

Peter Ashton, Rachel MacDonald

Can the Magnetic Kink Instability Trigger Solar Energetic Events?

Abstract:

In this project we investigate whether or not the magnetic kink instability could be a trigger mechanism for solar energetic events. To answer this question, we determine whether active regions can contain magnetic twist sufficient to undergo the kink instability, following the formulation of Leka, Fan & Barnes 2005. Solar active regions were evaluated based on available data, solar flare activity, and the presence of emerging flux. For isolated bipoles within candidate active regions, the amount of magnetic twist present in the regions' magnetic fields was calculated for comparison with a theoretical critical value. Preliminary results include at least one active region for which the magnetic twist present was sub-critical, and thus inconsistent with the kink instability as a trigger, and yet the region produced a small solar flare.