

M05a **The property of helicity and current in a flare-productive active region obtained by Hinode**

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The qualitative nature of the regions producing a flare has been widely studied, and these studies show that the region tends to produce a flare when a strong magnetic shear is observed. We here present a qualitative description of the process leading to a flare by investigating the evolution of magnetic helicity and current in a flare-productive active region. From Hinode observations we derived the temporal development of photospheric magnetic field, which was then used to calculate the time variation of the magnetic helicity injected in the photosphere and a time-series of photospheric maps of longitudinal current density. We obtained the result that shear motions have more effect on accumulating magnetic helicity than rotational motions, and the magnetic helicity increased exponentially with time during the preflare phase. Then the helicity accumulation became saturated, and just after the saturation a flare occurred. We discuss how the helicity evolution is related to the occurrence of a flare. We also compare the observational result on the distribution of current density with an MHD simulation to understand the nature of the so-called sigmoids.