

M09b

Polar Faculae and their association with Polar Magnetic Field

A.J.Kaithakkal, S. Tsuneta, Y. Suematsu, M. Kubo (NAOJ), D. Shiota (RIKEN)

Polar faculae are small bright features in the polar region of the Sun. They are observed with concentrations of polar magnetic fields. The number of the polar faculae at the latitudes greater than 50 degree has 11-year periodicity like the sunspot cycle, but it becomes a maximum in the solar minimum period. Studies on polar faculae are important because the polar faculae have a possibility to be a good indicator of polar magnetic fields. We analysis data of the north polar region taken by the Hinode spectropolarimeter (SP) in September 2007. Accurate measurements of vector magnetic fields at high spatial resolution by Hinode/SP for the first time allow us to compare polar faculae with polar magnetic fields in detail. There are many patchy magnetic field structures in the polar region, and we confirm that bright features have good correlations with these magnetic patches. The bright features must be polar faculae. It is found that the each magnetic patch is not uniformly bright but contains smaller islands having higher intensity and larger magnetic flux. The magnetic flux in a given magnetic patch increases with the intensity when the intensity contrast is higher than 1.1. When the intensity contrast is lower than 1.1, there is no clear correlation between the intensity and magnetic flux in the magnetic patch. The islands with the intensity contrast higher than 1.1 in the magnetic patch have magnetic flux density larger than 10^{16} Mx. The properties as mentioned above are common to magnetic patches with both majority and minority magnetic polarities in a data set, and we will confirm those results statistically by using polar panorama maps.