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Poster
The Solar Dynamics Observatory / Helioseismic and Magnetic Imager (HMI) Active Region Patches (HARPs) provide meta-data (the SHARP parameters) that represent a small sample of ways to describe the photospheric magnetic fields in active regions. The SHARP parameters were selected based on decades of research into the question of what drives a solar active region to flare (c.f., Bobra et al 2014 and references therein). We present here an expansive study of additional approaches for characterizing active region magnetic fields in this context (c.f. Leka et al 2018). Beyond additional parameterizations of the surface magnetic field as provided by the HMI vector field maps, we examine the ability of a coronal-field model (from the Magnetic Charge Topology analysis, c.f. Barnes and Leka 2006) and parameters derived from them, to distinguish between flare-imminent and flare-quiet epochs -- with the motivation that the solar coronal magnetic field both stores the requisite energy to power energetic events, and is a candidate for trigger mechanisms as well. We perform these analyses of all HARPs, on a daily basis -- and compare the information provided by the short-term evolution to "snapshot" or static parameters. For all, the NWRA Classification Infrastructure (NCI), a facility based on nonparametric discriminant analysis, enables a quantitative evaluation from this large-sample analysis, of which characterizations can best distinguish regions in imminent likelihood of flaring. We present a summary of physical insights from this expanded analysis.

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