

Annual report of Interdivision B and E WG on Coordination of Synoptic Observations of the Sun.

Alexei A. Pevtsov & Frédéric Clette, co-Chairs of WG on behalf of its 53 members.

Report for the period Jan to Dec 2022

Current WG page: <https://gonewithsolarwind.com/index.php/iau-wg/>

In 2022, the working group continued supporting the activities conducted in the framework of SOLARNET-SPRING project (ground-based network for solar synoptic observations). SPRING is an EU initiative, which includes scientists' participation from some non-EU countries (Japan, USA). In their turn, US scientific community promoted development of the next generation Ground-based solar Observing Network (ngGONG). The need for continuation of long-term synoptic programs of the Sun and the importance of international collaboration were presented at several international conferences.

WG members participated in the white papers submitted to the 2024 Decadal Survey on Heliophysics by the National Research Council of the US National Academy of Sciences, Engineering, and Medicine. These white papers promoted broad international collaboration in groundbased studies of the Sun, solar irradiance and alike.

The WG members were also involved in recovery of historical Sunspot Number (SN) and Group Number (GN) records. The results of this activity were presented by Clette et al (2023). The report briefly describes plans for developing procedures for evaluating the new SN and GN timeseries series and selecting the next versions of SN and GN for sanction by an International Astronomical Union (IAU) reviewing body, with formal release targeted for conjunction with the IAU General Assembly in 2024.

The WG members also participated in activities of S1 cluster in the framework of COSPAR International Space Weather Action Teams (ISWAT, <https://iswat-cospar.org/>). This Cluster is comprised of three teams on Long-term solar variability, worst-case scenario for extreme solar events, and data sets of historical observations of solar and geomagnetic activity, which significantly overlaps with interests of this IAU WG. In 2022, ISWAT S1 cluster prepared a review article in support of updated COSPAR's Roadmap on Space Weather. This review article emphasizes the development a comprehensive inventory of solar and geomagnetic datasets relevant for long term space weather and space climate research; a standardized method for processing and preservation of historical data, their quality and current state. It also raises concerns about (lack of sufficient) resources for preservation of these critical datasets. In these discussions, the review article refers to IAU initiatives on preservation and scientific exploration of historical data.

Finally, the co-Chairs reached an agreement to step down. In 2023 , the WG will select new co-chairs.

References:

1. Clette, F., Lefèvre, L., Chatzistergos, T., Hayakawa, H., Carrasco, V.M., Arlt, R., Cliver, E.W., Dudok de Wit, T., Friedli, T., Karachik, N., Kopp, G., Lockwood, M., Mathieu, S., Muñoz-Jaramillo, A., Owens, M., Pesnell, D., Pevtsov, A., Svalgaard, L., Usoskin, I.G., van Driel-Gesztelyi, L.,

Vaquero, J.M.: 2023, **“Recalibration of the Sunspot Number: Status Report”**, Solar Physics, **298**, Article number: 44, DOI: [10.1007/s11207-023-02136-3](https://doi.org/10.1007/s11207-023-02136-3)

2. Pevtsov, A.A., Nandy, D., Usoskin, I., Pevtsov, A., Corti, C., Lefevre, L., Owens, M., Li, G., Krivova, N., Sahab, C., Perri, B., Brun, A.S., Strugarek, A., Dayeh, M.A., Nagovitsyn, Y.A., von Fay-Siebenburgen, R.: 2023, **“COSPAR Space Weather Roadmap 2022 – Cluster S1 Review”**, Adv. Space Research, submitted