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Average feature of interplanetary disturbances identified from radio scintillation measurements

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The coronal mass ejection (CME) is known as a cause of severe space environment disturbances, so that improvement of our understanding on it is highly desired. In particular, detailed knowledge on the three-dimensional (3D) structure and propagation of CME in the interplanetary space is important from the viewpoint of space weather predictions. However, global properties of interplanetary CME (ICME) are poorly understood, since our understanding of the ICME is mostly dependent on in situ measurements by a few spacecraft distributed sparsely in the heliosphere. Interplanetary scintillation (IPS) measurements allow us to

probe a wide range of the inner (within 1AU) solar wind in a relatively short time, so that they act as a useful tool to study global properties of the ICME. Here, we should note that IPS measurements provide information on integration of solar wind parameters along the line of sight (los). We need to use an inversion technique for retrieving the 3D structure of the ICME from observed IPS data. Recently, we have developed the analysis method to reconstruct the 3D shape of ICME from IPS g-value data, which represent the magnitude of solar wind density fluctuations (los integration). In this analysis method, a simple ICME model, which is defined by several adjustable parameters, is optimized by comparing between calculated and observed g-values. Using this method, we have performed the analysis of g-value data taken with the IPS system of the Solar-Terrestrial Environment Laboratory, Nagoya University, and determined the 3D structure of ICME for 9 events. We report here the results of this analysis, and deduce the average feature of global shape of ICMEs.