

## Magnetic shear development process in flare-productive solar active regions

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In order to forecast the occurrence of strong solar flares, we need study the energy build-up process and the triggering mechanism of strong flares. Kurokawa(1987) classified the magnetic shear development processes into two types:

(A) Collision of different magnetic polarities which are originally belong to two different bipolar regions. (B) Emergence of a strongly-twisted flux rope. Kurokawa(1987) also found the type (A) development of magnetic shear is essential for strong flare occurrence.

To develop this work, we are studying all active region which produced X-class flares in the 23th solar cycle. Among 50 sunspot regions which produced X-class flares from July 1996 through September 2005, we first studied 11 regions where more than 3 X-class flares were observed. For this analysis we mainly used SOHO MDI and TRACE data, and for the recent vents we also used Hida SMART Halpha and magnetic field data. We found all X-class flares in the analyzed regions are related to the emerging twisted flux ropes.