Hinode-3: 3rd Hinode Science Meeting
Hitotsubashi Memorial Hall, Tokyo
1–4 December, 2009

Nonlinear force-free field extrapolation of coronal magnetic field using the data obtained by Hinode satellite

Han He

National Astronomical Observatories, Chinese Academy of Sciences

Huaning Wang

National Astronomical Observatories, Chinese Academy of Sciences

Yihua Yan

National Astronomical Observatories, Chinese Academy of Sciences

Abstract. The Hinode satellite can obtain high quality photospheric vector magnetograms of solar active regions and the simultaneous coronal loop images in soft X-ray and extreme ultra-violet (EUV) bands. In this work, we apply the newly developed upward boundary integration computational scheme for nonlinear force-free field (NLFFF) extrapolation of coronal magnetic field (He and Wang, 2008, JGR, 113, A05S90) to the photospheric vector magnetograms acquired by the Spectro-Polarimeter (SP) of the Solar Optical Telescope (SOT) aboard Hinode satellite. Three vector magnetograms of the same solar active region NOAA 10930 are selected for the NLFFF extrapolations, which were observed within the interval of 26 hours when the active region moved across the disk center of the sun. The comparisons between the calculated field lines and the coronal loop images obtained by the X-Ray Telescope (XRT) and the EUV Imaging Spectrometer (EIS) of Hinode show that the orientations of the field lines basically coincide with the coronal loop observations in the central area of the active region for all the three magnetograms. This result supports the NLFFF model being used for tracing the slow variations of the 3D coronal magnetic structures as the responses of solar atmosphere to the magnetic field changes in the photosphere.