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AUTHORS/ CONTRIBUTORS LIST

Name	Function	Organization
Mats Löfdahl	Task contributor	SU
Dan Kiselman	Forum chair	SU

SCIENTIFIC APPROVAL CONTROL FROM WP LEAD

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Prepared	Mats Löfdahl	SU	Task contributor	Nov 26 th , 2020
Revised	Tirtha Som	Leibniz-Institute for Solar Physics (KIS)	Project Manager	Dec 15 th , 2020
Approved	Dan Kiselman	SU	WP2 Lead	Dec 16 th , 2020

APPROVAL CONTROL FROM PROJECT OFFICE

Control	Name	Organization	Function	Date
Approved	Tirtha Som	KIS	Project Manager	Dec 17 th , 2020
Approved	Rolf Schlichenmaier	KIS	Project Coordinator	Dec 17 th , 2020
Authorized	Markus Roth	KIS	Project Scientist	Dec 17 th , 2020

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1. Forum Agenda

Forum Title: 2nd SOLARNET Forum for telescopes and databases

Date: Thursday 26 November 2020

Venue/ Organization: Online via zoom

10:00 Welcome

10:05 SOLARNET Access Programmes

- Trans-national Access programme - Dan Kiselman (SU) and information from operators about the facilities: GREGOR&VTT, SST, THEMIS, SUNRISE 3, Piz Daint, and Q&A
- Discussion on up-coming calls for proposals.
- Virtual Access programme - Mats Carlsson (UiO) and information from the operators about the databases: Hinode SDC, BE-WISSDOM, Stockholm SST Archive, IBIS-A, GRIS Data Archive, and Q & A

12:00 Break

13:30 Coordination and dissemination

- Coordination between ALMA and ground-based telescopes - Miroslav Barta (ASU)
- Service mode observations - Gregal Vissers (SU)
- Coordinated observations - Carsten Denker (AIP)
- Big-data storage/other data networking - Nazaret Bello Gonzalez (KIS)
- Software inventory - Robertus Erdelyi (USFD)
- Metadata for observations - Stein Vidar Haugan (UiO)
- Metadata for simulations - Stein Vidar Haugan (UiO)

15:30 End of Forum

2. Welcome

Dan Kiselman (SU) welcomes the participants to this second Forum for telescopes and databases run by remote access with zoom due to the Covid-19 pandemic.

What is SOLARNET? Kiselman explains that it is a project funded by the EU commission that aims at integrating the major European infrastructures for high-resolution solar physics. Total cost M€ 13.5, EU grant M€ 10, 30% of which for the access programmes. This Forum concerns mainly WP2 (coordination and exploitation), WP9 (transnational access), and WP10 (virtual access).

3. SOLARNET Access Programmes

3.1 Trans-national Access programme

Kiselman (SU) presents an overview of the SOLARNET access programmes and the participating facilities, in addition to some experience from statistics and questionnaires. The aim is to open infrastructures to researchers from countries not hosting the facilities. Infrastructures are paid and researchers can travel for free to the facilities with SOLARNET and thereby EU support.

Participating facilities are the four ground-based telescopes (GREGOR, VTT, and SST, and THEMIS), one balloon-borne telescope (Sunrise) and one supercomputer centre (Piz Daint). The EAST Time Allocation Committee awards time not only based on scientific merit of the proposal but also with priority to new users and users from countries without facilities of their own.

Statistics and questionnaires tell us that users are generally content but do not always understand how expensive and valuable the access is.

He mentions that each individual sub-session will be followed by questions and discussion.

Information from operators about the facilities follows.

3.1.1 GREGOR & VTT

Thomas Berkefeld (KIS) presents the German telescopes on Tenerife and the available instruments on them.

Gregor: GRIS, GRIS-IFU, VIS slitjaw, WIS imagers.

VTT: Hellride, LARS, VIS Echelle spectrograph.

Scheduling in two observing seasons in 2021A and 2021B is foreseen.

VTT will start late in 2021 and its periods will be Jun-Aug, Sep-Nov. Remote observations plus on site (PI) observations will be possible.

Q: Will service observations be made?

A: Pending manpower they will probably be done. Were done last year.

Comment from Carsten Denker: Remote observations is currently more difficult for VTT than for GREGOR.

A: New fast link from La Palma should make it possible but needs test run.

3.1.2 SST

Kiselman (SU) presents the SST and its instruments: The CRISP imaging spectropolarimeter, the CHROMIS imaging spectrometer, and the TRIPPEL spectrograph. Primarily the observations are conducted in PI visitor mode with the observing campaigns typically lasting ~10-days. A few days are scheduled in service queue mode where staff performs observations. But in 2020 all SOLARNET observations were conducted in service mode due to the pandemic. This is will probably not be possible for coming seasons. The staff provides standard data reductions for SOLARNET Access data.

New instrument HeSP (Hyperspectral polarimeter for He I 10830) planned for installation in early 2021. Could become common instrument in 2022 but not 2021.

3.1.3 THEMIS

Bernard Gelly (CNRS) presents THEMIS and its instruments. Refurbishing is ongoing but THEMIS should be able to participate in Access programme in 2021. The instrumentation includes MTR2, broad band; IFU in the visible; "visitor port" for visitor instruments. New AO closing loop on granulation is planned December 2020. The installation and test polarimetric analysis are to be done in 2021.

3.1.4 SUNRISE 3

Andreas Lagg (MPS) presents Sunrise III, which is a balloon observatory that has not participated in an Access programme before. Both the instruments and gondola are all new for this flight. This should enable a better stability and pointing than Sunrise I and II. Instruments: SUSI (UV slit spectropolarimeter), TuMag (imaging spectropolarimeter), SCIP (IR slit spectropolarimeter) will also be on board. Sunrise III is planned to fly in June 2022 for approximately 5 days (120 h).

Kiselman: When can the Access call be made?

Lagg: Second half of 2021.

3.1.5 Piz Daint

Oskar Steiner (KIS & USI/IRSOL) presents the computational facilities in Piz Daint. These are 5704 nodes, 12 cores each, 1813 nodes 2 by 18 cores and provides up to 1.5 million node hours for SOLARNET in three cycles. The proposals are subjected to a two-tier evaluation process - first scientific and then technical.

The first cycle executed between Jan-Dec 2020 has largely been completed with two projects.

The second cycle scheduled between Jan-Dec 2021 have collected proposals until 4 October 2020. The proposals have already been evaluated for scientific merit and are now being evaluated on their technical feasibility.

Third cycle is planned. The call for proposals to be advertised in April 2021. With the preliminary proposals due in May 2021, the tests are expected to run during summer following which the final proposals deadline will be in Sep 2021.

Question from Leenaarts: Lots of work involved in applying, more than for other facilities. Can this be simplified?

Steiner: Easier to apply to own facilities, not easy to simplify for SOLARNET.

Schmassmann: technical analysis takes a lot of time, for the first proposal. Easier second time. Leenaarts: Possible to simplify for commonly used codes?

Steiner: Good idea. Performance analysis might not be necessary when a code has been used before.

5 min break

3.2 Virtual Access programme

Mats Carlsson (UiO) gives an overview of the virtual access programme and the five data archives. Brief reports from the operators about the databases are also presented.

3.2.1 Hinode SDC

Carlsson (UiO) presents the Hinode SDC hosted by Oslo. The observational data from Hinode and IRIS, as well as numerical simulations are also presented. There is a plan to include also SST data from Oslo/Lockheed campaigns, and ALMA data. A new search interface is therefore required to execute the plan.

3.2.2 BE-WISSDOM

Robbe Vansintjan (ROB) presents the SDO Data Centre. It has data from two SDO instruments, AIA and HMI. Provides data on demand rather than latest data. He presents several different ways to get access, web, ftp, IDL, python. Also, the latest quick look data through a dedicated web page as well as through JHelioviewer.

3.3.3 Stockholm SST Archive

Mats Löfdahl (SU) presents the status of the Stockholm SST Archive. The SSTRED pipeline can now make science-ready datacubes in FITS format with metadata ready for archival following the SOLARNET recommendations. Data will be stored in Stockholm. The SOLARNET 1, prototype SVO in Belgium will be used to make science-ready data searchable until a production site available. SOLARNET-access data from last year, for which the proprietary period of 1 year has expired, will be first to be uploaded. There are still a few server-side issues to solve for data that are not open access before uploading of more recent SOLARNET data, as well as ISP-owned data, can be uploaded.

3.3.4 IBIS-A

Ilaria Ermolli (INAF) presents IBIS-A, the IBIS data Archive, including data from service mode campaigns within the FP7 SOLARNET project. There are both raw data and calibrated data, as well as context data and coordinated observations from Hinode and IRIS are searchable and available from www.ibis20.inaf.it. Upcoming data uploads are B and v maps from inversions. Browsing and download are free but download require registration.

3.3.5 GRIS Data Archive

Carl Schaffer (KIS) presented the GRIS Data Archive. It has evolved into the *KIS Science Data Centre* with data from several instruments. A prototype is available and will move to production code. Combination searches for multiple instruments is possible.

3.3.6 Q & A

Kiselman: Do we now know how to archive the simulations produced in SOLARNET (Piz Daint)?

Carlsson: Data files should follow metadata recommendations but that is delayed. Given the small amount of simulations, searches do not make much sense. Main mode of access is a list with descriptions.

Schmassmann: Many simulations exist or will exist, searching necessary.

Haugan: Will subset access be important?

Schmassmann: Yes.

Lunch Break

4. Coordination and dissemination

Coordination between ALMA and ground-based telescopes

Miloslav Barta (ASU) presents ALMA and how it can be used for solar observations. Solar time dedicated are ~4 weeks/yr and automatically coordinated with Hinode and SDO. Also coordinated SST observations have been done.

4.1 Service mode observations

Gregal Vissers (SU) presents SST service mode observations in practice and his experiences in year 2020. PI-mode campaigns turned to service-mode due to pandemic lock downs in Spain. With the first half of April in strict lockdown, three SOLARNET service-mode campaigns were successfully executed.

Some particular requirements are coordination with PIs, proposal requirements, PI interaction, sequence definitions, acquisition, interaction, proposal ranking and scientific merit, target availability, seeing conditions, coordination with space telescopes.

Data assessment quick look, prioritisation, pipeline processing, quality check, and delivery of science ready data are in progress.

Two years of service mode campaigns has been planned. Although data has been delivered for all proposals (executed campaigns) but only one (year 2020) fully covered in service-mode. Service-mode campaigns were too short. Final mop-up campaign will be useful.

Aiming for common calibration sequences works well but sometimes requires compromises.

Erdelyi points out that service mode makes for fewer observers with training.

4.2 Coordinated observations

Carsten Denker (AIP) presents coordinated observations with multiple ground based and space borne telescopes. Two campaigns were planned for 2020.

SST+GREGOR+Hinode, IRIS, 2 days in Oct, but no observations could take place due to high clouds.

VTT+ Lomnický štít, no observations possible due to pandemic. It is planned to reschedule to 2021.

2021 proposal: dedicated period of 1 week with all available telescopes. Goal is to follow disk passage of one active region.

FaMuLUS at VTT. Spectroscopic data. Availability of fast large CMOS cameras. Large FOV makes good for coordinated observations possible.

Erdelyi: can you say something about the chromium line?

A: A wavelength region with several lines, magnetic sensitive, allows multi-line inversion.

Q: what height?

Kuckein: lower photosphere.

4.3 Big-data storage/other data networking

Nazaret Bello Gonzalez (KIS), Caligari, and Kahusmaa present storage and management of Big Data in the KIS Science data centre (SDC). Five years of funding approved, starting 2021.

The SDC gets data from Tenerife and DKIST which are transferred to KIS. Tiered storage, data exist in multiple copies long-term and fast access. There is an SDC IT-Framework for data governance, optimization of cost and usage. Public clouds (Amazon, Microsoft, Google) will be used for scalability. RUCIO (Rule-based data distribution) is open-source software developed at CERN. Steep learning curve but very useful for easily replicating data between sites with varying retention times.

Q Erdelyi: SOLARNET or KIS?

BR: KIS.

Break

4.4 Software inventory

Robertus Erdelyi (USFD) presents a software inventory conducted earlier in 2020.

Coordination of development of software tools for solar physics to determine the needs, availability, and future directions for computational, visualization and analysis tools. Current data rates TB/day, upcoming facilities will deliver PB/day.

Löfdahl: Is there WCS support in python?

Erdelyi and others: Yes, in sunpy and help is available.

4.5 Metadata for observations and simulations

Stein Vidar Haugan (UiO) presents development of metadata definitions for observations (has been going on since SOLARNET 1) and for simulations (newer development, needs discussion with experienced users).

Observations metadata document 1.3d is available on arXiv. This is a mature document but it is not final, nor static.

FITS keywords are used as a language but the definitions are not tied to that. Metadata recommendations attempts to limit name space to make easier for databases to handle searches based on similar quantities for different data sources.

Leenaarts: What about derived quantities? Would it be difficult to define metadata for those?

A: Yes! There is a difference between what looks like observations and what looks like 3D volume data. Dialogue with users needed.

Kiselman: There is help available for organizing a meeting.

5. End of Forum

Kiselman thanks the participants and closes the Forum with the expectation that next year's Forum might be a physical meeting in Oslo.

The presentations of the Forum will be made available on the repository [Science Media \(science-media.org\)](https://science-media.org).

Annexures

6. Participants List

Name	Position held	Affiliation
Peter Caligari	Group Leader SDC	Leibniz Institute for Solar Physics (KIS)
Adrián Hernández García	Presently masters student on astrophysics at ULL (or former technician at IAC)	Universidad de La Laguna / Instituto de Astrofísica de Canarias
Adur Pastor Yabar	Postdoctoral researcher	Institute for Solar Physics, Department of Astronomy, Stockholm University
Aleksandra Osipova	Researcher	Pulkovo Observatory, Saint-Petersburg, Russia
Alisdair Davey	DKIST Data Center Scientist	National Solar Observatory
Ana Belén Griñón Marín	Postdoctoral scholar fellow	Stanford University
Andreas Lagg	Sunrise III Project Manager	MPI for Solar System Research (MPS), Göttingen, Germany
Artem Koval	Research Assistant	Astronomical Institute of the Czech Academy of Sciences (Ondrejov, Czech Republic)
Bernard Gelly	THEMIS Director	CNRS
Carl Schaffer	SDC Software Engineer	Leibniz Institute for Solar Physics (KIS)
Carlos Dominguez	Post-doctoral fellow	IAC
Carlos Jose Diaz Baso	Postdoctoral researcher	Stockholm University
Carsten Denker	Professor of Solar Physics	Leibniz-Institut für Astrophysik Potsdam (AIP), Germany
Catherine Fischer	Junior research group leader	Leibniz Institute for Solar Physics

Christoph Kuckein	Post-Doctoral Researcher	Leibniz-Institut für Astrophysik Potsdam (AIP), Germany
Dan Kiselman	SOLARNET WP2 leader	Stockholm University
Felipe Oliveira Tavares	PhD Student	INPE - National Institute for Space Research - Brazil
Francesca Zuccarello	Associate Professor	University of Catania
Galina G. Motorina	Postdoc	Astronomical Institute of the Czech Academy of Sciences Fricova Str. 298, 251 65 Ondrejov, Czech Republic
Giorgio Viavattene	Post-Doctoral Researcher	INAF - Osservatorio Astronomico di Roma
Gregal Vissers	Researcher	Institute for Solar Physics, Stockholm University
Hanna Strecker	Postdoc	Leibniz Institute for Solar Physics (KIS)
Ilaria Ermolli	Astronomer	INAF Osservatorio Astronomico di Roma, Italy
Jan Jurcak	Researcher	Astronomical Institute of the Czech Academy of Sciences
JiaJia Liu	Research fellow	Queen's University Belfast, UK
Jorrit Leenaarts	professor	Stockholm University
Julius Koza	Senior Researcher	Solar Physics Department, Astronomical Institute, Slovak Academy of Sciences, Tatranska Lomnica, Slovakia
Kevin Reardon	Astronomer	National Solar Observatory
Kostas Tziotziou	Director Scientist	Institute for Astronomy, Astrophysics, Space Applications and Remote Sensing (IAASARS), National Observatory of Athens
Luis Eduardo Antunes Vieira	Researcher (PI - Galileo Solar Space Telescope - GSST)	Heliophysics and Planetary Sciences Division (DIHPA) Brazilian National Institute for Space Research (INPE/Brazil)
Marco Guenter	IT Expert	Leibniz Institute for Solar Physics (KIS)

Markus Roth	Scientist / SOLARNET PI	Leibniz-Institut fuer Sonnenphysik (KIS), Germany
Markus Schmassmann	PhD student	Leibniz-Institut für Sonnenphysik, Germany
Marta García Rivas	PhD student	Astronomical Institute of the Czech Academy of Sciences
Mats Löfdahl	Researcher	Institute for Solar Physics/Stockholm University
Meetu Verma	Postdoctoral	Leibniz-Institut für Astrophysik Potsdam (AIP)
Mihalis Mathioudakis	Professor of Astrophysics	Queen's University Belfast
Miroslav Barta	Senior researcher, head of the Department of Solar Physics	Astronomical Institute of Czech Academy of Sciences & European ALMA Regional Center - Czech node
Murabito Mariarita	Post-Doctoral Researcher	INAF-Osservatorio Astronomico di Roma
Nazaret Bello González	KIS Science Data Centre Project Scientist KIS Scientist	Leibniz-Institut für Sonnenphysik (KIS)
Oskar Steiner	Senior Scientist	Leibniz-Institut für Sonnenphysik and Istituto Ricerche Solari Locarno
Peter Gömöry	Director	Astronomical Institute, Slovak Academy of Sciences, Tatranska Lomnica, Slovaki
Peter H. Keys	Lecturer	Queen's University Belfast, U.K.
Petri Kehusmaa	Project Manager	Leibniz-Institute for Solar Physics
Philip Lindner	PhD student	Leibniz-Institut fuer Sonnenphysik (KIS), Germany
Robbe Vansintjan	Scientist	Royal Observatory of Belgium
Robertus Erdelyi	Prof	sp2rc/u of sheffield
Rolf Schlichenmaier	Scientist / SOLARNET coordinator	Leibniz-Institut fuer Sonnenphysik (KIS), Germany

Ryan James Campbell	PhD student	Queen's University Belfast
Saida Milena Díaz Castillo	PhD student	Leibniz-Institut fuer Sonnenphysik (KIS)
Salvo Guglielmino	Permanent Researcher	INAF - Osservatorio Astrofisico di Catania
Sargam Madhav Mulay	Post-Doctoral Researcher	University of Glasgow, UK
Sergio Javier González Manrique	Postdoc	Instituto de Astrofisica de Canarias
Stein Vidar Haugan	Technical Lead, Project Related IT Services	Institute of Theoretical Astrophysics, University of Oslo
Stephane Regnier	Senior lecturer	Northumbria University, Newcastle-upon-Tyne, UK
Suraj Sahu	PhD Student	Physical Research Laboratory, India
Thomas Berkefeld	staff scientist, interim head of the German Solar Telescopes, Tenerife	Leibniz-Institut für Sonnenphysik, Freiburg, Germany
Tiago M. D. Pereira	Associate Professor	Institute of Theoretical Astrophysics, University of Oslo
Tirtha Som	SOLARNET Project Manager	Leibniz-Institut fuer Sonnenphysik (KIS), Germany
Tsvetan Tsvetkov	Assistant Professor	Institute of Astronomy and National Astronomical Observatory, Bulgaria
Viktor Fedun	Senior Lecturer	The University of Sheffield, UK