

## Characteristic Development of Magnetic Shear in a Flare-productive Sunspot Obtained by Hinode

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It has been recognized that magnetic shear tends to develop toward the onset of a flare. Field-aligned currents giving the energy source of a flare introduce distortion to a magnetic structure and the structure acquires free magnetic energy, as demonstrated by force-free-field modelings (Nakagawa et al. 1971; Sheeley & Harvey 1975; Low & Nakagawa 1975; Sakurai 1979; Weatland et al. 2000; Wiegmann et al. 2000; Regnier & Priest 2007). The aim of the present study is to derive several key quantities representing magnetic shear in a flare-productive sunspot, and to explain the evolution and structure of sunspot magnetic fields producing a flare. Those quantities are obtained from state-of-the-art observations by Hinode, which reveal the characteristic development of magnetic shear in the flare-productive sunspot.