

Summary of last (2016) year activity by IAU Inter-Division B and E Working Group on Coordination of Synoptic Observations of the Sun:

**1. Activity related to preservation and digitization of records of past solar activity.**

- The WG was contacted by researchers from the Taipei Astronomical Museum (TAM), who run an observing program of daily sunspot drawings since 1941. The TAM drawings were digitized and made available via Historical Archive of Sunspot Observations (HASO) at <http://haso.unex.es/>
- We received several requests for letters of support for WG members for their activity on digitization of solar observations from historical archives: Zurich Library, ISSI, and Paris Observatory. Several members of WG worked together on issues related to getting access to historical data and/or finding funding for digitization of data.
- In early 2016, we learned about an effort to digitize synoptic maps created by Patrick McIntosh, and had attended the team meeting for this project. The project is led by David Webb (see current information at [http://www.ngdc.noaa.gov/docucomp/page?xml=NOAA/NESDIS/NGDC/STP/Solar/iso/xml/solar-imagery\\_composites\\_synoptic-maps\\_mc-intosh.xml&view=getDataView&header=none](http://www.ngdc.noaa.gov/docucomp/page?xml=NOAA/NESDIS/NGDC/STP/Solar/iso/xml/solar-imagery_composites_synoptic-maps_mc-intosh.xml&view=getDataView&header=none) ).

**2. Activity related to support continuation/funding for synoptic programs threatened by budget cuts**

- Letters of support for continuation of the WDC-SILSO activities at the Royal Observatory of Belgium, in Brussels were provided
- We also provided letters of support for continuing operations of Debrecen Heliophysical Observatory, and for a research proposal that seeks funding for implementing advanced statistical methods to improve the sunspot number as recomputed from the SILSO database. The DHO project was extended by one year, but unfortunately, we have recently learned that the current plans still call for a discontinuation of the Debrecen Photoheliographic Data Project at the end of this (2017) year.
- Co-Chairs wrote a brief “Opinion” article to highlight current funding situation threatening the long-term synoptic programs. The article is under review at AGU’s EOS publication.

**3. Activity related to verification of existing sunspot number time series and developing a unified sunspot time series.**

- Several members of the WG participate in grass-root community initiative to recalibrate the historical time series of sunspot number and create a single unified time series (with error bars). During the Space Climate 6 symposium in Levi (Finland, April 2016), we held a side meeting to discuss plans for this recalibration. During the SPD meeting in Boulder, we organized a small side meeting to make further plans.
- At the end of 2016 a group of researchers who expressed interests in pursuing verification and reconciliation of different time series was identified, and smaller focus

groups were formed. These groups had started examining existing time series for specific issues. Later this year (2017), all focus groups will meet to discuss the solutions for found differences between different time series. This will take place in the framework of future ISSI workshops.

- As a long-term goal, we plan proposing a unified sunspot number time series as a “reference” series for IAU approval. External (non-solar) communities had expressed a strong desire for having a single sunspot number time series (not the multiple ones). The concept of “reference” data sets is used by other communities (e.g., Earth magnetic field, solar irradiance); and as part of developing sunspot number “reference” time series, we will rely on their experience and develop clear procedures for updating, vetting and officially approving the reference time series.

#### **4. Activity related to improving access to modern and historical data.**

- The work on the WG web site was somewhat slow. We created a Google map of solar observatories, and now are working on implementing comments we received after the release of the map. We also continue collecting links to various solar data although it is clear that the presentation of this data needs to be improved. The web site still uses “long list” format, which is getting too long to be useful. Input for suggestions on better approaches for providing access to solar data at WG site was solicited from the WG members.
- The WG continue identifying additional long-term datasets that could be of interest for the community. Some of the datasets were very useful in the past, but unfortunately, are not updated anymore. Examples of such datasets include summary information on prominences at the limb and their eruptions, maps of coronal holes, synoptic/Carrington maps of EUV/coronal intensity. Some of the datasets were only produced during limited periods of time, and there is no consistency between different time periods. The WG is creating an initial list of such data products derived from primary data that would be beneficial for researchers. Once the list is finalized, the WG will work with the community to find solutions for maintaining these data products.

#### **5. Promoting the broadening international participation in WG activities**

- Presentations on activities of this WG were made at “Synoptic ground-based solar observations for Space Weather, Nice, 19-20/10/2016”

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