IHDEA meeting 2020

lundi 19 octobre 2020 - jeudi 22 octobre 2020

Recueil des résumés

Contents

Interfaces & Databases / **2**

BASS2000 - a ground-based solar observations database

Auteur: Jean Aboudarham[1]

[1] *LESIA*

Auteur correspondant jean.aboudarham@obspm.fr

BASS2000 was originally devoted to the dissemination of French ground-based solar observations. But it extends now to Portuguese (Coimbra) and Belgian (Brussels) observations. Added values are also available, such as a high-resolution quiet Sun spectrum ranging from UV to IR, connected with the virtual observatory VAMDC.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / **3**

MASER: A Science Ready Toolbox for Low Frequency Radio Astronomy

Auteurs: Baptiste Cecconi[1]; Alan Loh[1]; Pierre Le Sidaner[2]; Stéphane Aicardi[2]; Renaud Savalle[2]; Xavier Bonnin[1]; Quynh Nhu Nguyen[1]; Sonny Lion[1]; Albert Shih[2]; Philippe Zarka[1]; Corentin Louis[3]; Laurent Lamy[1]; Jean-Mathias Grießmeier[4]; Jeremy Faden[5]; Christopher Piker[5]; Nicolas André[6]; Stéphane Erard[1]; Vincent Génot[6]; Joseph Mafi[7]; Mark Sharlow[7]; Jim Sky[8]

[1] *LESIA - Observatoire de Paris - PSL*

[2] *DIO - Observatoire de Paris - PSL*

[3] *IRAP - CNES / CNRS*

[4] *LPC2E - Univ. d'Orléans*

[5] *University of Iowa*

[6] *IRAP - CNRS*

[7] *UCLA*

[8] *Radiosky Publishing*

Auteur correspondant baptiste.cecconi@obspm.fr

MASER (Measuring, Analysing and Simulating Radio Emissions) provides a comprehensive infrastructure dedicated to low frequency radio emissions (typically < 50 to 100 MHz). The four main radio sources observed in this frequency are the Earth, the Sun, Jupiter and Saturn. They are observed either from ground (down to 10 MHz) or from space (down to a few kHz). Ground observatories are more sensitive than space observatories and capture high resolution data streams (up to a few TB per day for modern instruments). Conversely, space-borne instruments can observe below the ionospheric cut-off (10 MHz) and can be placed closer to the studied object.
Several tools have been developed in the last decade for sharing space physcis data. Data visualization tools developed by the CDPP (Centre de Données de la Physique des Plasmas, in Toulouse,

France) and the University of Iowa (Autoplot) are available to display and analyse space physics time series and spectrograms. A planetary radio emission simulation software is developed in LESIA (ExPRES: Exoplanetary and Planetary Radio Emission Simulator). The VESPA (Virtual European Solar and Planetary Access) provides a search interface that allows to discover data of interest for scientific users, and is based on IVOA standards (astronomical International Virtual Observatory Alliance). The University of Iowa also develops Das2 that allows to distribute data with adjustable temporal resolution.

MASER is making use of all these tools and standards to distribute datasets from space and ground radio instruments available from the Observatoire de Paris, the Station de Radioastronomie de Nançay and the CDPP deep archive. These datasets include Cassini/RPWS, STEREO/Waves, WIND/Waves, Ulysses/URAP, ISEE3/SBH, Voyager/PRA, Nançay Decameter Array (Routine, NewRoutine, JunoN), RadioJove archive, swedish Viking mission, Interball/POLRAD... MASER also includes a Python software library for reading raw data.

This work is supported by CDPP, CNES, PADC, Europlanet-2020-RI and Europlanet-2024-RI. The Europlanet 2020 Research Infrastructure project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654208. The Europlanet-2024 Research Infrastructure project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871149.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / 4

Heliophysics and planetology data distributed by AMDA with HAPI

Auteurs: Vincent Génot[1]; Benjamin Renard[2]; Myriam Bouchemit[3]; Nicolas Dufourg[4]; Elena Budnik[5]; Nicolas André[3]; Baptiste Cecconi[6]; Alan Loh[7]; Christian Jacquey[3]

[1] *IRAP/CNRS/UPS/CNES*

[2] *AKKA*

[3] *IRAP*

[4] *CNES*

[5] *Noveltis/IRAP*

[6] *Observatoire de Paris*

[7] *LESIA - Observatoire de Paris - PSL*

Auteurs correspondants: baptiste.cecconi@obspm.fr, vincent.genot@irap.omp.eu

AMDA is both an online space data analysis tool and database which serves the heliophysics and planetology communities. It is developed and maintained by the CDPP for more than 15 years and has always had interoperability in its high priorities. A recent update of AMDA made its data distributed via HAPI thanks to the use of the official node-js HAPI server and the implementation of a binding to the AMDA REST web services. This presentation will quickly demonstrate AMDA functionalities with a focus on data that are now distributed via HAPI.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

SPASE / **5**

SPASE implementations in CDPP archives and databases

Auteur: Daniele Boucon[None]

Co-auteurs: Dominique Heulet [1]; Nicolas Dufourg [1]; Myriam Bouchemit [2]; Nicolas André [2]; Elena Budnik [2]; Christian Jacquey [2]; Quentin Brzustowski [2]; Vincent Génot [2]

[1] *CNES*

[2] *IRAP/CNRS/UPS/CNES*

Auteurs correspondants: vincent.genot@irap.omp.eu, daniele.boucon@cnes.fr, nicolas.dufourg@cnes.fr

For more than 20 years, the CDPP (the French Plasma Physics Data Centre) archives and gives access to heliophysics and planetology datasets.

Community and uses have changed over time in particular the need for interoperability, through formats, metadata and model standards. In this context, taking advantage of the evolution of the SIPAD archiving system and CNES storage strategy, the CDPP has drawn a roadmap towards the implementation of the SPASE data model. At the same time the AMDA online database and tool is heavily dependent on SPASE to standardize dataset description and handle its information system. This presentation will give a broad overview of current and future SPASE usages at CDPP.

Open access:

My presentation material shall not be distributed openly.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / **6**

Status update on the SDAC and the VSO (withdrawn)

Auteur: Jack Ireland[1]

[1] *NASA Goddard Space Flight Center*

Auteur correspondant jack.ireland@nasa.gov

Status update on the SDAC and the VSO

The Solar Data Analysis Center (SDAC) and the Virtual Solar Observatory (VSO) provide infrastructure in support of the international heliophysics community. In this presentation I will describe:

- New datasets stored at the SDAC
- New datasets made available via the VSO
- Upcoming data storage responsibilities assigned to the SDAC, including new missions and other research data
- Experiments in providing cloud and GPU computing facilities for SDAC data holdings

I will also give a brief description of the challenges in providing useful scientific access to the multi-petabyte SDO data archive, and some potential solutions.

Open access:

My presentation material shall not be distributed openly.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / **7**

Coordinating Python Development with PyHC

Auteur: Julie Barnum[1]

Co-auteurs: Aaron Roberts [2]; Alexandria Ware [3]; Shawn Polson [3]

[1] *Laboratory for Atmospheric and Space Physics*

[2] *NASA GSFC*

[3] *LASP*

Auteurs correspondants: alex.ware@lasp.colorado.edu, aaron.roberts@nasa.gov, julie.barnum@lasp.colorado.edu, shawn.polson@lasp.colorado.edu

Many Heliophysics software projects are being developed in, or converted to, the Python programming language. The Python in Heliophysics Community (PyHC) has worked over the past two years to bring together the solar and space physics communities for the purpose of coordinating Python software development efforts. The goal of this work is to share knowledge and lessons learned, reduce the incidence of duplicated efforts, ascertain potential collaborations between PyHC projects, and ensure that existing software tools are interoperable and widely available. This presentation will showcase the efforts of the PyHC and increase awareness of the resources that the PyHC provides.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

SPASE / 8

Registering Resources from Observatoire de Paris and Nançay in HPDE

Auteurs: Baptiste Cecconi[1]; Alan Loh[2]; Pierre Le Sidaner[3]; Julien GIrard[4]; Emmanuel Thetas[5]; Jean Aboudarham[6]

[1] *Observatoire de Paris*

[2] *LESIA - Observatoire de Paris - PSL*

[3] *DIO - Observatoire de Paris - PSL*

[4] *CEA-Saclay*

[5] *USN, Observatoire de Paris, CNRS, PSL, Université d'Orléans*

[6] *LESIA*

Auteurs correspondants: jean.aboudarham@obspm.fr, baptiste.cecconi@obspm.fr, julien.girard@cea.fr, emmanuel.thetas@obs-nancay.fr

Observatoire de Paris is hosting and managing Solar observations facilities (in Meudon and Nançay), Radio astronomy instruments (Nançay), and is producing and distributing Heliophysics data collections. The PADC (Paris Astronomical Data Centre) and the CDN (Nançay Data Centre) teams are working on describing and registering those resources in the HPDE registry, using the SPASE data model. We present here the current status of the work, and the issues and challenges that have been encountered.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

SPASE / 9

Integrated environment for simulation access and visualization : an extension of SPASE proposed by the TEMPETE project

Auteurs: Ronan Modolo[1]; Vincent Génot[2]; Francois Leblanc[3]; Nicolas André[2]; Jean-Philippe Toniutti[4]; Laurent Beigbeder[4]; Daniel Popescu[4]; Myriam BOUCHEMIT[2]; Philippe Garnier[2]; Michel Gangloff[2]; Claire Baskevitch[3]; Elisabeth Werner[3]; Jean-Yves Chaufray[3]; Dominique Fontaine[5]; Philippe Savoini[5]

[1] *LATMOS / UVSQ*

[2] *IRAP*

[3] *LATMOS / CNRS*

[4] *GFI*

[5] *LPP*

During the EU-FP7 project « Integrated Medium for Planetary Exploration » (IMPEx), an interface between planetary simulation databases and online data processing tools has been developped [Khodachenko et al, 2011]. One of the efforts of the IMPEx project was to specify a language describing the data that exchanged between the simulation databases and the visualization tools [Hess et al, 2013]. This led to extend the SPASE data model in order to describe most of the numerical codes used for simulations of the plasma environment in the Solar System. This extension is now fully incorporated in SPASE.
The TEMPETE project aims to understand the response of planetary magnetospheres and exospheres to solar storms. The project more specifically addresses how to describe and track the temporal evolution of the interaction of a solar storm with planetary environments (Earth, Mars, Mercury). We relied on the effort and the infrastructure developped in the IMPEx project and we extend it to a new class of simulation model and to give also the possibility to describe time varying simulation results. The first step is to extend the current SPASE data model in order to describe upper atmosphere/exosphere simulation runs and results. Secondly we intend to describe variable input conditions and associated results.
We present here the status of the data model extension and new visualization functionnalities.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

SPASE / **10**

NASA HP Use of Digital Object Identifiers for Data

Auteur: Aaron Roberts[1]

[1] *NASA GSFC*

Auteur correspondant aaron.roberts@nasa.gov

Digital Object Identifies (DOIs) can be used to create a Permanent ID (PID) for any digital entity, be it a published article, a numerical dataset, a software program, an image, a model, or even a sound. The key is having a home for the object that will not go away, or that will transfer the object to a new home if it does. The DOI must point to a "landing page" URL that contains the current location and general information about the resource, as well as one or more methods or links to access the object (ftp site, web page, web service pointer). Required descriptive terms are a title, a "creator" (aka author), a publisher (provider of the object; typically a repository), a publication date, a type (mostly "dataset" in this context), and an identifier (the DOI itself). DOIs are registered by members of DOI organizations (the NASA Heliophysics Data Environment–HPDE–is a member of datacite.org, which in turn belongs to the International DOI Foundation, https://doi.org/). The most difficult part of "minting" DOIs is to generate a landing page. For this purpose, for datasets, NASA HPDE is using the SPASE data product registrations (see https://heliophysicsdata.gsfc.nasa.gov), which contain the required links and much more information. Our plan is to work with the MASA missions, mainly via Project Scientists, to mint DOIs for data-product-level (SPASE Numerical Data Products) for all the current and prior NASA observatories. The most important element is getting agreement on the Creators of the datasets. The process should improve product metadata in general.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / **11**

pySPEDAS: Space Physics Environment Data Analysis Software in Python

Auteur: Eric Grimes[1]

[1] *UCLA*

Auteur correspondant egrimes@igpp.ucla.edu

SPEDAS (Space Physics Environment Data Analysis Software) is a framework, written in IDL, to support loading, plotting, analysis, and integration of data from a number of space- and ground-based observatories, including THEMIS, MMS, GOES, ERG, IUGONET, and most data sets archived at NASA CDAWeb. While powerful, IDL has numerous limitations, including the high cost of licensing, limited support and issues created by a single namespace. Due to these limitations and the increasing popularity of the Python programming language, we are collaborating with several missions to bring their data products into the Python environment through a project called pySPEDAS. pySPEDAS currently supports loading data from over 20 missions, as well as several ground-based observatories and includes some basic tools for analyzing these data. This presentation will include a brief introduction to the library, the current status and a brief discussion of how we're validating the data products.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

SPASE / **12**

IUGONET activity for upper atmosphere study

Auteur: Yoshimasa Tanaka[1]

Co-auteurs: Norio Umemura [2]; Shuji Abe [3]; Atsuki Shinbori [2]; Satoru UeNo [4]; Kazuo Shiokawa [2]

[1] *National Institute of Polar Research*

[2] *Institute for Space-Earth Environmental Research, Nagoya University*

[3] *International Center for Space Weather Science and Education, Kyushu University*

[4] *Kwasan and Hida Observatories, Graduate School of Science, Kyoto University*

Auteurs correspondants: ueno@kwasan.kyoto-u.ac.jp, abeshu@icswse.kyushu-u.ac.jp, ytanaka@nipr.ac.jp, umemura@isee.nagoya-u.ac.jp, shinbori@isee.nagoya-u.ac.jp, shiokawa@nagoya-u.jp

In the Earth's upper atmosphere above about 60 km, including the mesosphere, thermosphere, and ionosphere, various phenomena are generated by energy inputs from higher regions (e.g., solar radiation, solar wind, and particle precipitation from the magnetosphere) and from the lower atmosphere (e.g., atmospheric waves). Thus, comprehensive analysis of various kinds of satellite and ground-based observational data in the multiple regions is important to understand physical mechanism of the phenomena. Inter-university Upper atmosphere Global Observation NETwork (IUGONET) project started in 2009 to share and effectively analyze such various upper atmospheric data, including solar and planetary data, which have been accumulated by Japanese universities and institutes for more than 60 years. We present our activities to share the upper atmosphere data and facilitate interdisciplinary studies regarding solar-terrestrial physics (STP).
We have supported the research activity in the STP field through the release of the upper atmosphere data, the development of data search and analysis tools, and the education of young scientists. We have supported publishing various upper atmosphere data in collaboration with many STP projects, such as EISCAT, SuperDARN, PWING, and ERG. We have also provided a data analysis software, called "iUgonet Data Analysis Software (UDAS)", and a data service, "IUGONET Type-A", to accelerate comprehensive data analysis. UDAS is a plug-in software for Space Physics Environment Data Analysis Software (SPEDAS), which allows researchers to analyze various types of the IUGONET data in an integrated fashion. IUGONET Type-A is a one-stop data service to search data, show information of data (via metadata and quick-look plots), identify events of interest, interactively create stacked-plot, and guide users to advanced analysis with SPEDAS. The IUGONET metadata is based on the Space Physics Archive Search and Extract (SPASE) data model to ensure interoperability with other STP missions. In order to produce scientific output effectively using the IUGONET data and tools, we regularly hold data analysis workshops for young researchers in Japan and other countries (e.g., Indonesia, Malaysia, India, China, Nigeria). As a result, many research papers including the Master and Doctor theses have been published by using the IUGONET data and tools.

Open access:

My presentation material shall not be distributed openly.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / 13

SunPy : The community-developed, free and open source solar data analysis environment for Python.

Auteurs: Laura Hayes[1]; The SunPy Community[None]

[1] *NASA Goddard Space Flight Center*

Auteur correspondant lauraannhayes@gmail.com

The goal of the SunPy project is to facilitate and promote the use and development of community-led, free, and open source data analysis software for solar physics based on the scientific Python environment. The project achieves this goal by developing and maintaining the SunPy core package, supporting an ecosystem of affiliated packages, and educating the solar physics community about the Python scientific software stack. In the last year, the SunPy project released the first official stable release (version 1.0) of the core package, won a grant from NASA, published a paper about the project in The Astrophysical Journal (The SunPy Community et. al, 2020), published a paper about the software in The Journal of Open Source Software (Mumford et al., 2020), and surveyed the solar physics community about software and hardware usage published these results in Solar Physics (Bobra et al., 2020). This talk will present how the sunpy package can be used for solar physics data analysis and discuss the current status and roadmap for the package.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / 14

Autoplot and Java Libraries for HAPI and Science Processing

Auteur: Jeremy Jeremy Faden[None]

Auteur correspondant faden@cottagesystems.com

Autoplot has been useful for developing science processes that interact with HAPI and Das2 Servers, CDF files, and other file formats where a collection of files form a database covering long time spans ("aggregations"). Internally, Autoplot's Java code implements these features, and to make use of them codes will use Autoplot as a library. This is messy, and I've extracted functionality from Autoplot to form two independent Java libraries.

First, a library for handling the URI Templates (https://github.com/hapi-server/uri-templates/wiki/Specification) which are used for aggregation is available. Given a time range and template, the list of files covering the interval is computed. Or, given a list of files, the time range for each file is computed. I realize this is fairly trivial for any given aggregation, but URI_Templates are a standard specification and this library makes using this specification easy.

Second, an independent library for interacting with HAPI servers is available (https://github.com/hapi-server/client-java). This library manages transactions with HAPI servers, and provides serial (record-by-record) access as well as returning all the data as one transaction. Further, HAPI data is cached, so that repeated interactions with a server will not require repeating downloads, while quick checks of freshness are used to ensure the cache is up-to-date. IDL, Matlab, and Python have Java bridges which make the library useful in these environments as well, which will also be demonstrated.

I will also briefly show Autoplot and review new features introduced this past year.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / 15

Current Status of ERG-Science Center (withdrawn)

Auteurs: Yoshizumi Miyoshi[1]; Iku Shinohara[2]; Tomoaki Hori[1]; Masafumi Shoji[1]; Chae-Woo Jun[1]; Shun Imajo[1]; Satoko Nakamura[1]; Masahiro Kitahara[1]; Shoya Matsuda[2]

[1] *ISEE, Nagoya University*

[2] *ISAS/JAXA*

Auteurs correspondants: imajos@isee.nagoya-u.ac.jp, iku@stp.isas.jaxa.jp, tomo.hori@nagoya-u.jp, masafumi.shoji@nagoya-u.jp, chae-woo@isee.nagoya-u.ac.jp, miyoshi@isee.nagoya-u.ac.jp, matsuda@stp.isas.jaxa.jp, nakamura.satoko@isee.nagoya-u.ac.jp, kitahara.masahiro@isee.nagoya-u.ac.jp

The ERG(Arase) Science Center serves as a hub of the ERG project, providing data files in a common format (CDF) and developing the space physics environment data analysis software for IDL/SPEDAS. These tasks contribute to the ERG project by achieving quick analysis and well-organized conjugate ERG satellite and ground-based observations. In this presentation, we report the current status of the ERG (Arase) Science Center activity including a topic of data DOI for the ERG project data.

Open access:

My presentation material shall not be distributed openly.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / 16

HAPI Update and Recent Developments

Auteur: Jon Vandegriff[1]

Co-auteurs: Robert Weigel [2]; Jeremy Faden [3]; Aaron Roberts [4]; Todd King ; Eric Grimes [5]; Nand Lal ; Bernard Harris [6]; Robert Candey [6]; Scott Boardsen [7]

[1] *JHU Applied Physics Lab*

[2] *George Mason University*

[3] *Cottage Systems, Inc.*

[4] *NASA GSFC*

[5] *UCLA*

[6] *GSFC*

[7] *University of Maryland Baltimore County*

Auteurs correspondants: aaron.roberts@nasa.gov, egrimes@igpp.ucla.edu, faden@cottagesystems.com, jon.vandegriff@jhuapl.edu, tking@igpp.ucla.edu, voycrs@gmail.com, rweigel@gmu.edu, bernard.t.harris@nasa.gov, scott.a.boardsen@nasa.gov, robert.m.candey@nasa.gov

The Heliophysics Application Programmer's Interface (HAPI) offers a standardized way for data providers to serve time series data. HAPI offers a lowest common denominator set of request features and a simple streaming data transport protocol that can represent existing data holdings with little or no information loss. We present a brief overview of the specification, including recent and proposed changes. We also describe existing implementations for servers as well as progress on client libraries and tools for accessing HAPI-compliant data.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / **17**

SOLARNET Virtual Observatory

Auteur: Benjamin Mampaey[1]

Co-auteur: Robbe Vansintjan [2]

[1] *Royal Obervatory of Belgium*

[2] *Royal Observatory of Belgium*

Auteurs correspondants: benjamin.mampaey@oma.be, robbe.vansintjan@oma.be

The goal of the SOLARNET Virtual Observatory (SVO) is to provide easy access to the data of ground based solar telescopes and satellite data to the larger scientific community. The SVO is designed to let users search across multiple datasets from different instruments by letting the users search on a time range, on events or instrument characteristics in a central metadata database.

We will present the work we achieved so far, what we wish to achieve in the near future and the challenges that we face.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / **18**

Current status of Hinode science center: toward Solar-C science center

Auteurs: Shinsuke Imada[1]; team Hinode & Solar-C[None]

[1] *Nagoya Univ.*

Auteur correspondant imada@nagoya-u.jp

For the promotion of the Hinode science output, a Japanese science center is formed at ISEE, Nagoya University, where analysis tools, calibration, and the computer environment for data analysis are provided to the researchers. In this talk, we discuss the current status of Hinode science center at ISEE. Recently, Solar-C(EUVST) (EUV High-Throughput Spectroscopic Telescope) mission is discussed as a flagship mission for the solar physics over the world. Solar-C(EUVST) is designed to comprehensively understand the energy and mass transfer from the solar surface to the solar corona and interplanetary space, and to investigate the elementary processes that take place universally in cosmic plasmas. As a fundamental step towards answering how the plasma universe is created and evolves, and how the Sun influences the Earth and other planets in our solar system, the proposed mission

is designed to comprehensively understand how mass and energy are transferred throughout the solar atmosphere. Understanding the solar atmosphere, which connects to the heliosphere via radiation, the solar wind and coronal mass ejections, and energetic particles is pivotal for establishing the conditions for life and habitability in the solar system. We now also prepare to set up the Solar-C science center at ISEE. We discuss the current status of Solar-C science center at ISEE.

Open access:

My presentation material shall not be distributed openly.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / 19

The Das2 System: Efficient Navigation of Large Time-Series Data Sets

Auteur: Chris Piker[1]

Co-auteurs: Larry Granroth [1]; Alexander Drozdov [2]

[1] *The University of Iowa*

[2] *University of California, Los Angeles*

Auteurs correspondants: chris-piker@uiowa.edu, larry-granroth@uiowa.edu, adrozdov@ucla.edu

Das2 describes a collection of cooperating programs originally created to support daily review and analysis activities of the Cassini RPWS investigation. The system proved to be useful and is now relied upon for rapid access to working data sets from many missions including Galileo, Polar, Cluster, Voyager, Mars Express and Juno as well as ground based radio astronomy results from the Nançay Decameter Array and Long Wave Array.

The key points of das2 as envisioned 18 years ago are automatic server-side data reduction and automatic generation of data requests during GUI interaction, features not unfamiliar to anyone who has used Google Maps™. The most widely used das2 client program is Autoplot. Since Autoplot is already the focus of a separate presentation, this overview will focus on other aspects of the das2 system. In short I will:

- Give a brief development history and major component synopsis;
- Navigate gigabytes of Planetary Data System files over a home DSL link;
- Touch on standardizing an in-house protocol;
- and cover more recent developments such as the stream validator and SPEDAS client.

I will also point out where more work is needed to make das2 servers immediately usable without local software development.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / **20**

Space solar physics data and VO services at MEDOC

Auteurs: Eric Buchlin[1]; Stéphane Caminade[2]; Nima Traoré[3]; Mebsout Magali[2]; Dassas Karin[2]; Baptiste Cecconi[4]

[1] *Université Paris-Saclay, CNRS, Institut d'Astrophysique Spatiale, 91405, Orsay, France*

[2] *Université Paris-Saclay, CNRS, Institut d'Astrophysique Spatiale, 91405, Orsay, France*

[3] *DSI Group, 92350 Le Plessis-Robinson, France*

[4] *Observatoire de Paris*

Auteurs correspondants: baptiste.cecconi@obspm.fr, eric.buchlin@ias.u-psud.fr, magali.mebsout@ias.u-psud.fr, nima.traore@ias.u-psud.fr, stephane.caminade@ias.u-psud.fr, karin.dassas@ias.u-psud.fr

MEDOC, created as the European data and operations center for SoHO, also hosts data from STEREO, SDO, and other solar physics space missions. Data from observations and derived data are distributed through interfaces including a SiTools instance providing a web interface and web services. In addition, we are developing an EPN-TAP service for derived data sets produced by MEDOC. We will report on the current status of this development and discuss the prospects.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

General / **21**

Update on the NASA HPDE

Auteur: D Aaron Roberts[1]

[1] *NASA GSFC*

Auteur correspondant aaron.roberts@nasa.gov

The NASA Heliophysics Data Environment has been actively adding datasets (PSP, ICON, GOLD, SolO, etc.); working on moving the large SDO data archive to the Solar Data Analysis Center at GSFC; adding DOIs to NASA datasets; and other projects. The NASA HPDE has also been working with NASA HQ to develop a "data system of the future" known as the NASA Heliophysics Digital Resource Library (HDRL), which will also include modeling (centered at CCMC). The intent is to provide uniform dataset access and to allow seamless data-model integration to facilitate a more complete understanding of complex Heliophysics systems. We are exploring options for implementing cloud storage, keeping computing near to large data archives, and using integrated datasets and novel

methods to gain new insights. Many of these efforts use an increasingly integrated set of Python routines as a basis.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / 22

SPEDAS Interoperability Tools and Future Development Plans

Auteur: Jim Lewis[1]

[1] *UC Berkeley Space Sciences Laboratory*

Auteur correspondant jwl@ssl.berkeley.edu

The SPEDAS software package includes several features designed to support discovery, download, and analysis of heliophysics data sets without the need to develop mission-specific load routines. In this presentation, we will briefly demonstrate some of these tools, including downloads via NASA's CDAWeb service, the Heliophysics API (HAPI), and the DAS2 protocol. We will discuss the metadata and file format standards that enable the development of these general-purpose access tools, and describe our development plans for supporting additional heliophysics archives and general-purpose analysis tools.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / 23

Kamodo python visualization and analysis

Auteurs: Darren De Zeeuw[None]; Lutz Rastaetter[1]; Asher Pembroke[2]

[1] *NASA CCMC*

[2] *Predictive Science Inc.*

Auteurs correspondants: apembroke@predsci.com, lutz.rastaetter-1@nasa.gov, darrens@umich.edu

Kamodo is an open source python package under development at the Community Coordinated Modeling Center (CCMC). It can read, interpolate, visualize, and analyze space weather model output and data. A Kamodofied model has a python reader and interpolator to enable visualization and analysis tools in Kamodo. Many of the already Kamodofied models have had their most useful visualization adapted for utilization on the CCMC website. Kamodo can pull in satellite trajectories, interpolate from model output in time and space, and provide data/model comparison and analysis. As an open source project, the Kamodo development team is encouraging community involvement. That involvement can range from beta testing, suggestions for new features, new visualization options or new Kamodofied model readers. The Kamodo GitHub site is here: https://github.com/nasa/Kamodo

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / **24**

PlasmaPy: An open source Python package for plasma research and education

Auteurs: Nicholas Murphy[1]; D. Stańczak[2]; Everson E.[3]; J. Beckers[None]; K. Bryant[None]; S. Fordin[None]; P. Heuer[None]; F. Khan[None]; P. Kozlowski[None]; S. Langendorf[None]; A. Leonard[None]; R. Malhotra[None]; B. Maruca[None]; S. Mumford[None]; T. Parashar[None]; D. Schaffner[None]; D. Stansby[None]; F. Tamboli[None]; R. Qudsi[None]; T. Varnish[None]; S. Vincena[None]

[1] *Center for Astrophysics | Harvard & Smithsonian*

[2] *IPPLM*

[3] *UCLA*

Auteur correspondant namurphy@cfa.harvard.edu

The mission of the PlasmaPy project is to foster the creation of an open source software ecosystem for plasma research and education. The PlasmaPy package contains the core functionality needed by most plasma scientists, while community-developed affiliated packages will contain more specialized functionality. Because plasma science is vital to much of heliophysics and astronomy, PlasmaPy is being developed to be interoperable with Astropy while in communication with the Python in Heliophysics Community. PlasmaPy is being developed to include commonly used plasma formulae, object-oriented representations of particles, base classes for plasma simulations, and tools for plasma diagnostics and analysis.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Tools & Software / 25

Overview of CDPP activities in space physics

Auteurs: Nicolas Andre[1]; Vincent Génot[1]; Christian Jacquey[1]; Myriam Bouchemit[1]; Elena Budnik[1]; Quentin Brzustowski[1]; Frédéric Pitout[1]; Alexis Rouillard[1]; Illya Plotnikov[1]; Elena Budnik[2]; Nicolas Dufourg[3]; Daniele Boucon[3]; Joelle Durand[3]; Dominique Heulet[3]; Michel Gangloff[1]; Baptiste Cecconi[4]

[1] *IRAP, OMP, CNRS, UPS, CNES*

[2] *Noveltis*

[3] *CNES*

[4] *Observatoire de PAris*

Auteur correspondant nicolas.andre@irap.omp.eu

The French Plasma Physics Data Centre (CDPP, http://cdpp.eu/) initially established by CNES and CNRS aims to providing access to local and remote data, designing and building science driven analysis tools for observational data as well as results from models and numerical simulations. Other tools like the Propagation Tool or 3DView allow users to put their data in context and interconnect with other databases and tools through interoperability. This presentation will briefly summarize all CDPP activities targeting in particular those related to current and future missions like Bepicolombo, JUICE, and Solar Orbiter.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

Interfaces & Databases / 26

Activities and Status of the SPDF Archive for the Past Year

Auteur: Robert Candey[1]

[1] *GSFC*

Auteur correspondant robert.m.candey@nasa.gov

The SPDF archive has added GOLD, Parker Solar Probe and Solar Orbiter data in the past year and is working on ICON data and final data from Van Allen Probes. We present the various activities from the past year and current status.

Open access:

I authorise the IHDEA to openly distribute my presentation material.

Abstract:

I accept that the content of my abstract is present in the book of abstracts.

Online Material:

I give my consent to share my material with the conference participants.

General / **27**

Welcome & Logistics

Auteur correspondant baptiste.cecconi@obspm.fr

General / **28**

IHDEA Introduction

General / **30**

ESA Highlights

General / **31**

CNES Highlights

Auteurs: Daniele Boucon[None]; Nicolas Dufourg[1]; nicolas andre[2]

[1] *CNES*
[2] *irap*

Auteur correspondant daniele.boucon@cnes.fr

General / **32**

JAXA/Nagoya Highlights

General / **33**

ObsParis Highlights

Auteur correspondant baptiste.cecconi@obspm.fr

General / **34**

Tools for IHDEA (wiki, slack,...)

Auteur correspondant baptiste.cecconi@obspm.fr

SPASE / **35**

SPASE 2.3.2 Highlight and new features

Auteur correspondant tking@igpp.ucla.edu

SPASE / **36**

SPASE/HAPI-Inside & Open metadata

Open access:

Abstract:

Online Material:

Interfaces & Databases / **37**

TAP & EPN-TAP

Auteur correspondant baptiste.cecconi@obspm.fr

We shortly introduce TAP and EPN-TAP in the context of the IHDEA. TAP is the Table Access Protocol, a science agnostic API to search into relational databases. EPN-TAP is a TAP interface, with a specific metadata dictionary specifying the table columns. EPN-TAP is dedicated to solar system sciences (planetary and heliophysics).

Open access:

Abstract:

Online Material:

Interfaces & Databases / **38**

Open Discussion

Auteur correspondant baptiste.cecconi@obspm.fr

Tools & Software / **39**

Solarsoft update (withdrawn)

Auteur correspondant jack.ireland@nasa.gov

Open access:

Abstract:

Online Material:

Tools & Software / **40**

Open Discussion

Tools & Software / **41**

Open Discussion

Other packages update
PyHC/IHDEA interactions

General / **42**

IHDEA Working Groups

Auteur correspondant baptiste.cecconi@obspm.fr

Open discussion
Working group proposal
Setting up contributors and goals

General / **43**

Future IHDEA recommendations

General / **44**

Summary & plans for the next meeting

SPASE / **45**

Showcase

SPASE / **46**

DOI for ESA Heliophysics spacecraft experiments and relation to SPASE

47

National tribute to Samuel Paty

All French research and education institutions will observe one minute of silence, to pay our tribute to Samuel Paty, high school teacher, murdered on Oct. 16 2020 because he was doing his job of teaching freedom of speech.

Tools & Software / **48**

HelioPy

Auteur correspondant arnaud.masson@esa.int

Short presentation of HelioPy