

What can EIS observations tell us about eruptions from sigmoidal active regions?

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Abstract. Soft X-ray images of the Sun have shown that some active regions contain loops, or collections of loops, which appear forward or reverse 'S' in shape. These structures are known as sigmoids and are of interest because sigmoidal active regions have a high probability of producing an eruption.

Recent observational and theoretical work has supported the interpretation of the magnetic structure of some sigmoids as being that of a flux rope lying very low in the solar atmosphere, having a bald patch separatrix surface topology. This work indicates that the flux rope is present in the solar atmosphere before the onset of the eruption. The main question to be addressed now is how the sigmoidal active regions which produce an eruption evolve toward an instability or loss of equilibrium.

We use Hinode observations to investigate eruptive sigmoidal active regions. We discuss the importance of the evolution of the photospheric magnetic field, the role of reconnection and present results from EIS which give an insight into how the sigmoid and overlying arcade field evolve toward the onset of an eruption.