Chromosphere and Transition Region to a Coronal Rain Event

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We report that a strong downflow event caused three-minute oscillations in the solar atmosphere. Our observations were carried out by using the Fast Imaging Solar Spectrograph (FISS) of the 1.6 meter New Solar Telescope (NST) and the Interface Region Imaging Spectrograph (IRIS). Our main findings are as follows: (1) The strong downflow was seen at the Hα absorption line at first, and then appeared at the Si IV and C II emission lines. It seems that the characteristics of the downflow are consistent with a coronal rain event. (2) After the event, oscillations of velocity were identified in the chromospheric lines and transition region lines. (3) The amplitudes of oscillations were 2km/s at Mg II line and 3km/s at C II and Si IV lines and decreased with time. (4) The period of the oscillation was 2.67 minutes at first, but gradually increased with time. Our findings are in agreement with Chae & Goode (2015) 's theory that of acoustic waves generated by a disturbance in a gravitationally-stratified medium.

[포 SS-03] Photometric observations of the Baptistina asteroid family

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The Baptistina family is one of the typical young asteroid families with an age estimated to be about 140-320 Myrs old (Masiero et al. 2012); considered to have not enough time to experience a significant collisional and dynamical evolution since it was formed. Therefore, it may offer a unique insight into spin rate distribution of relatively fresh fragments and physical mechanism of a family break-up event.

Observations of the Baptistina family asteroids were conducted during 111 nights from 2013 Oct. to 2015 Feb., using 0.5 m- to 2 m- class telescopes at 6 observatories in the northern hemisphere. We used CCD cameras on the Sobaeksan Optical Astronomy Observatory (SOAO) 0.6 m telescope on Mt. Sobaek, Korea, the Lemmonsan Optical Astronomy Observatory (LOAO) 1.0 m telescope on Mt. Lemmon, USA, the Tubitak Ulusal Gozlemevi (TUG) 1.0 m telescope in Bakirlitepe, Turkey, the Bohyunsan Optical Astronomy Observatory (BOAO) 1.8 m telescope on Mt. Bohyun, Korea, the McDonald Observatory 2.1 m Otto Struve Telescope on Mt. Locke, USA, and the National Astronomical Research Institute of Thailand (NARIT) Observatory 2.4 m telescope on Mt. Doi Inthanon, Thailand. Here, we will present our preliminary results for lightcurve analyses of Baptistina family members.

[포 SS-04] Evaluation of a Solar Flare Forecast Model with Cost/Loss Ratio

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There are probabilistic forecast models for solar flare occurrence, which can be evaluated by various skill scores (e.g. accuracy, critical success index, heidek skill score, true skill score). Since these skill scores assume that two types of forecast errors (i.e. false alarm and miss) are equal or constant, which does not take into account different situations of users, they may be unrealistic. In this study, we make an evaluation of a probabilistic flare forecast model (Lee et al. 2012) which use sunspot groups and its area changes as a proxy of flux emergence. We calculate daily solar flare probabilities from 1996 to 2014 using this model. Overall frequencies are 61.08% (C), 22.83% (M), and 5.44% (X). The maximum probabilities computed by the model are 99.9% (C), 89.39% (M), and 25.45% (X), respectively. The skill scores are computed through contingency tables as a function of forecast probability, which corresponds to the maximum skill score depending on flare class and type of a skill score. For the critical success index widely used, the probability threshold values for contingency tables are 25% (C), 20% (M), and 4% (X). We use a value score with cost/loss ratio, relative importance between the two types of forecast errors. We find that the forecast model has an effective range of cost/loss ratio for each class flare: 0.15-0.83(C), 0.11-0.51(M), and 0.04-0.17(X), also depending on a lifetime of satellite. We expect that this study would provide a guideline to determine the probability threshold for space weather forecast.

[포 SS-05] Heating of a coronal loop