

#38 Topic: Super-Resolving Magnetograms covering 40 years of space weather events

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Abstract:

We apply deep learning architectures with the aim of converting magnetograms from a source survey to a target survey while preserving the features and systematics of the target survey. As a first step, we test the validity of a deep learning approach based on a single instrument conversion between different resolutions in order to utilize perfect alignment and identical systematics and identify the conditions under which the conversion breaks down. We perform this analysis on magnetograms taken by the Helioseismic and Magnetic Imager (SDO/HMI). We then apply the same approach to upscale and cross-calibrate magnetograms obtained by the Michelson Doppler Imager (MDI/SOHO), as well as magnetograms taken by the Global Oscillation Network Group (GONG) to the resolution of SDO/HMI.