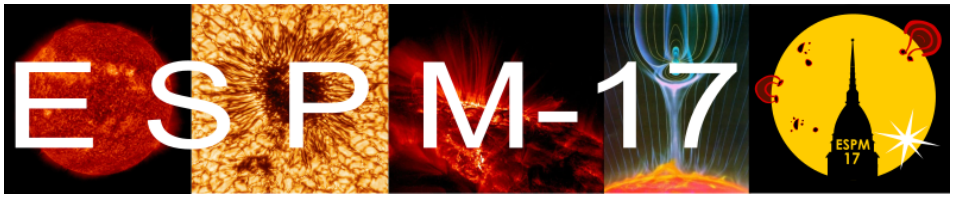

Contribution ID: **42** Type: **Poster**

Ca II K Polar Network as A Proxy for Estimating Historical Polar Magnetic Field of the Sun

The polar magnetic field in the Sun is an important aspect of the solar dynamo process for predicting future solar cycles. However, systematic measurements of this polar field have only been available since 1976 at the Wilcox Solar Observatory (WSO). Prior to 1976, there was a lack of direct information on polar magnetic fields, leading people to utilize various proxies such as polar faculae and polar filaments to infer polar field data. The use of polar faculae, however, introduced uncertainties due to manual counting methods, impacting the accuracy of polar field information. Recently, the polar network has emerged as a more reliable proxy for polar field information. This is attributed to its correlation with polar faculae, along with its observation in higher latitudes compared to polar faculae. In this study, we employed newly calibrated and rotation-corrected Ca II K data from the Kodaikanal Solar Observatory (KoSO) from 1907 to 2007 to detect the polar network automatically and estimate polar magnetic fields. In addition to KoSO data, we utilized PSPT/Rome Ca II K data (1996-2022) to generate a composite polar network index (PNI) series from 1907 to 2022. Our findings revealed a significant correspondence between polar faculae counts from the Mount Wilson Observatory (MWO) and the Polar Network Index (PNI) from KoSO Ca II K data. Additionally, a good correlation was observed between the PNI (KoSO and PSPT/Rome) and the polar field (WSO and Advective Flux Transport (AFT)) during the overlapping analysis period from which we estimated the historical polar field.

Primary author: Ms MISHRA, Dibya Kirti (ARIES, Nainital, INDIA)

Co-authors: Dr JHA, Bibhuti Kumar (Southwest Research Institute, Boulder, CO 80302, USA); Dr CHATZISTERGOS, Theodosios (Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, D-37077 Göttingen,Germany); Dr ERMOLLI, Ilaria (INAF Osservatorio Astronomico di Roma, Via Frascati 33, 00078 Monte Porzio Catone, Italy); Prof. BANERJEE, Dipankar (Aryabhatta Research Institute of Observational Sciences, Nainital-263002, Uttarakhand, India); Dr UPTON, Lisa A. (Southwest Research Institute, Boulder, CO 80302, USA)

Session Classification: Coffee break and poster session 1

Track Classification: Solar interior, sub-surface flows and long-term variability