

ABSTRACTS OF CONTRIBUTED PAPERS

ASSESSING THE PREDICTABILITY OF SOLAR ACTIVE REGIONS USING HELIOSEISMIC HOLOGRAPHY: AN EXPLORATORY DATA ANALYSIS

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For solar astrophysics and space weather, deepening our understanding of the relationship between solar Active Regions (ARs) and solar flares is essential to predict and mitigate their effects on our planet. This study focuses on assessing the possible connection between ARs on the far side of the Sun, identified through holographic helioseismology techniques, and the ARs that rotate onto the visible side of our star, the near side. Using Doppler observations from the Solar Dynamic Observatory (SDO), the Northwest Research Associates (NWRA), in collaboration with Stanford University, regularly generates acoustic maps of the far side of the Sun (one map every 12 hours), allowing us to analyze non-visible ARs from Earth. This poster will present exploratory data analysis of ARs in the identifiable regions on both the far and near sides of the Sun, covering the period from April 25, 2010, to July 31, 2023. The list and characteristics of active regions on the visible solar disk are taken from standard catalogs compiled by the National Oceanic and Atmospheric Administration (NOAA) for this purpose. The analysis aims to assess the existence (or lack thereof) of a relationship between active regions on the far side of the Sun and those that become visible due to the rotation of our star. We analyze key parameters such as acoustic intensity and morphological evolution of active regions, to then visualize them and carried out descriptive statistical techniques to evaluate potential statistical correlations among them. This exploratory data analysis is the first step of a broader project that seeks to use the acoustic characteristics of the Sun’s far side as predictors of subsequent solar flares on the visible side of our star.

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