

Project ISEST/MiniMax24

International Study of Earth-affecting Solar Transients

J. Zhang¹, M. Temmer², and N. Gopalswamy³

¹School of Physics, Astronomy and Computational Sciences,
George Mason University, Fairfax, VA, USA

²Institute of Physics, University of Graz, Styria, Austria

³NASA Goddard Space Flight Center, Greenbelt, MD, USA



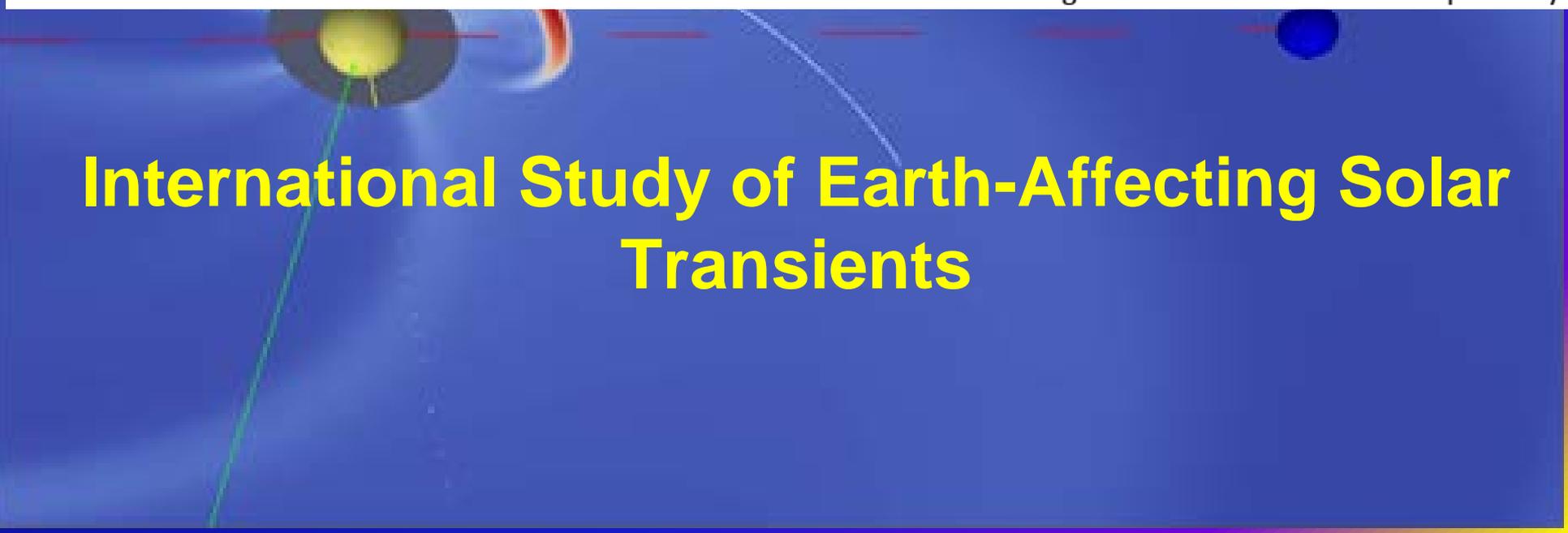
Jie Zhang



Manuela Temmer



Nat Gopalswamy



International Study of Earth-Affecting Solar Transients

The Goal

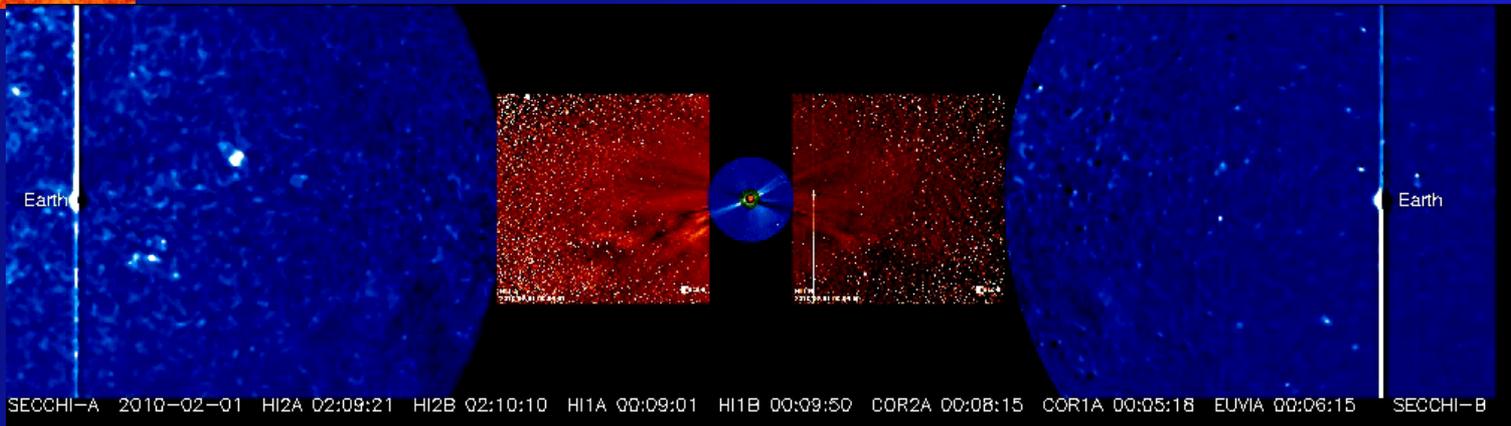
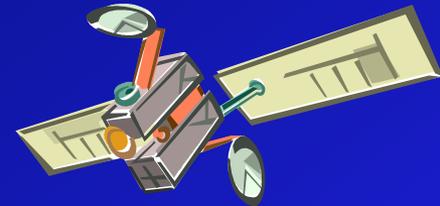
Understand the origin, propagation and evolution of solar transients through the space between the Sun and the Earth, and develop the prediction capability of space weather

Justification

Sun

Interplanetary Space

In-situ



Enabled by

(1) Advanced continuous observations

(2) Advanced global numerical simulations



SOC

Ayumi Asai

Mario M. Bisi

Kyungsuk Cho

Peter Gallagher

Manolis K. Georgoulis

Nat Gopalswamy (co-leader)

Alejandro Lara

Noe Lugaz,

Alexis Rouillard

Nandita Srivastava

Manuela Temmer (co-leader)

Yuri Yermolaev

Yu-Ming Wang

David Webb

Bojan Vrsnak

Jie Zhang (leader)

Kyoto University (Japan)

RAL (UK)

KASI (South Korea)

Trinity College Dublin (Ireland)

Academy of Athens (Greece)

NASA (USA)

National Autonomous University (Mexico)

University of New Hampshire (USA)

CNRS/IRAP (France)

Physical Research Lab (India)

University of Graz (Austria)

Space Research Institute (Russia)

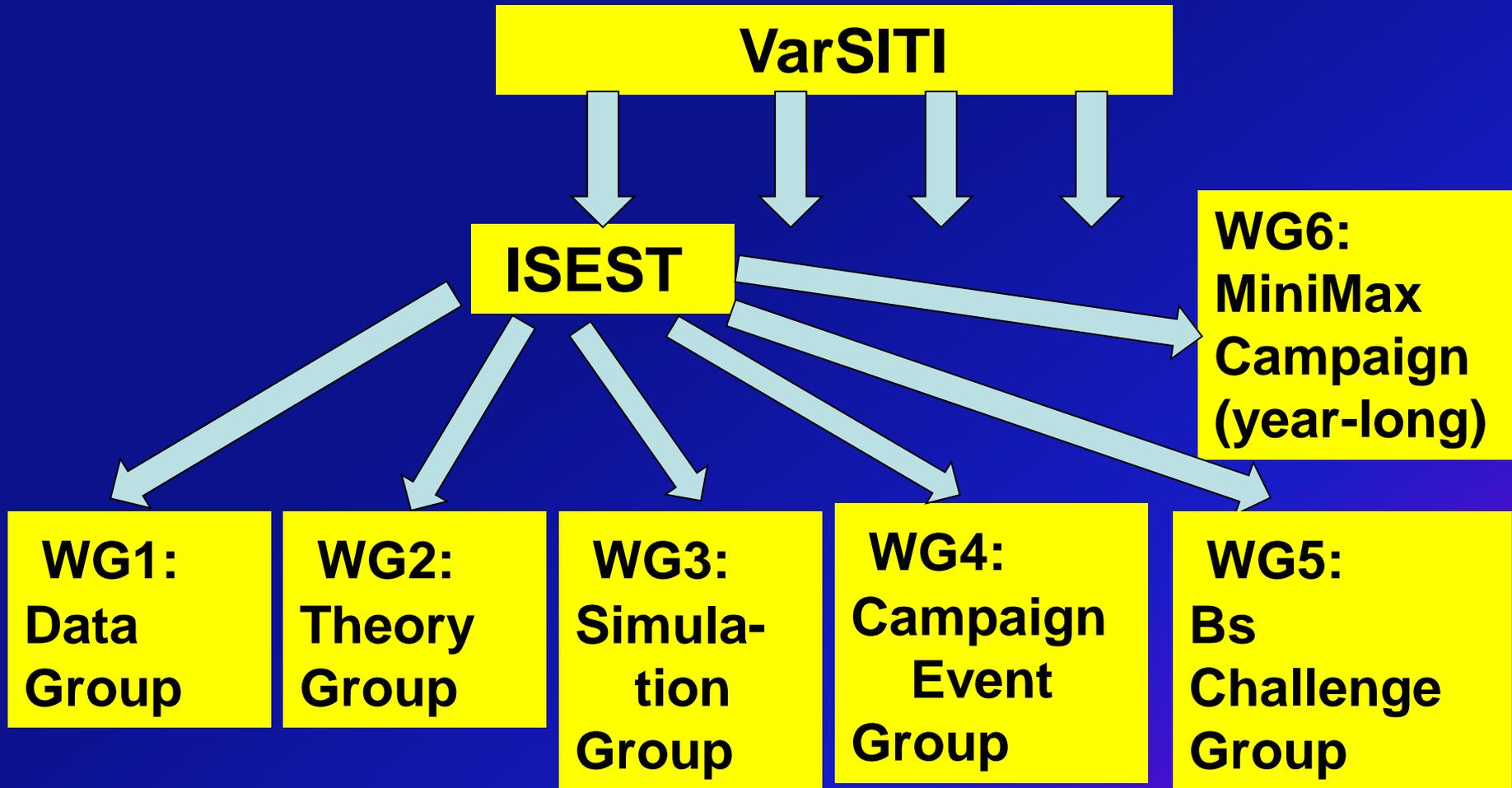
Univ. of Science and Technology (China)

Boston College (USA)

Hvar Observatory (Croatia)

George Mason University (USA)

Working Groups



Working Group Leaders

- WG1 (Data Group):** Jie Zhang (George Mason University, USA)
- WG2 (Theory Group):** Bojan Vrsnak (Hvar Observatory, Croatia)
- WG3 (Simulation Group):** Fang Shen (CSSAR, China)
- WG4 (Campaign Group):** David Webb (Boston College, USA)
- WG5 (Bs Group):** Manolis Georgoulis (Academy of Athens, Greece)
- WG6 (MiniMax24 Group):** Manuela Temmer (University of Graz, Austria)

WG1: Data Group

Scientific Objectives

- Identify all Earth-Affecting ICMEs during the STEREO era (2007– to – date) and their solar sources
- Track these events from the Sun to the Earth, and fully measure, characterize and quantify their properties and evolution
- Provide a comprehensive Sun-to-Earth CME event database online and publically available
- Identify and characterize SEPs
- Identify and characterize CIRs.



WG2: Theory Group

Scientific Objectives

- Understand the origin and structure of CMEs
 - The origin of CMEs
 - The formation of magnetic flux rope structure
 - How CMEs are deflected?
- Understand the dynamics of CMEs
 - How long the Lorentz force dominates over the aerodynamic drag force?
 - How much ambient conditions affect CMEs?
 - How to estimate the drag parameter and/or the dimensionless drag coefficients

WG3: Simulation Group

Scientific Objectives

- Provide global context for all CME events investigated by the ISEST WG1
- Investigate processes of CME initiation, heliospheric propagation, and CME interaction
- Develop tools to assist collaboration among modelers, theoreticians, and observers
- Existing Models: ENLIL, COIN-TVD, H3DMHD, SWMF

WG4: Campaign Event Group

Scientific Objectives

- For a small number of carefully selected events, integrate theory, simulations and observations in order to achieve a comprehensive understanding of the chain of cause-effect activities from the Sun to the Earth
- Provide textbook-style events from the Sun to the Earth to the community (happy stories).
- Examine controversial event such as stealth CMEs and problem ICMEs (surprising stories)

WG5: Bs Challenge Group

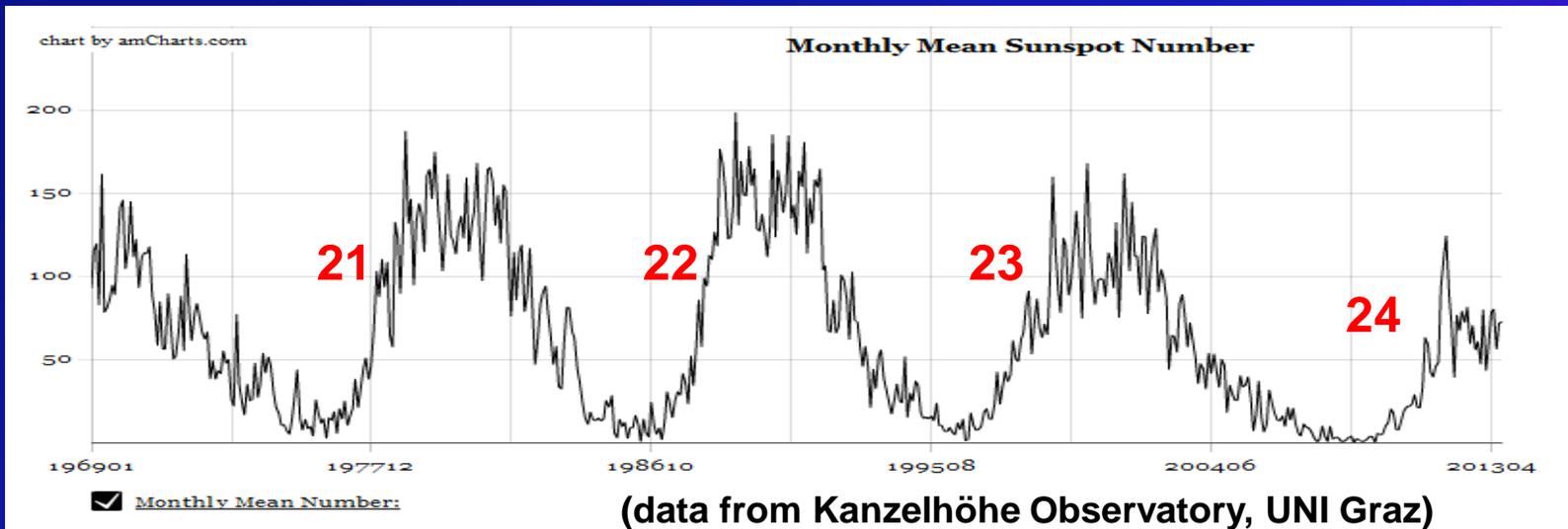
Scientific Objectives

- Understand and reconstruct the magnetic structure of CMEs/ICMEs from observations and models.
- Predict the Bs strength and duration in ICMEs upon arriving at the Earth

WG6: MiniMax24

Scientific Objectives

- Long-term campaign providing daily updates on solar and geo-space events through a network of international participants
 - 35 observatories/institutes from 17 countries are currently in the campaign
- Act as a "come-into-contact platform" with a broad range of experts.



Activity and Schedule

Organize Workshops

- A mini-ISEST workshop in University of Science and Technology of China (USTC) (April 18 - 19, 2014, China), organized by Jie Zhang & Yuming Wang
 - A special session in SHINE conference (June 23-27, 2014, USA), titled as "Earth-affecting CMEs", organized by Jie Zhang & Noe Lugaz
-
- One-day ISEST/MiniMax24 workshop held together with STP-13 conference (Oct. 18, 2014, Xian, China)
 - ISEST/MiniMax24 workshop, 2015, Mexico, Time-TBD

Activity and Schedule

VarSITI campaign study in STP-13 (Oct. 18, Xian, China)

• **Coordinators: Jie Zhang; David Webb (ISEST); Yoshi Miyoshi (SPeCIMEN), Nanan Balan (ROSMIC)**

• **Selected campaign events**

- **2012 July 12-14**
- **2012 October 04 – 08**
- **2013 March 15 - 17**
- **2013 May 27 - June 1**

Activity and Schedule

You can participate any time, any where!

Create two community portals:

**wiki-based websites allowing data uploading,
data sharing and discussion**

**1. ISEST Portal: user registration, data repository
from observations, simulations, analysis and
discussions**

(http://solar.gmu.edu/heliophysics/index.php/Main_Page)

**2. MiniMax Campaign Portal: daily updates of any
interesting events from participants**

(<https://igam02ws.uni-graz.at/mediawiki/>)

Thanks