Newsletter Cosmic Rays / March 2015

March 2015 has been a very active month in the sense of solar activity, with the most intense geomagnetic storm (G4) of the current solar cycle which started on March 17th (Fig. 1). This geomagnetic storm was the result of the interaction between the complex solar activity which spotted at the active region AR2297 (S22W29) and Earth's magnetosphere. Especially a magnetic filament erupted between 00:45 UT and 02:00 UT with also a C9.1 class solar flare with peak time at 02:13 UT. This combination of blasts hurled an Earth directed CME into the interplanetary space. This ICME arrived in the first hours of March 17th and a minimum of Dst index of -223 nT (preliminary data) was noticed at 22:00-23:00 UT. At this time interval the Kp index reached the maximum value of 8 and Ap index for the time 21:00-23:59 UT was 179.

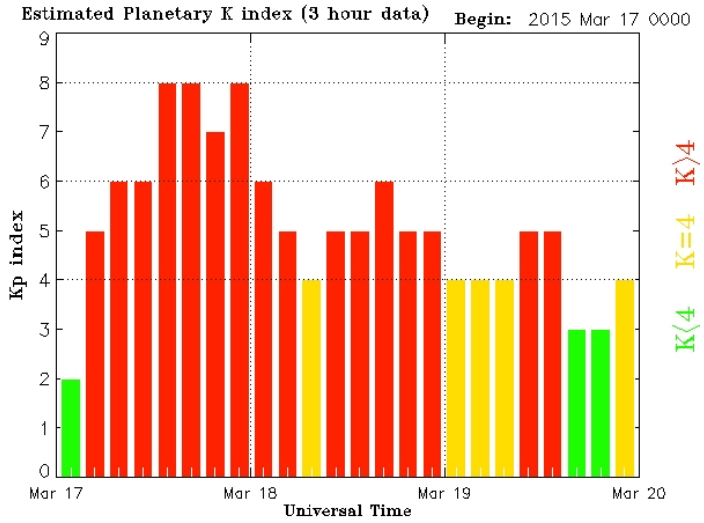

Figure 1: The Kp values for the most intense geomagnetic storm of the current solar cycle.

In terms of solar activity and especially in the sense of coronal mass ejections (CMEs) March 2015 was more active than the previous months. A number of 114 CMEs have been spotted, with 7 CMEs with angular width 90° < da < 180°, 3 CMEs with angular width 180° < da < 270° and 1 HALO CME resulting into distinct modulation of the galactic cosmic rays (source: http://sidc.oma.be/cactus/catalog.php).

Also March was very active in the sense of solar flares (SFs). A number of 284 C, M and X-class SFs spotted with 255 C, 28 M and 1 X-class SFs, the most energetic one being an X2.1 on 11/03/2015 at 16:22 UT from the AR 2297, S17E22, which gave some days after the G4 geomagnetic storm (Fig. 2).

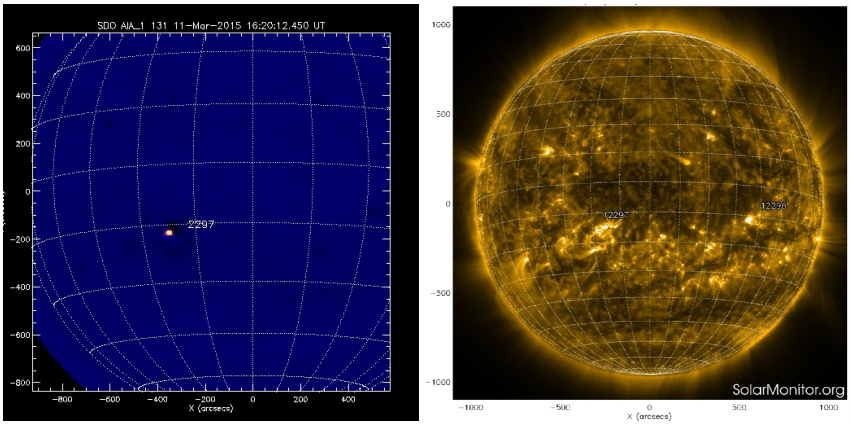

Figure 2: The X2.1 solar flare of 11/03/2015 at 16:22 peak time (from solarmonitor.org)

A Forbush decrease which started on March 2nd and its recovery phase of about 10 days is spotted. The M-class solar flares and the CMEs of March 8th and 9th had as a result a second Forbush decrease which started at March 10th and at the recovery phase started the G4 geomagnetic storm. This extended Forbush decrease had a recovery phase which lasted up to the end of the month. Hourly values of the cosmic ray intensity recorded at the Athens neutron monitor station (cut-off rigidity 8.53 GV) are illustrated in Fig. 3.

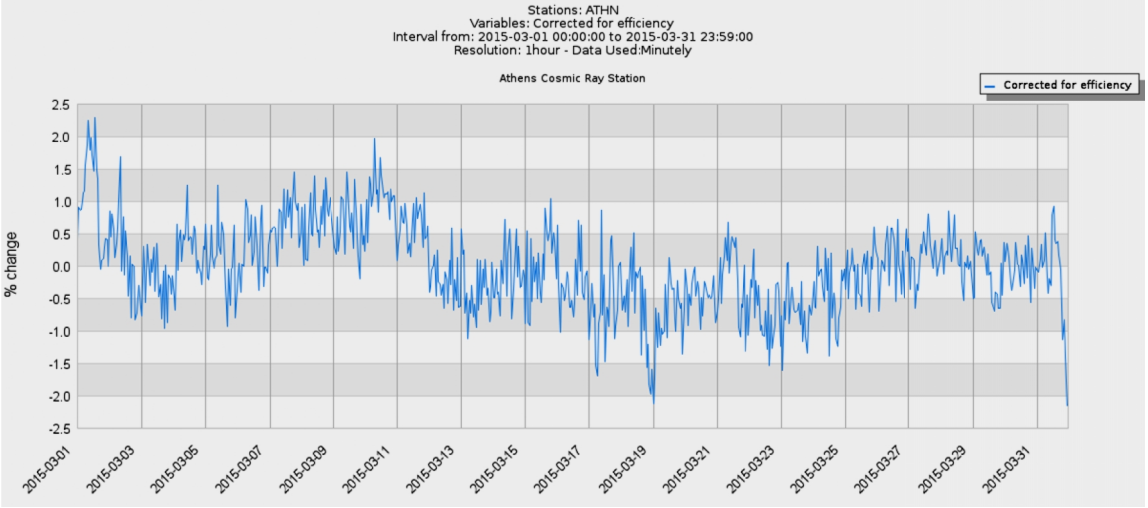

Figure 3: The corrected for pressure and efficiency counting rate of the Athens Neutron Monitor Station from 01-31/03/2015 (From multi station service of Athens Station)

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