

## Derivation of the Solar Plage Index using the Flare Monitoring Telescope at Hida Observatory

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It is well known that the solar irradiance modulates at 11-year solar cycle. There have been many arguments on the relation between the solar cycle and the earth's climate, but at least it is well established that UV/EUV directly affect the upper atmosphere of the earth. The solar UV radiation is mainly emitted by the chromospheric height. In the solar chromosphere, magnetic features such as dark filaments and bright plages are observed. Recently Bertello, Ulrich, and Boyden (2010) developed the Ca II K plage index based on the area occupied by plages and active network on the solar disk, and found good consistency with the UV irradiance.

We aim to derive a proper index of solar UV radiation using the chromospheric H-alpha images observed by the Flare Monitoring Telescope. The Flare Monitoring Telescope has operated at Hida Observatory since 1996 and at Ica University in Peru since 2010. It obtains the full disk images of the Sun at H-alpha center and wings. In this work we analyze the H-alpha center images in order to estimate the area of dark filaments and plages. We report our method to derive the filament and plage indices based on the histogram of the H-alpha intensities. We also make indices separated into the low and high latitudes, to see their differences of their long-term variation.

The preliminary results show that the plage index in the solar minimum 23/24 is lower compared to the one in the solar minimum 22/23. This is consistent with the recent satellite observation of UV radiation (e.g., Stanley et al. 2010). However, if we calculate the plage index only in the high latitude, the indices of the two minima are about the same. Relations between average magnetic field strength, EUV images, and coronal holes will be discussed. Our results tell that the plage index may work as a powerful tool for the estimation of UV radiation back decades in time before the start of the satellite observations, and additionally gives some insights to their origins.

Keywords: solar chromosphere, H-alpha, ultraviolet, solar irradiance