

## Three-Dimensional Structure of Magnetic Field and Energy Storing Process in the AR NOAA 10930

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The understanding of three-dimensional magnetic field of active region is crucially important to reveal the storage-release process of magnetic free energy and to be toward the success of space weather forecast. Solar Optical Telescope (SOT) on board HINODE is an ideal tool for this purpose, because it can provide highly resolved and continuous vector magnetogram. Since the data of magnetic field, however, is limited to on photosphere, a numerical technique is required to extrapolate three-dimensional magnetic field of the solar corona using magnetogram data as boundary value problem.

In this study, we extrapolated three-dimensional magnetic field, which is based on Non-Linear Force-Free (NLFF) modeling, before and after a flare on Dec.13, 2006 using high resolved vector magnetogram data from Hinode. Furthermore, the energy storing process in active region before a flare is suggested using time series vector magnetogram data.

As a result of extrapolation, we found, before the onset flare, strong sheared structures and current region were formed on the neutral line. Furthermore, we found, after flare, elongated magnetic flux is partially formed but a part of magnetic shear was released. In this paper, we will report the result of energy storing process from three-dimensional magnetic configuration and the quantity analysis of magnetic energy and helicity with time evolution using time series data.