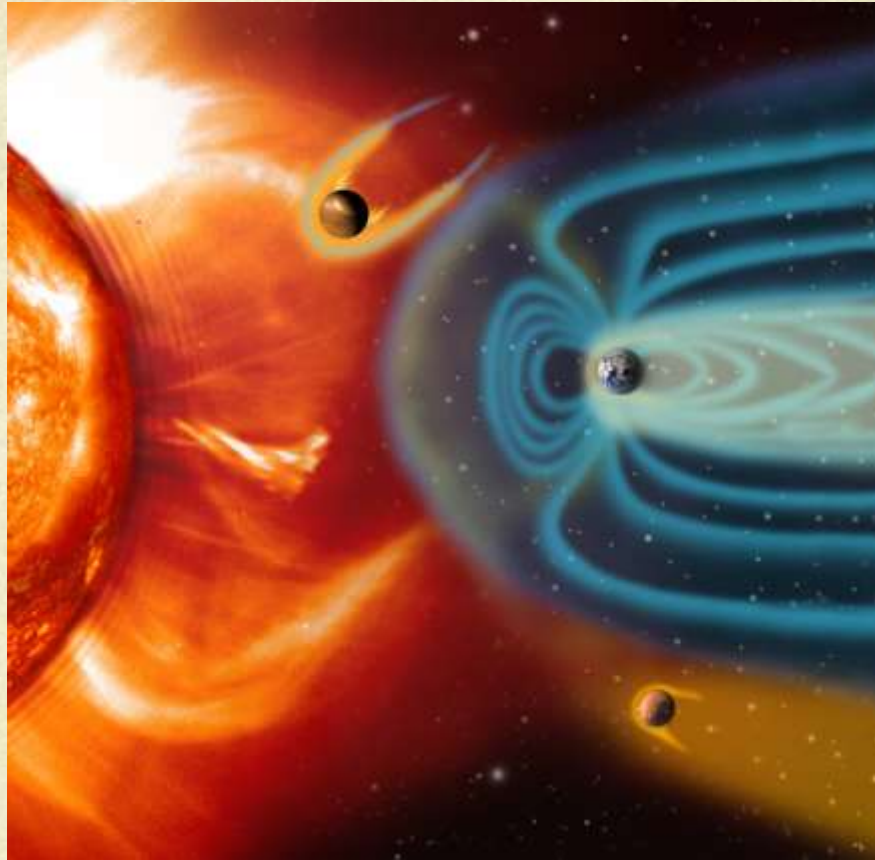


The PRESTO Program



Ioannis A. Dagleis

University of Athens

SCOSTEP NSP Committee Chair

SCOSTEP

Next Scientific Program Committee

- Ioannis A. Daglis (University of Athens, Greece)
- Loren Chang (National Central University, Taiwan)
- **Sergio Dasso** (University of Buenos Aires, Argentina)
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- Emilia Kilpua (University of Helsinki, Finland)
- **Daniel Marsh** (NCAR, USA)
- Katja Matthes (University of Kiel, Germany)
- **Dibyendu Nandi** (IISER Kolkata, India)
- Annika Seppälä (University of Otago, New Zealand)
- Rémi Thiéblemont (Univ. Pierre et Marie Curie, France)
- Qiugang Zong (Beijing University, China)

The 20 months of PRESTO definition

- October 2017: NSP Committee established
- March 2018: First draft ready
- May 2018: Open Call to scientific community
- July 2018: STPI4 and COSPAR
- November 2018: ISSI Beijing Forum
- December 2019: Second Open Call
- February 2019: ISSI Bern Forum
- March 2019: Final edit
- May 2019: PRESTO approval by SCOSTEP Bureau

ISSI Beijing Forum

- Amal Chandran
- Mamoru Ishii
- Kanya Kusano
- William Liu
- Shinobu Machida
- Takahiro Obara
- Duggirala
Pallamraju
- Nandita Srivastava
- Chi Wang
- Yuming Wang
- Yihua Yan

ISSI Bern Forum

- Seth Claudepierre
- Katya Georgieva
- Nat Gopalswamy
- Petra Koucká
Knížová
- Vladimir Kuznetsov
- Franz-Josef Luebken
- Nick Pedatella
- Eugene Rozanov
- Kazuo Shiokawa
- Alphonse Sterling
- Manuela Temmer

Choice of predictability theme
as a unifying concept for coordinating
research and outreach activities

PreSTo:

Predictability of the variable
Solar-Terrestrial Coupling



国际空间科学研究所 - 北京

太空 | TAIKONG

ISSI-BJ Magazine

No. 13 June 2019

PREDICTABILITY OF THE VARIABLE
SOLAR-TERRESTRIAL COUPLING
THE SCOSTEP NEXT SCIENTIFIC PROGRAM

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Scientific Committee on Solar-Terrestrial Physics





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google "ISSI Beijing"

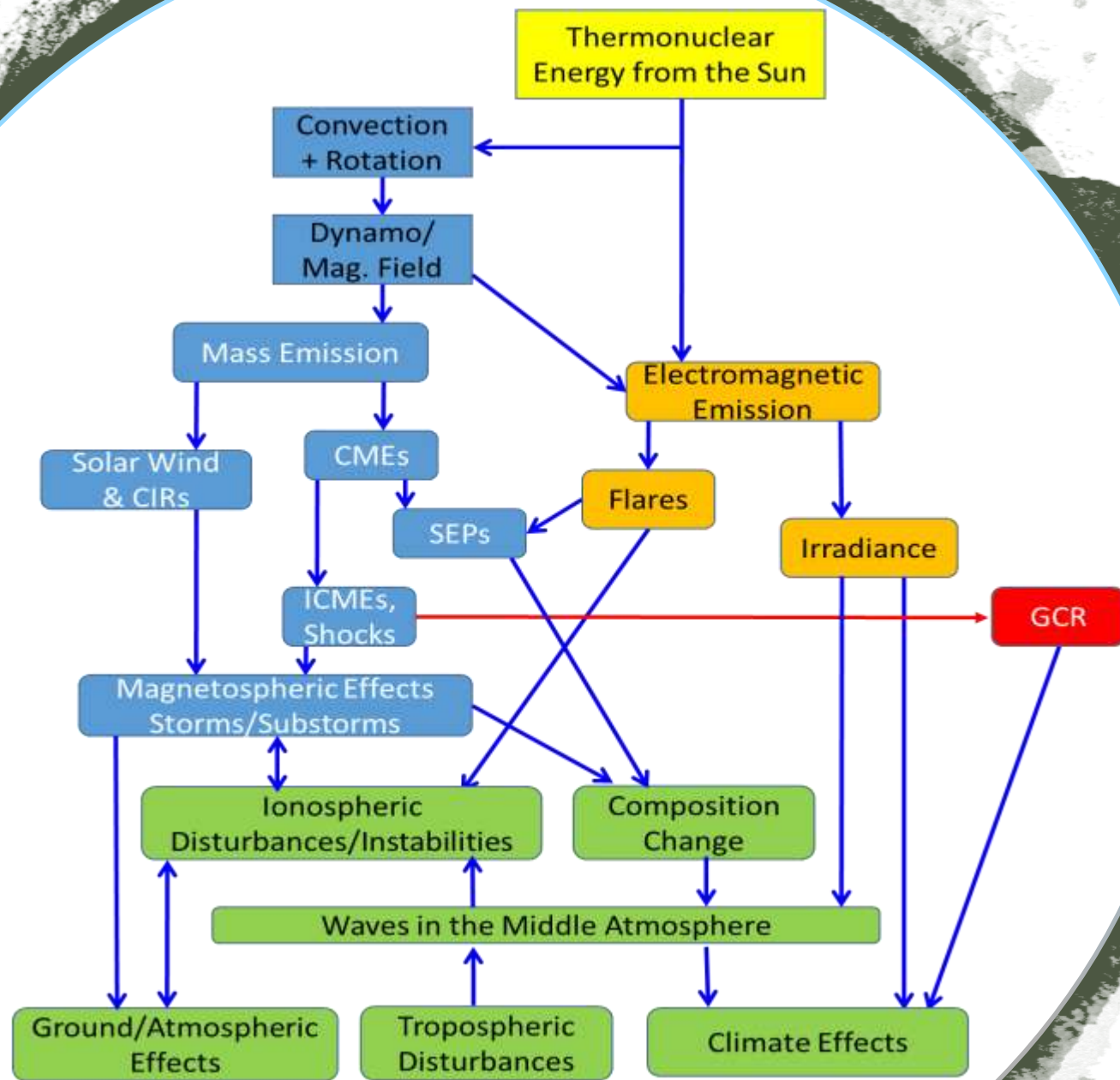


Predictability

A major motivation for PRESTO is the desire to conduct fundamental research that **has the prospect to advance predictive capability** (societal implications)

Predictability

- **timely scientific topic**
- **combines the interests of different topical communities**





Solar Eruption

Solar wind, CIR & CME



Geomagnetic storms & substorms

High-energy particles



EM Radiation



Orbit change



Satellite anomaly



Plasma bubbles



Ionospheric disturbances



aurora



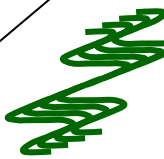
Radio communication



GNSS positioning

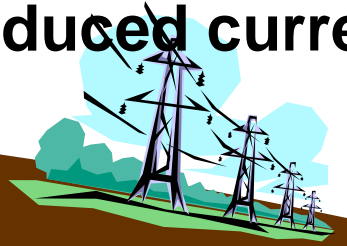


Atmospheric waves



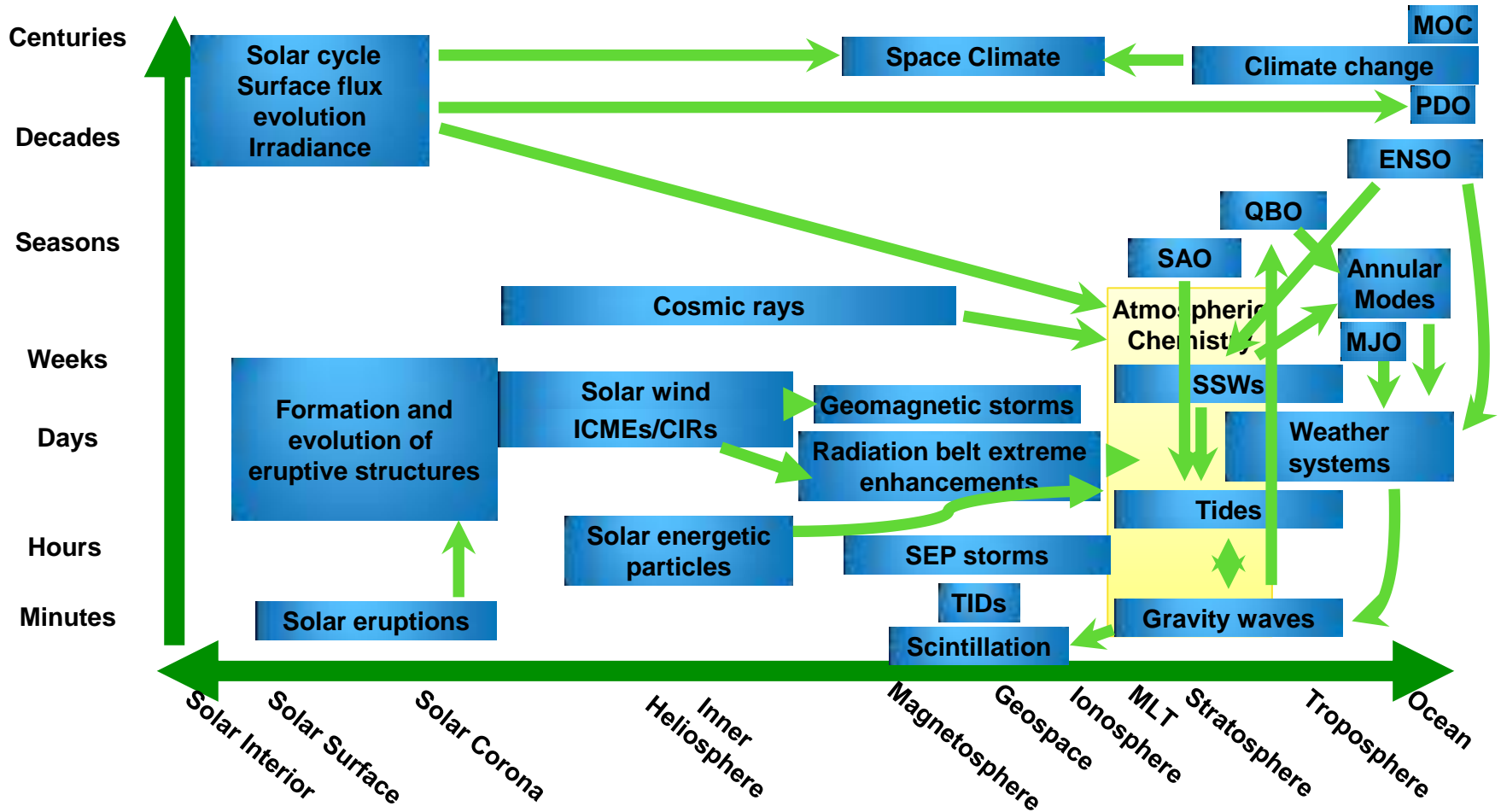
Climate change

Geomagnetically induced currents



An integrated view of solar-terrestrial coupling

Solar-terrestrial phenomena in various spatial & temporal scales



PreSTo: Predictability of the variable Solar-Terrestrial Coupling

3 pillars - 12 overarching questions

1. Sun, interplanetary space and geospace

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2. Space weather and the Earth's atmosphere

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1. Sun, interplanetary space and geospace

2. Space weather and the Earth's atmosphere

3. Solar activity and its influence on the climate of the Earth System

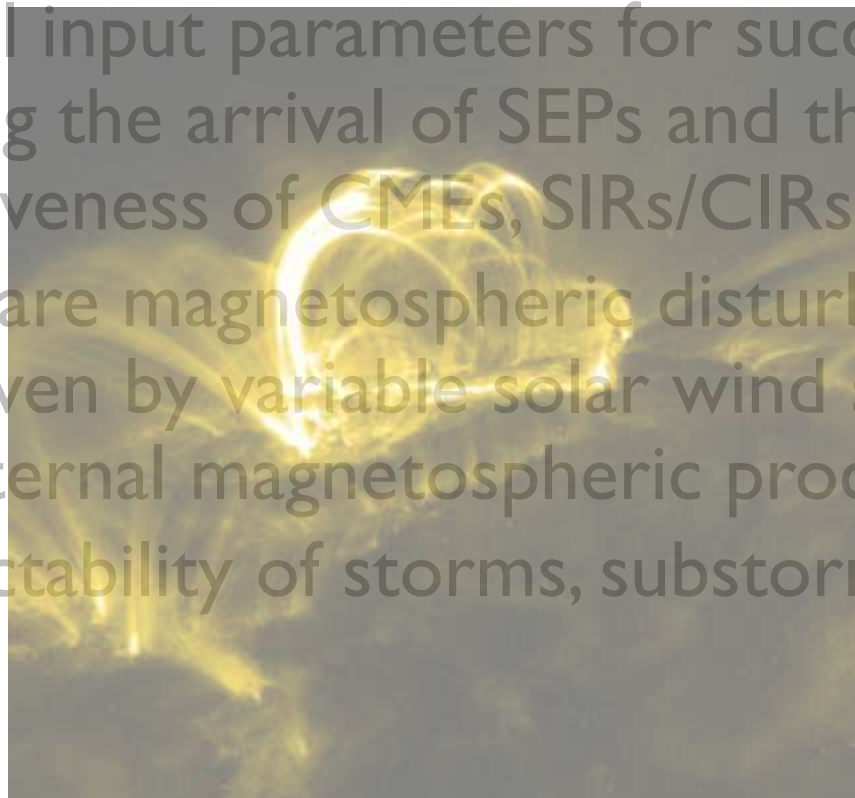
Pillar 1: Sun, interplanetary space & geospace

1.1. Occurrence of solar flares, CMEs, SEPs and reliable indicators of their initiation (Kusano)

1.2. Model input parameters for successfully forecasting the arrival of SEPs and the geoeffectiveness of CMEs, SIRs/CIRs

1.3. How are magnetospheric disturbances and waves driven by variable solar wind structures, and/or internal magnetospheric processes?

1.4. Predictability of storms, substorms and radiation hazards



Pillar 1: Sun, interplanetary space & geospace

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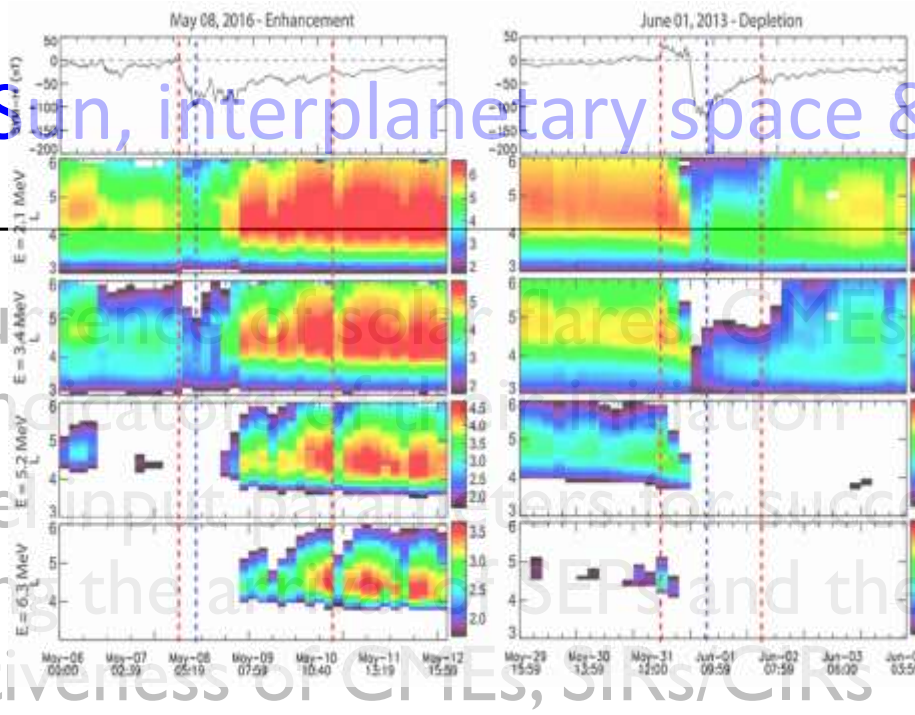
I.2. Model input parameters for successfully forecasting the arrival of SEPs and the geoeffectiveness of CMEs, SIRs/CIRs (Dasso)

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Pillar 1: Sun, interplanetary space & geospace



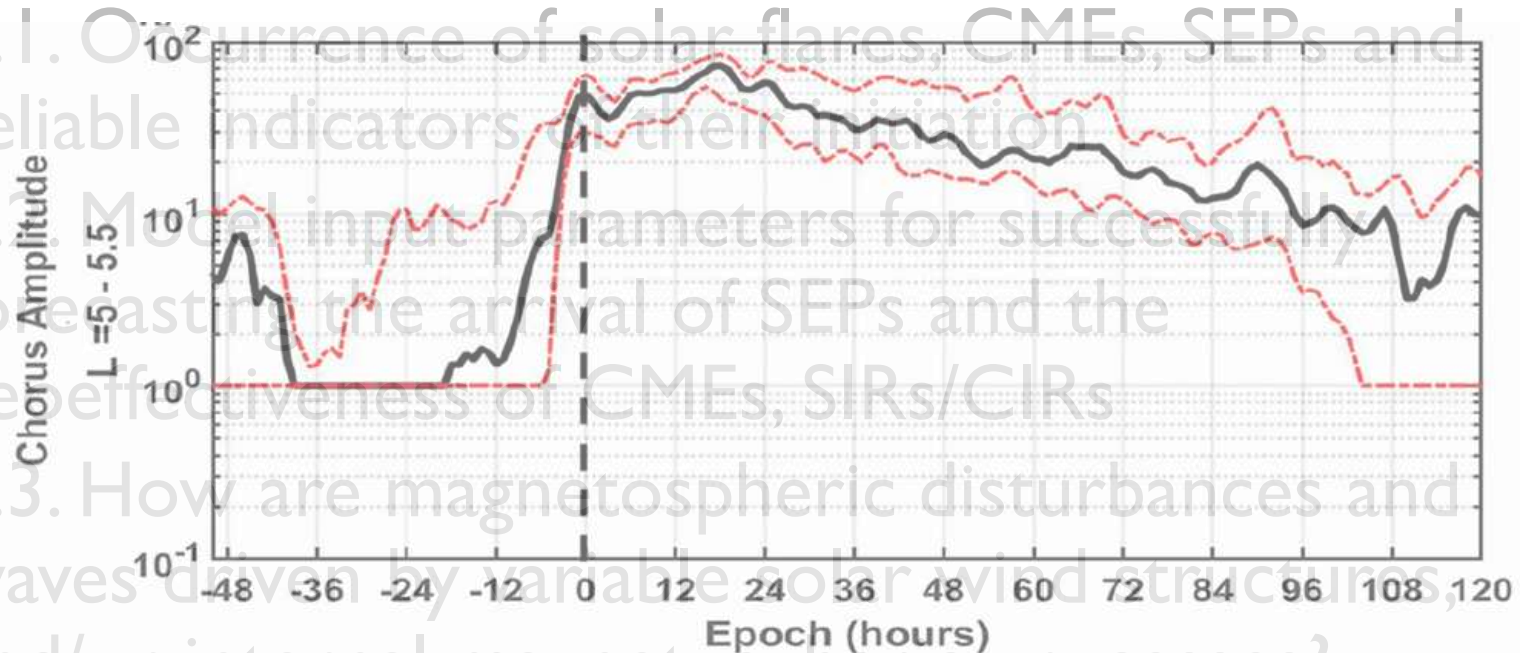
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I.2. Model input parameters for successfully forecasting the arrival of SEPs and the geoeffectiveness of CMEs, SIRs/CIRs

I.3. How are magnetospheric disturbances and waves driven by variable solar wind structures, and/or internal magnetospheric processes? (Horne)

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1.4. Predictability of storms, substorms and radiation hazards (Horne, Katsavrias)

Pillar 2: Space weather and the Earth's atmosphere

1.1. Response of thermosphere/ionosphere to forcing from above and from below (Qian/Miyoshi)

1.2. Impact of atmospheric waves and composition changes on middle and upper atmosphere

1.3. Magnitude and spectral characteristics of solar and magnetospheric forcing, needed for accurate predictions of the atmospheric response

1.4. Chemical and dynamical response of the middle atmosphere to solar and magnetospheric forcing

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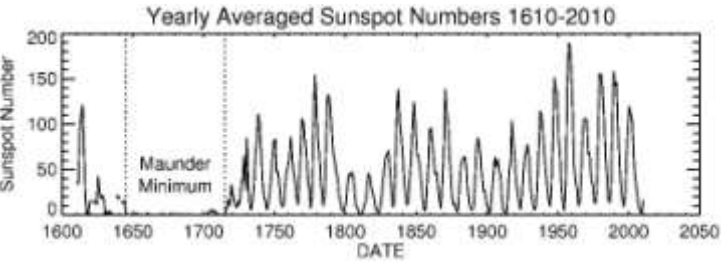
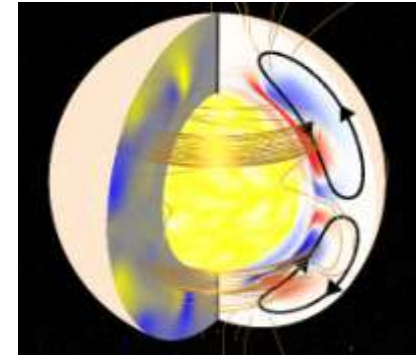
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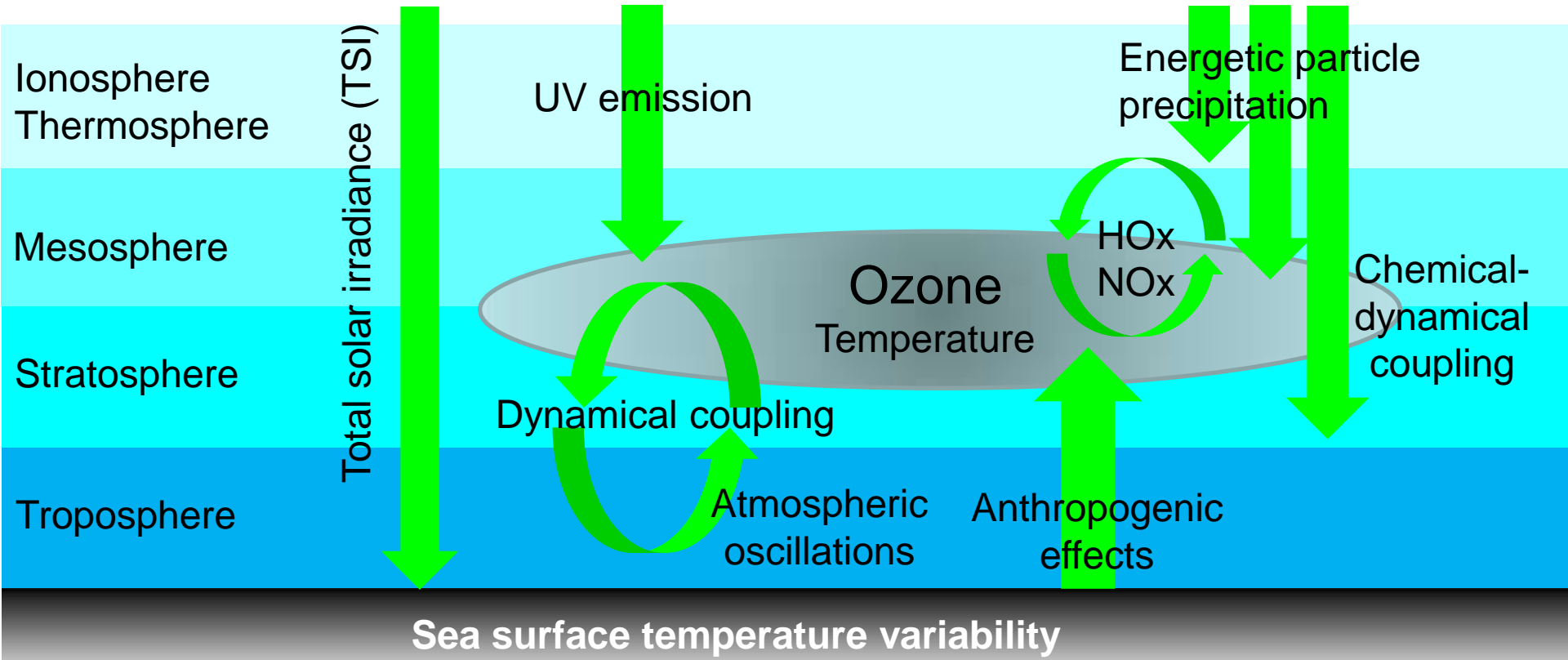
Solar dynamo



Interplanetary space

Magnetosphere

Solar energetic particles magnetospheric particles



Pillar 3: Solar activity and its influence on the climate of the Earth System

1.1. How will future solar activity vary over timescales relevant for the forcing of the Earth's climate and atmospheric dynamics? (Dikpati)

1.2. Role of coupling between atmospheric regions in the realization of the long-term solar influence

1.3. How is atmospheric response to the variable solar forcing affected by increasing greenhouse concentrations?

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Predictability

deterministic predictions

VS

probabilistic predictions

Predictability

sophisticated models

VS

simple models

Thank you!