M. Dryer (6), and B. Zieger (7)

(1) Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing 100029, China (yzhang@mail.iggcas.ac.cn), (2) Solar-Interplanetary-Geomagnetic Weather Group, State Key Laboratory of Space Weather, Center for Space Science and Applied Research, Chinese Academy of Sciences, Beijing 100190, China, (3) Geophysical Institute, University of Alaska, Fairbanks, AK 99775-7320, USA., (4) Exploration Physics International, Inc, Huntsville, AL 35806, USA, (5) Space Sciences Laboratory, University of California, Berkeley, CA 94720, USA, (6) Space Weather Prediction Center, Ret., National Oceanic and Atmospheric Administration, Boulder, CO 80305, USA., (7) Space Research Institute, Austrian Academy of Sciences, Graz, Austria

The images observed by twin spacecraft STEREO A and B appear as complex structures for two coronal mass ejections (CMEs) on August 1, 2010. One of the difficulties associated with the interpretation of the STEREO observations is how to distinguish different types of density structures in the heliosphere. Therefore a series of sky maps of Thomson-Scattered white Light by interplanetary CMEs (ICMEs) on August 1, 2010 are simulated using the Hakamada-Akasofu-Fry (HAF) three-dimensional solar wind model. We show that simulations of a solar event series are useful in sorting out the interplanetary density structures from these events that overlap or exceed the FOVs of the observing instruments. In this process, the time dependent, three-dimensional structure of particle density, calculated using the HAF model, is converted to Thomson-scattered white light intensity and compared to photometric observations of eruptive ejecta and shocks made by the twin STEREO satellites A and B. Comparison between the simulated sky maps and observations of STEREO A and B clarifies the structure and evolution of ICMEs in the observed images. Results demonstrate that the simulated sky maps by the HAF model are very useful in the interpretation of the observed images when the ICMEs overlap or extend beyond the fields of view of the instruments onboard STEREO A and B. In addition, comparison of the model with the observational data helps us to adjust key model parameters such as initial conditions and times of arrival, leading to improvements in model performance.