Space Weather Campaigns

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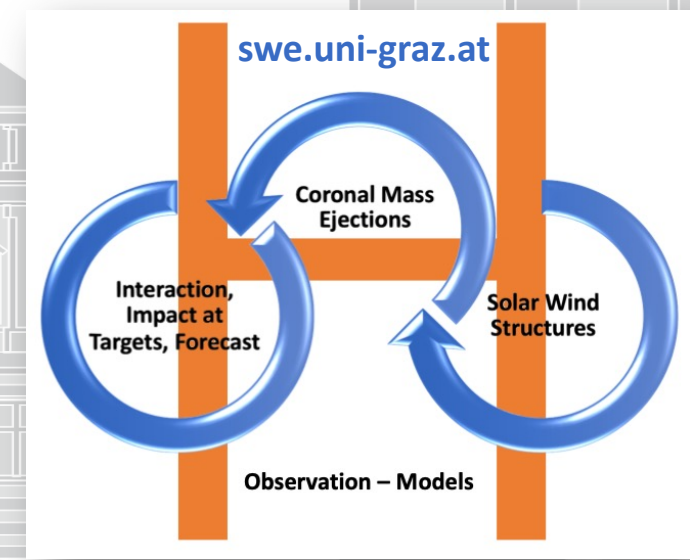
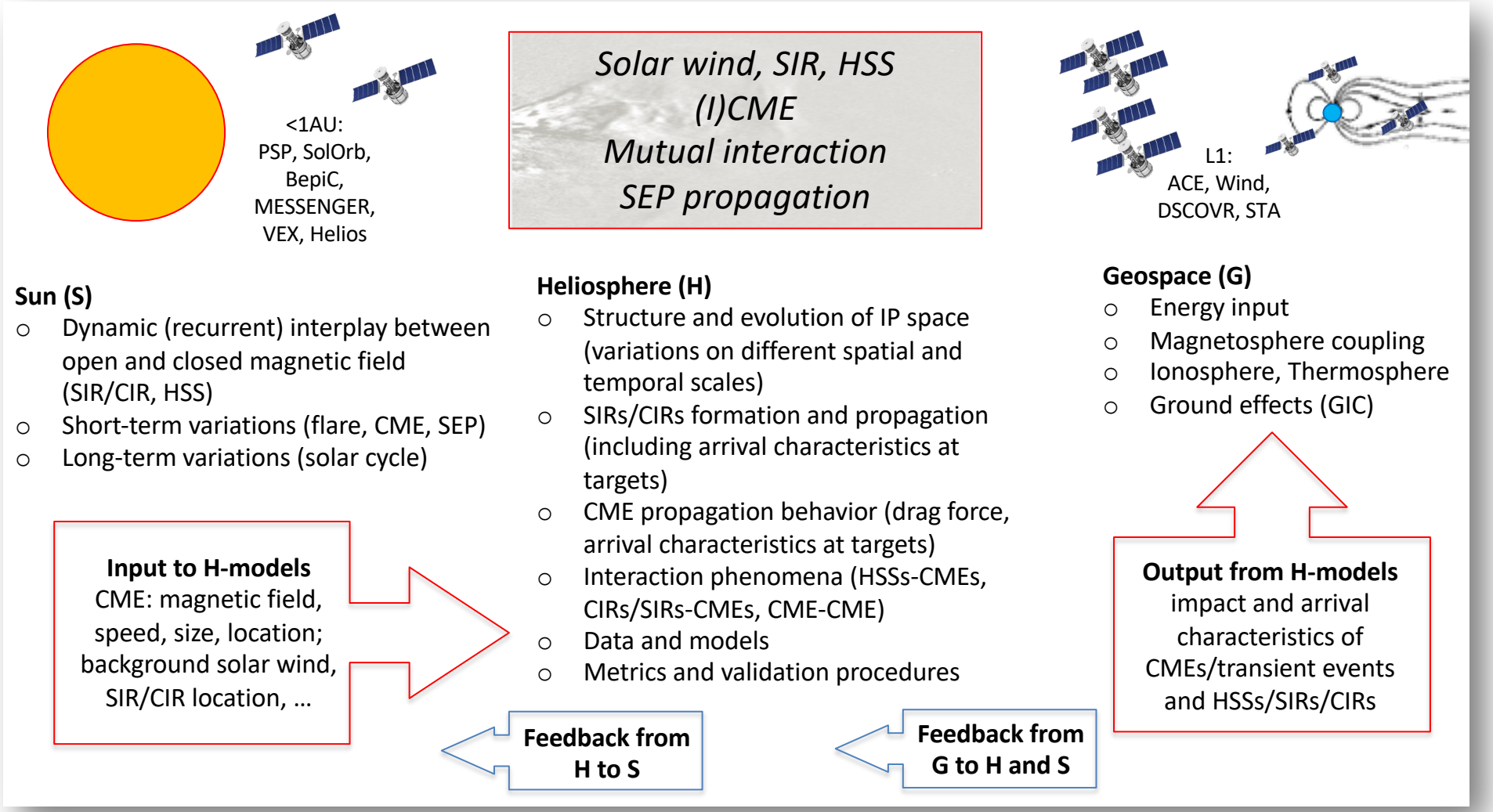


ISWI Meeting :: June 26, 2023 :: UN Vienna

Space Weather – understanding solar-terrestrial physics



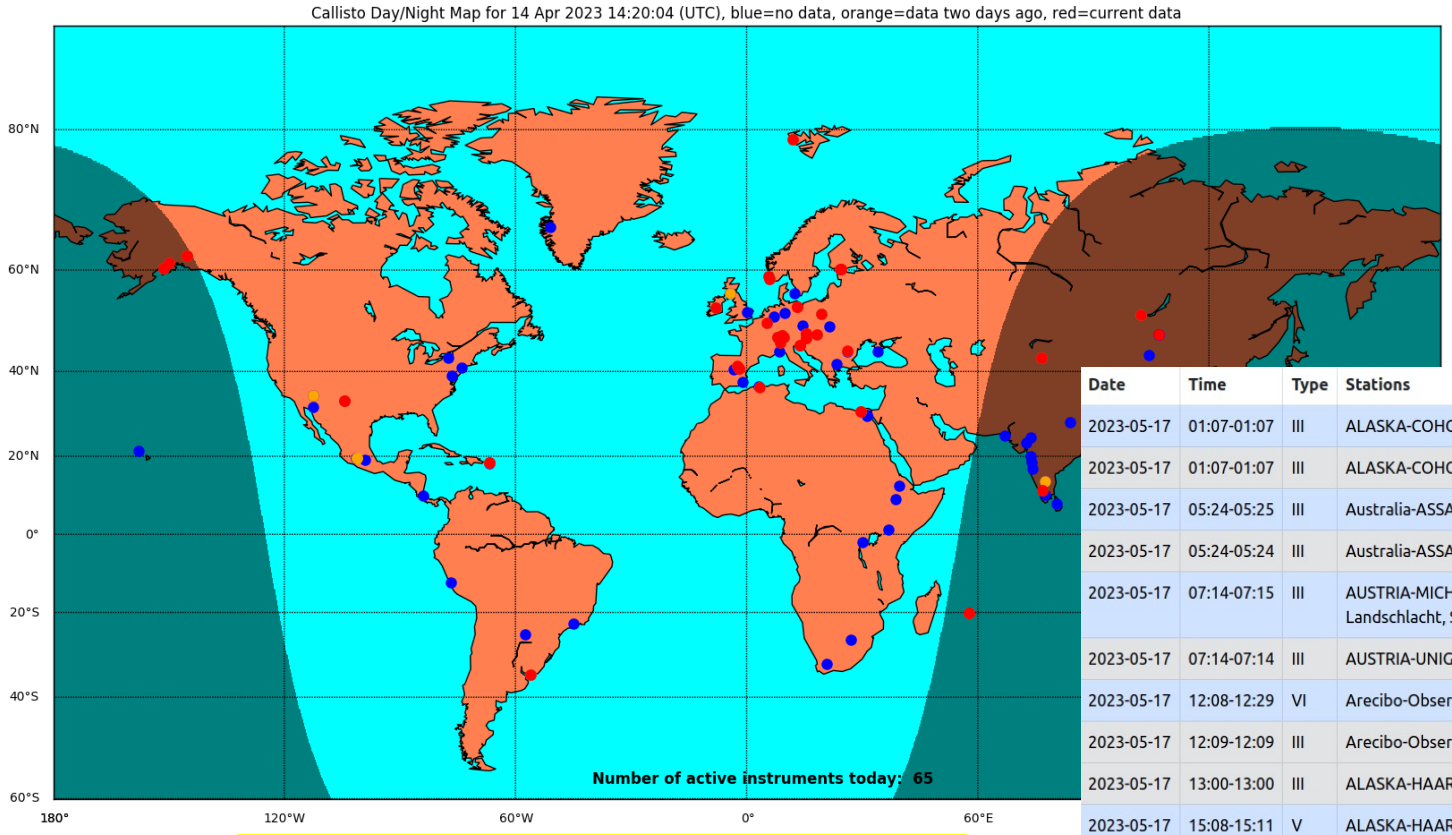
Space weather is a multi-disciplinary research area connecting scientists from across all domains requiring the whole global community to work together (sketch taken from Temmer+ 2023 – under revision for AdvSpRes).

The International Space Weather Initiative (ISWI)

The International Space Weather Initiative (ISWI) is a program of international cooperation to advance the space weather science by a combination of instrument deployment, analysis and interpretation of space weather data from the deployed instruments, in conjunction with space data, and to communicate the results to the public and students.

The goal of ISWI is to develop the physical insight necessary to understand the science, and to reconstruct and forecast near-Earth space weather. This includes instrumentation, data analysis, modeling, education, training, and public outreach.

E-CALLISTO 2.0



https://www.e-callisto.org

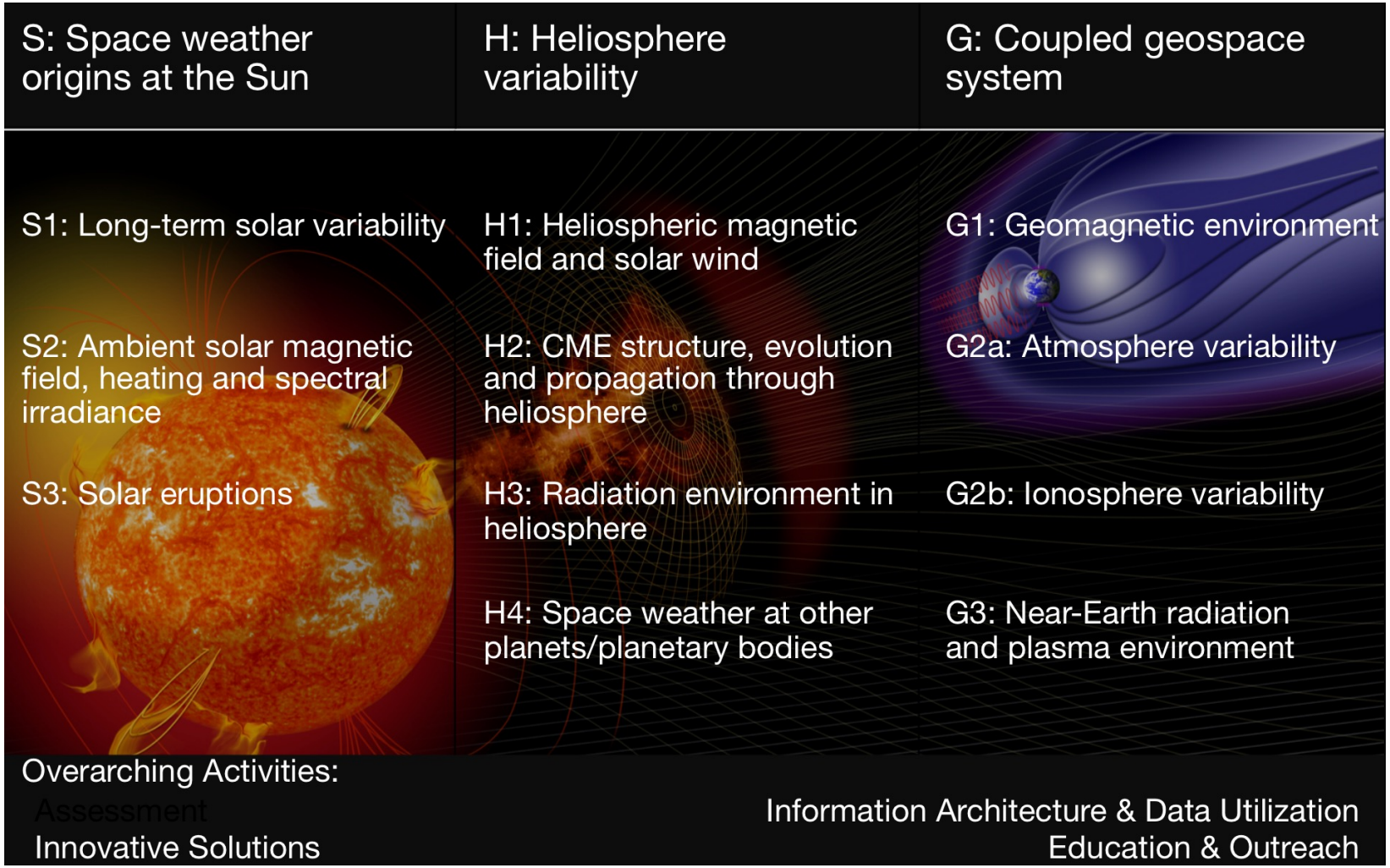
See Monstein 2006

E-CALLISTO community prepares for better networking and interaction. Space Weather relevant observations with respect to automatic detections of type II and type III bursts (see Javier Bussons Gordo et al., 2023).

☐ Official e-Callisto report ☐ deARCE generated report

Date	Time	Type	Stations
2023-05-17	01:07-01:07	III	ALASKA-COHOE, (ALASKA-HAARP), Australia-ASSA
2023-05-17	01:07-01:07	III	ALASKA-COHOE, ALASKA-HAARP, Australia-ASSA
2023-05-17	05:24-05:25	III	Australia-ASSA, (HUMAIN), INDIA-GAURI, Malaysia-Banting, SSRT, SWISS-Landschlacht
2023-05-17	05:24-05:24	III	Australia-ASSA, INDIA-OOTY
2023-05-17	07:14-07:15	III	AUSTRIA-MICHELBACH, (HUMAIN), INDIA-GAURI, INDIA-OOTY, KASI, (MRT1), Malaysia-Banting, (ROMANIA), SPAIN-SIGUENZA, SSRT, SWISS-Landschlacht, SWISS-MUHEN
2023-05-17	07:14-07:14	III	AUSTRIA-UNIGRAZ, INDIA-OOTY, SWISS-Landschlacht
2023-05-17	12:08-12:29	VI	Arecibo-Observatory, GERMANY-DLR, GLASGOW, HUMAIN, SWISS-Landschlacht
2023-05-17	12:09-12:09	III	Arecibo-Observatory, GLASGOW
2023-05-17	13:00-13:00	III	ALASKA-HAARP, SPAIN-PERALEJOS
2023-05-17	15:08-15:11	V	ALASKA-HAARP, AUSTRIA-UNIGRAZ, Arecibo-Observatory, (EGYPT-Alexandria), GERMANY-DLR, GLASGOW, HUMAIN, MEXICO-LANCE, (MRO), ROSWELL-NM, SWISS-HEITERSWIL, SWISS-Landschlacht, SWISS-MUHEN
2023-05-17	15:08-15:11	V	ALASKA-HAARP, AUSTRIA-UNIGRAZ, Arecibo-Observatory, GLASGOW, MEXICO-LANCE-B, SWISS-HEITERSWIL, SWISS-Landschlacht
2023-05-17	15:22-15:27	II	ALASKA-HAARP, AUSTRIA-UNIGRAZ, Arecibo-Observatory, GERMANY-DLR, GLASGOW, HUMAIN, MEXICO-LANCE, (ROSWELL-NM), (SPAIN-SIGUENZA), SWISS-HEITERSWIL, SWISS-Landschlacht, (SWISS-MUHEN)
2023-05-17	15:22-15:25	II	AUSTRIA-UNIGRAZ, Arecibo-Observatory, GLASGOW, MEXICO-LANCE-B, SWISS-HEITERSWIL
2023-05-17	15:52-15:52	III	ALASKA-HAARP, Arecibo-Observatory, GERMANY-DLR, GLASGOW, HUMAIN, MEXICO-LANCE, ROSWELL-NM, SWISS-HEITERSWIL, SWISS-Landschlacht
2023-05-17	15:52-15:52	III	ALASKA-COHOE, ALASKA-HAARP, Arecibo-Observatory, GLASGOW, MEXICO-LANCE-B, SWISS-Landschlacht

ISWAT - International Space Weather Action Teams



The ISWAT initiative provides a portal for state-of-the-art in space-weather science and modeling. Action Teams work via self-guided topical collaborations on different aspects of space weather organized into ISWAT Clusters.

The COSPAR ISWAT initiative is a channel for community inputs to our Living Global Space Weather Roadmap. COSPAR Space Weather Roadmap from Schrijver+ 2015 is ongoing.

Scientific Committee on Solar-Terrestrial Physics (SCOSTEP)

The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP) is a thematic body of the International Science Council (ISC).

SCOSTEP runs international interdisciplinary scientific programs and promotes solar-terrestrial physics research by providing the necessary scientific framework for international collaboration and dissemination of the derived scientific knowledge in collaboration with other ISC bodies.

SCOSTEP is a permanent observer at the United Nations Committee on the Peaceful Uses of Outer Space (UNCOPUOS).
Summer Schools, Symposia, Lectures, Workshops, Comic Books, …

International Space Environment Service (ISES)

The International Space Environment Service (ISES) is a collaborative network of space weather service-providing organizations around the globe. Our mission is to improve, to coordinate, and to deliver operational space weather services. ISES is organized and operated for the benefit of the international space weather user community.

ISES currently includes 22 Regional Warning Centers, four Associate Warning Centers, and one Collaborative Expert Center. ISES is a Network Member of the World Data System (WDS) of the International Science Council(ISC; formerly ICSU) and collaborates with the World Meteorological Organization (WMO) and other international organizations.

ISES has been the primary organization engaged in the international coordination of space weather services since 1962. ISES members share data and forecasts and provide space weather services to users in their regions. ISES provides a broad range of services, including: forecasts, warnings, and alerts of solar, magnetospheric, and ionospheric conditions; space environment data; customer-focused event analyses; and long-range predictions of the solar cycle.

The European Space Weather and Space Climate Association (E-SWAN)

The European Space Weather and Space Climate Association (E-SWAN) is an international non-profit association established in 2022. The mission of E-SWAN is to unite, sustain, and develop Space Weather and Space Climate activities in Europe. Working groups (technical, statutes, legal, funding, website scientific content, education, and outreach) were established.

First meeting at the European Space Weather Week in Toulouse, France in November 2023.

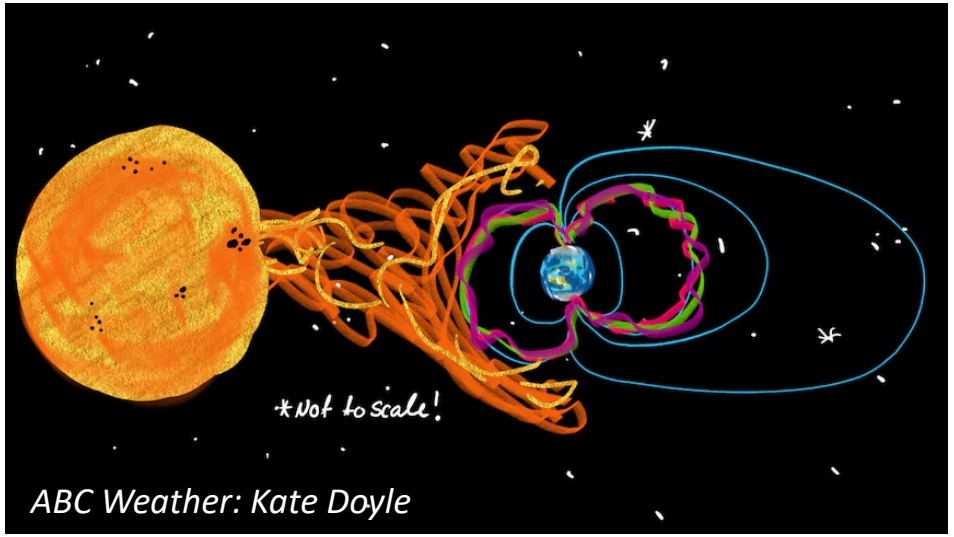
E-SWAN hosts the European Space Weather Week Program Committee, the Journal of Space Weather and Space Climate Editorial Committee, and the Space Weather and Space Climate international Medals committee. It will represent the community at large, including stakeholders, forecasters, scientists, product providers.

The International Meridian Circle Program (IMCP)

The International Meridian Circle Program, based on the Chinese Meridian Project, aims to take full advantage of 5000+ instrumentation to conduct all-weather observations and study the space weather and associated system sciences along approximately a meridian circle of 120°E/60°W passing through more than 10 countries and regions.

By treating the geospace, the atmosphere, as well as the cycles and spheres of the Earth surface as an integral system, the IMCP will conduct comprehensive global observations of multiple parameters to systematically study the kinetic properties of matter in the Earth system driven by solar activities and terrestrial activities, so as to reveal the relationship of space weather and global changes, and provide scientific grounding for tackling Earth disasters and informing space security decisions.

JAXA NICT, ESA, NASA, NOAA/Space Weather Prediction Center, WMO, …



ABC Weather: Kate Doyle

ESA's Space Weather Service Network aims to provide timely and reliable space weather information to end users. Individual products, reports, toolkits and user support are grouped into targeted services according to the needs of user communities from spacecraft operators through to power system operators.

The WMO Space Programme supports international coordination of operational activities in Space Weather in order to improve Space Weather hazard warnings for key application sectors such as aviation, radio-communications, satellite operations, electric power delivery, etc.

The Heliophysics Division Space Weather Science Application (SWxSA) initiative expands the role of NASA in space weather science under a single budget element and supports the multi-agency National Space Weather Strategy and Action Plan. It competes ideas and products, leverages existing Agency capabilities, collaborates with other national and international agencies such as the National Science Foundation (NSF), and partners with user communities to facilitate the effective transition of science knowledge to operational environments.

– Improving Space Weather Forecast – let‘s get the science done first!

Outlines the paths forward for improving our physical understanding, modeling, and consequently, forecasting of heliospheric transients. Identification of gaps in knowledge, capability, and data.

Gap Analysis compiled by APL 09/2020-04/2021 (chair A. Vourlidas):
https://science.nasa.gov/science-pink/s3fs-public/atoms/files/GapAnalysisReport_full_final.pdf

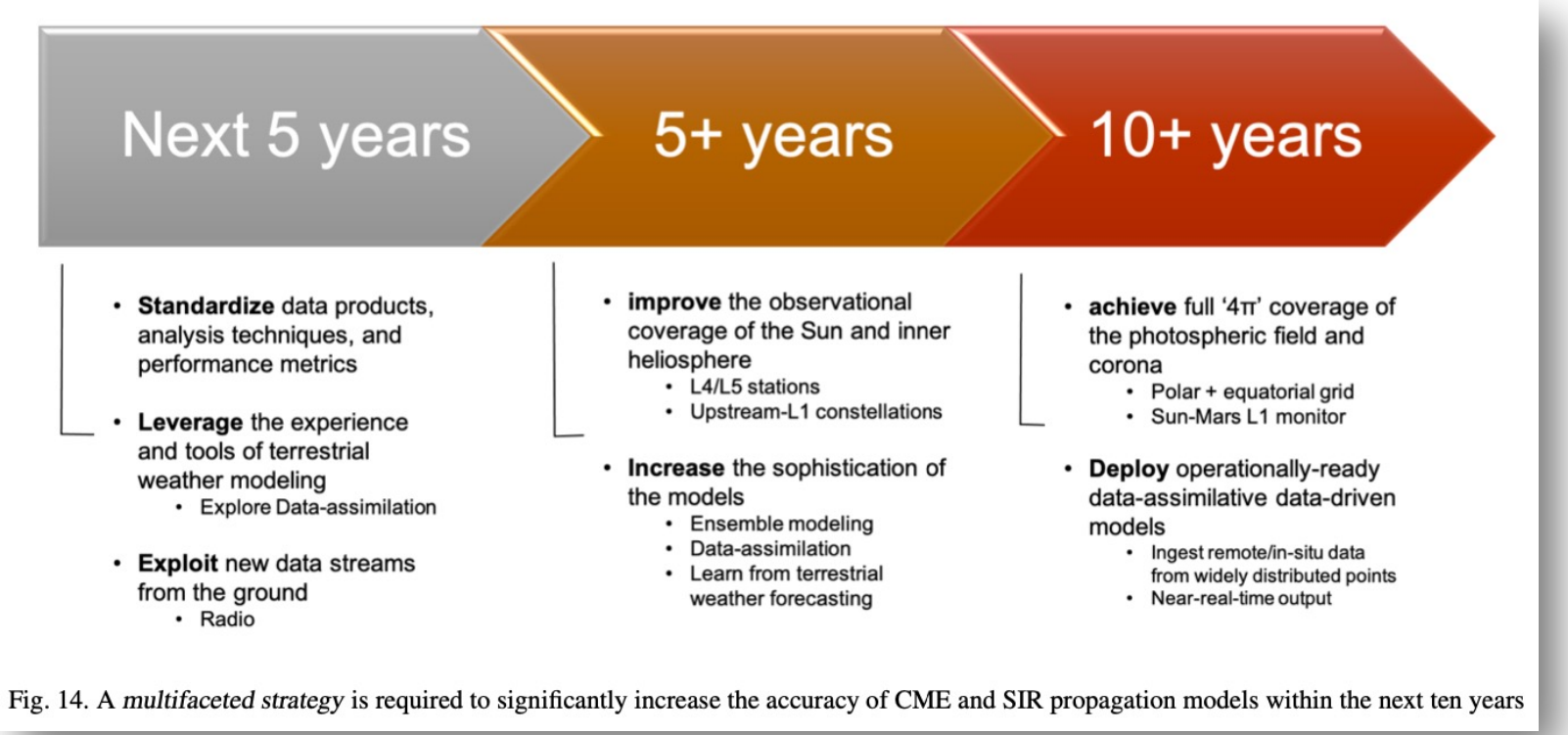


Fig. 14. A *multifaceted strategy* is required to significantly increase the accuracy of CME and SIR propagation models within the next ten years

M. Temmer et al., 2023, under revision