

Internal use only

Abstract number: S2-333

The active Sun and its implication for the heliosphere
oral preferred

Data driven active region modelling from SDO and STEREO

Wiegmann, Thomas⁰, Thalmann, Julia⁰, Inhester, Bernd⁰, Tadesse, Tilaye⁰
and Chifu, Julia⁰

⁰Max-Planck Institut fuer Sonnensystemforschung

Solar active regions are the origin of eruptive phenomena like flares and coronal mass ejections and the source region of space weather activity. The driving force for solar eruptions is magnetic energy, which is converted into kinetic and thermal energy. While we cannot measure the magnetic energy content in the solar corona above active regions directly, we derive information about the topology of coronal field lines by EUV-observations from the two STEREO/SECCHI spacecraft and from SDO/AIA. Additional, direct measurements of the photospheric magnetic field vector are available from SDO/HMI. We describe, how these observations can be used to model active regions by a sequence of force-free equilibria. The 3D model equilibria are analysed regarding the content of free magnetic energy, helicity and strong current concentrations. Free magnetic energy is required to drive the eruption, but its conversion to other energy forms by magnetic reconnection is constrained by the magnetic helicity. Furthermore, current driven micro-instabilities occur by its very nature only in strong current concentrations, which are also (additional to free energy) a prerequisite for eruptions.