

# **Non-Potentiality and Evolution of Magnetic Fields Associated with Flares and CMEs**

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In this talk, I review the observations of non-potentiality and evolution of photospheric magnetic fields associated with flares and CMEs. The following topics will be discussed: (1) Pre-flare conditions, such as high magnetic gradient, strong magnetic shear and large twist and electric current; new flux emergence; helicity injection and shear/converging flows. These results may lead to the automated real-time solar activity forecasting. (2) The rapid changes of magnetic structures leading to and following flares/CMEs. In particular, I address the recent discoveries that in delta sunspots, magnetic structures are enhanced at the flare neutral lines immediately following major flares, while the outside penumbrae decay in the same time scale. These changes are rapid (in the time scale less than one hour) and permanent. Some theoretic implications are discussed in the context of observational results.