

The relationship between the magnetic field and the coronal activities in the polar region

Masumi Shimojo[1]

[1] NAOJ

<http://solar.nro.nao.ac.jp/>

The image of the polar region of the sun is changing based on the observations taken by the three telescopes aboard the Hinode satellite. Based on the data of Solar Optical Telescope (SOT) aboard Hinode, Tsuneta et al. (2007) reported that there are many localized magnetic poles in the polar region, and the magnetic strength of the magnetic poles is over thousand Gauss. They called the strong magnetic pole in the polar region *kG-patche*. And, Cirtain, et al. (2007) and Savcheva, et al. (2007) presented that the occurrence rate of X-ray jets in the polar region is very high and 10 events/hour. Their result was obtained by the high resolution observations by X-ray Telescope (XRT) aboard Hinode. These results are very important for understanding the fast solar wind that blows from the polar region.

On the other hand, in order to understand the activities in the polar region, it is very important to investigate the relationship between the magnetic environments and the coronal structures/activities. In the paper, for the purpose, we aligned the photospheric images (G-band, Stoke-IQUV of FeI), the chromospheric images (Ca II H line, Stokes-V of Na) and coronal images (X-ray) obtained by Hinode, and investigate the relationship. Basically, the co-alignment process was done based on the alignment information of the telescopes reported by Shimizu et al. (2007). And, we aligned the images using the curve of the solar limb, finally. As the result of the co-alignments, we found the following things.

- 1) On most kG-patches in the polar coronal hole, there is any coronal structure.
- 2) X-ray jets in the polar coronal hole are not always associated with the kG-patches.

Some X-ray jets are associated with very weak magnetic field. And, the jets are strongly associated with the emerging/cancelling magnetic flux.

The first one suggests that the coronal heating is not effective only in the magnetic field strong, such as the center of the sunspot. The second result indicates that the producing mechanism of the X-ray jets in the coronal hole is same as that in the other region. And the result suggests that the magnetic activities are not weak even in the coronal hole.