

Observed pre flare characteristics of active region magnetic fields

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I will present data and results on observations of flare-related magnetic conditions in solar active regions. The following topics will be discussed. Static non-potential magnetic characteristics before flares such as magnetic gradients, shear and twist; 2) spatio-temporal dynamics of the photospheric magnetic flux such as flows and flux emergence; 3) evolution of magnetic structures leading to and following flares. A special attention will be payed to new approaches to quantify complexity of the photospheric magnetic fields in terms of intermittency, magnetic power spectra and probability distribution functions. Discovered correlation between the parameters and the flare activity in active regions provides new insights into understanding of the nature of magnetic coupling between the sub-photospheric layers, where the magnetic field is generated, and the corona where eruptions occur.