[SE-17] The Evolution of Pores Observed by HINODE/SOT

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Pores are small sunspots with strong magnetic flux density. They are important in understanding the mechanism of small-scale flux emergence and its interaction with neighboring plasma on the photosphere. However, it is still unknown how they form and evolve since their observational qualities are affected by the seeing conditions of ground observation. In this study, we investigated the evolution of the small pores (R < 2′) observed from 11:25 to 14:45 UT on 2006 December 29 by using the high resolution spectropolarimeter (SP) and the G-band filtergram onboard Hinode. Their magnetic flux density and Doppler velocities are estimated from the SP data by applying the Center of Gravity (COG) method. The horizontal motions around the pores are tracked by adopting the Nonlinear Affine Velocity Estimator (NAVE) method to G-band filter images. As results, we found that: (1) there is a positive correlation between Intensity (darkness) of the pores and their magnetic flux density; (2) the pores are surrounded by the strong downward motions (highly red-shifted) by neighboring granulations; (3) there are two groups of the pores that show different evolutionary pattern in the brightness, magnetic flux density, and Doppler shift. One is the growing pores whose magnetic flux is increasing and downward flow speed is slightly decreasing. The other group is the diffusing (or scattering) pores that have decreasing flux density with relatively strong downward flow motion by invading granulations. Our results show that the formation and evolution of the pores are controlled by the motion of ambient granulation. information.

[SE-18] An estimation of propagating wave speed in a spicule observed by the Hinode SOT

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Recent high-resolution observations by solar space missions (TRACE, SOHO, and Hinode) reveal that the solar atmosphere is full of wave signatures in various scales. Especially, since the Hinode launch in 2006, many Alfven wave signatures in the chromosphere and the corona have been reported in several literatures. However, few of them show a clear evidence of propagation. In this study, we estimated the propagating wave speed in a spicule observed by the Hinode SOT on 2008 June 3 to present a more quantitative and clear evidence of propagating waves. At first, we made so-called space-time plots at different height of the spicule axis using time series images of the spicule. A space-time plot can be made by stacking spatial slices with time from time-series images. We found that all space-time plots show oscillation patterns with a period of about 130 s and that the amplitude of the oscillation increased slightly with height. We also investigated the cross-correlation among space-time plots to estimate the phase difference of the oscillation with height and its propagating speed. We found that the mean phase delay over the height difference of 3 arcsec (about 2300 km) is about 16 s. This result suggests that the oscillation is a propagating wave and the propagating speed is about 140 km s-1. Additionally, we will discuss the error analysis for estimating the propagation speed.