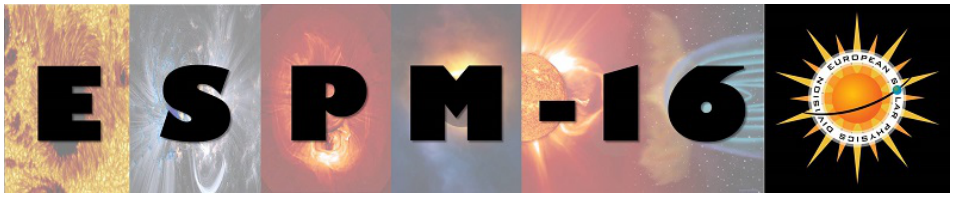

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Global Solar Magnetic Variations Characterized by Excess Brightness Indices and Spectroscopic Proxies

Monday, 6 September 2021 15:56 (13 minutes)

On a global scale chromospheric magnetic activity is represented by plages and enhanced chromospheric network. These phenomena significantly contribute to the variation of the solar UV radiation and the enhancement in chromospheric emission in the two strong resonance Ca II H & K lines. We present a set of excess brightness and area indices based on disk-resolved UV 1600Å images of the Atmospheric Imaging Assembly (AIA) on board the Solar Dynamics Observatory (SDO) and full-disk Ca II K line-core filtergrams of the Chromospheric Telescope (ChroTel) at Observatorio del Teide, Tenerife, Spain. In addition, we compute the spectroscopic S-index based on the quasi-synoptic observations in 2018 and 2019 with the Potsdam Echelle Polarimetric Spectroscopic Instrument (PEPSI) of the Large Binocular Telescope (LBT) at Mt. Graham International Observatory (MGIO), Arizona, U.S.A. All indices display signatures of rotational modulation, even during the very low magnetic activity in the minimum of Solar Cycle 24. The UV 1600Å and Ca II K image-based excess brightness indices reveal as strong peak of activity in 2012 and the double-peaked maximum in 2014. These features are driven by complex and large active regions. Furthermore, both spectral- and image-based indices demonstrate that the Solar Cycle 24 concludes with a deep minimum. Moreover, the SDO/AIA UV excess brightness indices reveal an intriguing aspect of activity asymmetry between the two hemispheres. In particular, starting in 2018, the rotational modulation in the southern hemisphere vanishes, indicating exceptionally low solar activity representing the basal activity level of the Sun.

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