

**INTER-DIVISION B-E /  
WORKING GROUP ON**

**COORDINATION OF SYNOPTIC  
OBSERVATIONS OF THE SUN**

**CO-CHAIR  
CO-CHAIR**

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**TRIENNIAL REPORT 2015-2018**

**1. Introduction**

The WG on Coordination of Synoptic Observations of the Sun was created as the result of discussions at Commission 12 and the Division II (The Sun) business meetings during the IAU General Assembly in Rio De Janeiro, Brazil in 2009. It was formalized in late-2011. The WG was re-created after the IAU reorganization of the Commissions and Working Groups, and in late-2015, after the IAU GA in Honolulu, the WG became the Inter-Division B-E working group. In 2016, the WG was designated as Functional working group. Alexei Pevtsov served as the Chair of the WG since its creation, and in 2013, Frédéric Clette was elected as the vice-Chair. Since 2015, both of them serve as co-Chairs. The mission of the WG is to facilitate international collaboration in synoptic long-term solar observations, which includes past, current, and future synoptic programs, preservation, calibration, and access to synoptic solar data products. The working group provides a forum for discussion of all issues relevant to synoptic long-term observations of the Sun including (but not limited to) coordination between synoptic programs in different countries (both in respect to exchange of information and planning for future synoptic programs) and a proper calibration and preservation of historical data from different sources (e.g., sunspot drawings, CaK plage indices, magnetic field measurements etc). There are currently 55 members of the WG from 19 countries.

**2. Developments within the Past Triennium**

During the 2015-2018 triennium, the WG concentrated on four major issues related to: (1) support for continuation of synoptic programs threatened by budget cuts and promoting the broadening of international participation in WG activities, (2) preservation and digitization of records of past solar activity, (3) verification of existing sunspot number time series and developing a unified sunspot time series, and (4) improving access to modern and historical data.

In respect to these four issues:

(1) The WG members and its co-Chairs continue raising concerns about declining funding levels, which threaten the long-term continuation of synoptic solar observations. The WG provided letters of support for continuing operations of Debrecen Heliophysical Observatory, the WDC-SILSO activities at the Royal Observatory of Belgium, Brussels and for a research proposal seeking funding for implementing advanced statistical methods to improve the sunspot number as recomputed from the SILSO database. Co-Chairs published an opinion piece entitled “To understand future solar activity, one has to know the past” (Pevtsov and Clette 2017). To discuss the long-term sustainability of

synoptic programs with the international community, members of the WG had initiated a series of splinter meetings. A first splinter meeting on coordination of synoptic observations was held in conjunction with L5 Consortium meeting, Oct. 16, 2017, Göttingen, Germany (<http://science-media.org/conferencePage.php?v=26>). A second meeting was held in conjunction with the IAU Symposium 340 on Long-Term Datasets for the Understanding of Solar and Stellar Magnetic Cycles, 18-24 Feb., 2018, Jaipur, India. To raise the awareness of international astronomical community about issues related to long-term preservation of historical data, orphan data, continuation of long-term synoptic solar and stellar observational projects, members of WG are reaching out to the community via invited/contributed talks at major National and International meetings, colloquia and committee presentations. The WG maintains a list of astronomical observatories (optical and radio) engaged in solar observations, instrument networks and neutron monitors. Different facilities are shown as separate layers on a Google map, which is available via the WG web page (under Resources) at <https://www.nso.edu/IAU-Com12/resources>.

(2) Members of international community continue discovering new archives of sunspot drawings and other historical data worth preservation. Thus, for example, The WG was contacted by researchers from the Taipei Astronomical Museum (TAM), who run an observing program of daily sunspot drawings since 1941. The digitized TAM drawings were made public via Historical Archive of Sunspot Observations (HASO, <http://haso.unex.es>). As other example, researchers from Ulugh Beg Astronomical Institute, Tashkent, Uzbekistan discovered archives of sunspot drawings from different periods between 1884 and 1927. Upon advice from the WG co-Chairs, they started the digitization project. Upon completion, the digitized drawings will be made public via HASO. The WG provided support letters to several national projects aimed at digitization of historical data. Such letters were issued to scientists from Russian Federation, Switzerland, USA, and Uzbekistan to support their work in archives in different countries. Letters of support were also issued for IAU symposia and focus topics at IAU GA.

(3) Members of WG continued discussion of issues related to developing a consensus sunspot time series, and developing procedures and policies on future updates once such a time series is developed. The most recent discussions occurred in the framework of international team on Recalibration of the Sunspot Number Series supported by the International Space Science Institute (ISSI).

(4) Several members of WG worked together on issues related to getting access to historical data and/or finding funding for digitization of data. The WG is involved in discussions on improving discoverability of historical data and their accessibility by the broad international community. The ideas include maintaining a centralized repository (e.g., Historical Archive of Sunspot Observations (HASO) for sunspot drawings), and having a distributed data archives with pointers via Virtual Solar Observatory (VSO). Also discussed were issues of long-term maintenance/preservation of archives after retirement of projects PIs.

Finally, members of the WG were involved in recovery and making public the dataset of historical Mount Wilson Observatory HK Project (stellar cycles). The dataset discovered by Dr. Richard Radick at the National Solar Observatory (NSO) at Sacramento Peak was made public via the NSO Digital Library at [ftp://solis.nso.edu/MountWilson\\_HK/](ftp://solis.nso.edu/MountWilson_HK/). To distinguish this dataset from any other versions, it was designated as ‘‘HK\_Project\_v1995\_NS0’’.

### 3. Closing Remarks

Over the last reporting period, the WG concentrated on supporting continuation of long-term programs and promoting stronger international collaboration in synoptic observations of the Sun. Work also continued on preservation of historical data and developing a consensus sunspot number time series. The work of the WG includes sun-as-a-star observations, and thus, the WG is opened to questions related to synoptic observations of other stars (e.g., stellar activity cycles). We invite all astronomers interested in long-term synoptic observations and preservation of historical data to join the discussion. The Working Group's website can be accessed via

[https://www.iau.org/science/scientific\\_bodies/working\\_groups/255/](https://www.iau.org/science/scientific_bodies/working_groups/255/).

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### References

Pevtsov, A. A. & Clette, F. 2017, *To understand future solar activity, one has to know the past*, Eos, 98, DOI: <https://doi.org/10.1029/2017EO083277>