

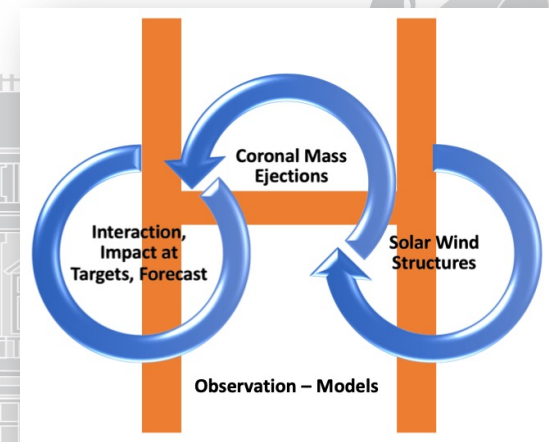
iSWAT H1+2 Clusters: CME Propagation Through Ambient Solar Wind

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iSWAT Workshop :: September 13-17, 2021 :: online

iSWAT structure and connection between H1+H2

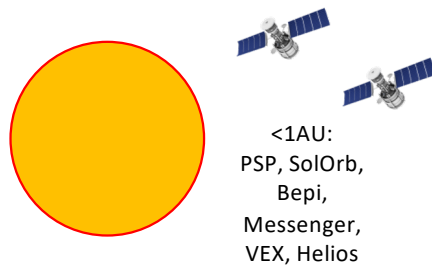


<https://www.iswat-cospar.org/>

S: Space weather origins at the Sun	H: Heliosphere variability	G: Coupled geospace system	Impacts
<p>S1: Long-term solar variability</p> <p>S2: Ambient solar magnetic field, heating and spectral irradiance</p> <p>S3: Solar eruptions</p> <p>Overarching Activities: Assessment Innovative Solutions</p>	<p>H1: Heliospheric magnetic field and solar wind</p> <p>H2: CME structure, evolution and propagation through heliosphere</p> <p>H3: Radiation environment in heliosphere</p> <p>H4: Space weather at other planets/planetary bodies</p>	<p>G1: Geomagnetic environment</p> <p>G2a: Atmosphere variability</p> <p>G2b: Ionosphere variability</p> <p>G3: Near-Earth radiation and plasma environment</p> <p>Information Architecture & Data Utilization Education & Outreach</p>	<p>Climate</p> <p>Electric power systems/GICs</p> <p>Satellite/debris drag</p> <p>Navigation/Communications</p> <p>(Aero)space assets functions</p> <p>Human Exploration</p>

Peer users :: S-H-G ::

Connecting S – H – G focusing on H



Sun (S)

- Dynamic (recurrent) interplay between open and closed magnetic field (SIR/CIR, HSS)
- Short-term variations (flare, CME, SEP)
- Long-term variations (solar cycle)

Input to H-models

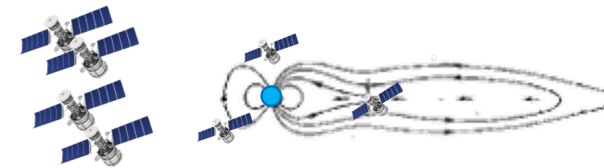
CME: magnetic field, speed, size, location; background solar wind, SIR/CIR location, ...

*Solar wind, SIR, HSS
CME, ICME
Mutual interaction
SEP propagation*

Heliosphere (H)

- Structure and evolution of IP space (variations on different spatial and temporal scales)
- SIRs/CIRs formation and propagation (including arrival characteristics at targets)
- CME propagation behavior (drag force, arrival characteristics at targets)
- Interaction phenomena (HSSs-CMEs, CIRs/SIRs-CMEs, CME-CME)
- Data and models
- Metrics and validation procedures

L1:
ACE, Wind,
DSCOVR, STA



Geospace (G)

- Energy input
- Magnetosphere coupling
- Ionosphere, Thermosphere
- Ground effects (GIC)

Output from H-models
impact and arrival characteristics of HSSs/SIRs/CIRs and transient events

Teams



- H1-01: Ambient Solar Wind Validation Working Team
(M. Reiss / K. Muglach) – Splinter Sep 15, 16:30-18:30UT
- H1-02: Heliospheric Radio Diagnostics of the Background Solar Wind
(R. Fallows) – Splinter Sep 28, 08:30-10:30UT and 16:30-18:30UT
- H2-01: CME Arrival Time and Impact Working Team
(C. Verbeke / L. Mays) – Splinter Sep 28, 16:30-18:30UT
- H2-02: Magnetic Profiles of Interplanetary CMEs
(C. Kay)
- H2-03: CME model evaluations through synthetic observations
(Luke Barnard, Tanja Amerstorfer) – Splinter Sep 27, 08:30-10:30UT

Workshop Goals



“COSPAR Roadmap preparation”

Day 1 – Sep 14, 16:30-18:30UT

Discussion of paper structure

Agree on timeline

All team leads - action: prepare reference list of recent and future papers related to the team

Day 2 – Sep 27, 16:30-18:30UT

Working title

Fix leads and team for each chapter

Overleaf document

Proof-readers? Names!

**ISWAT is a huge platform to connect people with different
expertise but same overall goals**

**Make methods and tools available for (early career) colleagues to jump in and get trained for
future Space Weather research**

Discussion topics and input for Roadmap



Global scale:

- *Structure and evolution of interplanetary space* throughout the heliosphere

Large scale:

- *SIRs/CIRs* formation and propagation (including arrival characteristics at targets)
- *CME* propagation behavior (drag force, arrival characteristics at targets)
- *Interaction* phenomena (HSSs-CMEs, CIRs/SIRs-CMEs, CME-CME)

Forward information - Cluster G:

- Geospace energy input (impact of HSSs/SIRs/CIRs and transient events)

Backward information - Cluster S:

- Review of *observational input* to models (including current uncertainties in inputs=>outputs, and future requirements for improvement)

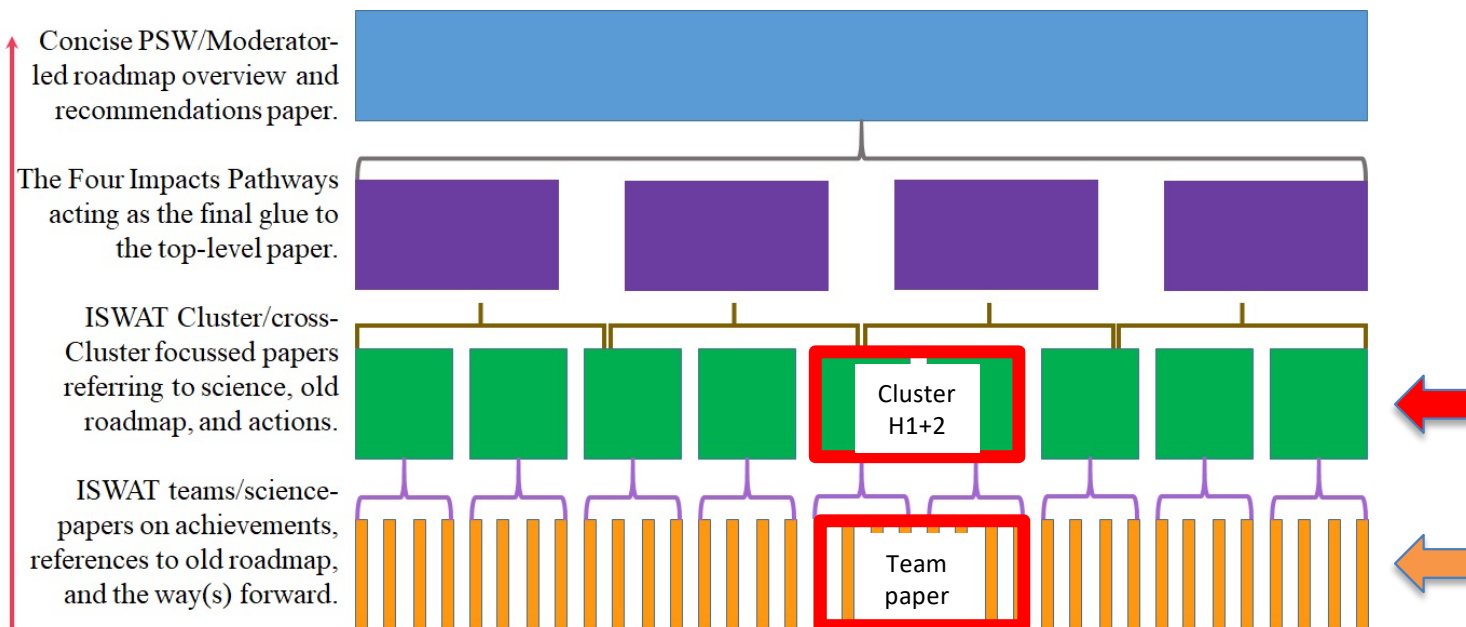
General:

- Development of *metrics* for objective model tests, comparison, validation and further improvement

Together we prepare for the COSPAR Space Weather Roadmap



- Cluster H1+2 centered forward looking paper.
- Make it a strong paper useful for the community, i.e., peer-users, and practical guide for the next generation.
- Provide application to everyday's work.



Overview (simplified) diagram of the papers structure forming the Updated COSPAR Space Weather Roadmap.

COSPAR Space Weather Roadmap Cluster H1+2 paper

https://docs.google.com/document/d/1H_SYyl1cqHRE3ggGSbMMkAJmtNynTovci97g9xM6JEc/edit?usp=sharing

https://join.slack.com/t/slack-s9r5931/shared_invite/zt-s47u9ggu-5MMMyMcmNNCrcpzPRUb_phw