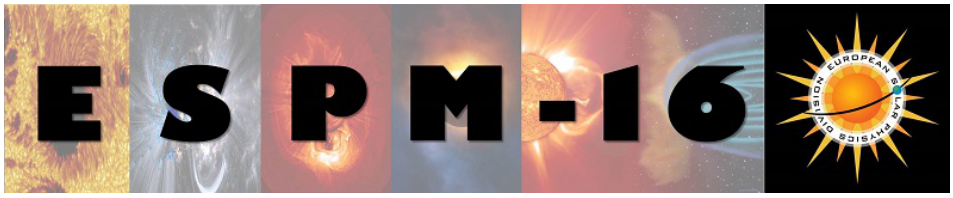

Contribution ID: **555** Type: **Poster**

Including ephemeral regions in surface flux transport simulations and solar irradiance reconstructions

Monday, 6 September 2021 11:50 (13 minutes)

Time-series of historical solar irradiance variations is an important input to climate models. An extension of the record of direct irradiance measurements available since 1978 to earlier times is only possible with the help of models. For this, we need to know the evolution of the surface magnetic field. The longest record of direct observations of solar activity is the sunspot number covering the last four centuries. However, it has the shortcoming that it only allows tracing the evolution of the large-scale active region (ARs) harbouring sunspots, while the evolution of small-scale ephemeral regions (ERs) is heavily uncertain. At the same time, ERs play an important role in driving the long-term irradiance variations. We use a new model of the ERs emergence based on recent solar observations, where the emergence of all magnetic regions is described by a single power-law distribution with an exponent varying with solar activity, as represented by the sunspot number. The evolution of the magnetic field with time is simulated with a surface flux transport model, and the computed magnetic field is used to reconstruct solar irradiance.

Primary author: HOFER, Bernhard (Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, Goettingen, Germany)

Co-authors: Dr KRIVOVA, Natalie A. (Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, Goettingen, Germany); Dr CAMERON, Robert (Max Planck institute for Solar System Research, Goettingen, Germany); Dr JIANG, Jie (School of Space and Environment, Beihang University, Beijing, China); Prof. SOLANKI, Sami (Max Planck Institute for Solar System Research, Goettingen, Germany); Dr WU, Chi-Ju (Max Planck Institute for Solar System Sciencerch, Goettingen, Germany); Dr USOSKIN, Ilya G. (Space Climate Research Unit and Sodankylä Geophysical Observatory, University of Oulu, Oulu, Finland)

Presenter: HOFER, Bernhard (Max Planck Institute for Solar System Research, Justus-von-Liebig-Weg 3, Goettingen, Germany)

Session Classification: Poster Session 1.6

Track Classification: Session 5 - Solar-Terrestrial Relations, Solar Wind, Space Weather and Space Climate