[구SO-11] Measurements of Turbulent Magnetic Diffusivity on the Solar Surface

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The magnetic diffusivity in the solar photosphere is determined by applying a model of magnetic induction to high resolution magnetograms of plage regions, taken by HINODE/SOT and SOHO/MDI. The mean value of magnetic diffusivity determined from SOT magnetograms with the smallest pixel size of 116 km is about 0.84±0.34 km2 s-1. This is the smallest value that has been empirically determined so far. High resolution and full-disk MDI magnetograms with the pixel sizes of 440 and 1400 km yielded larger values of 4.5±1.4 km2 s-1 and 13±10 km2 s-1, respectively. The measured diffusivity values at different length scales are consistent with a turbulent cascade that ends at a resistive dissipation scale of about 25 km. The results suggest that turbulent magnetic diffusivity should be taken into account in the analysis of the observed rate of magnetic flux cancellation in the photosphere.

[구SO-12] The Rate of Magnetic Flux Cancellation in Quiet Regions and Active Regions

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The canceling magnetic features (CMFs) have been believed that they might be results of magnetic reconnection in the solar low atmosphere. To investigate the magnetic reconnection in the low atmosphere, we measured important parameters such as the rate of the magnetic flux cancellation, converging speed, and magnetic field of CMFs. The rate of magnetic flux cancellation we obtained using Stokes I and V images taken by the Narrow-band Filter Imager (NFI) on SOT/Hinode and MDI/SOHO magnetograms, was compared with the result of previous studies. We checked the relation between the converging speed and the rate of flux cancellation of the flux cancellation fragments, and estimated the outflow speed according to Sweet-Parker magnetic reconnection model and Petscheck model. As a result, we found that the distribution of magnetic flux cancellation rate has the range between 105 G cm s-1 and 107 G cm s-1. For the discussion of this range, we may consider the difference in magnetic flux between NFI data of SOT/Hinode and MDI/SOHO magnetograms due to the different calibration methods.