

Data-driven Modeling for Energetic Events in the Solar Corona: Present Status and Perspective

Kanya Kusano[1]; Satoshi Inoue[2]; Daikou Shiota[3]; Takahiro Miyoshi[4]; Takaaki Yokoyama[5]; Tetsuya Yamamoto[6]; Takashi Sakurai[7]

[1] ESC/JAMSTEC; [2] ADSM, Hiroshima Univ; [3] Kwasan Observatory, Kyoto Univ.; [4] Grad. Sch. Sci., Hiroshima Univ.; [5] School of Science, Univ.Tokyo; [6] Astronomy Sci., Tokyo Univ; [7] NAOJ

<http://www.es.jamstec.go.jp/esc/research/Holistic/index.ja.html>

Because active space weather phenomena can be caused by solar coronal energetic events, flares and coronal mass ejections (CMEs), it is crucially important to predict the solar corona activities. However, the trigger mechanism of solar flares still remains to be solved, so that the prediction of them is not well operative yet. The coalition between observation and numerical simulation could play a crucial role for that, because the solar corona is governed by a complicated nonlinear dynamics. In this talk, the present status and the perspective for the data-driven simulation of coronal energetic events will be reviewed, and the results of new studies for the modeling of solar active regions will be also reported. In particular, the reconstruction method for the three-dimensional coronal magnetic field and the new algorithm to simulate the transition dynamics from the onset of flares to CME will be explained. Furthermore, the new models of the flare onset mechanism, the formation mechanism of sigmoid as the precursor phenomena, and the role of reconnection in the CME acceleration phase are also discussed.