

ROSMIC: COUPLING BY DYNAMICS (ROSMIC-CD)

--- Connecting dynamicists around the world ---

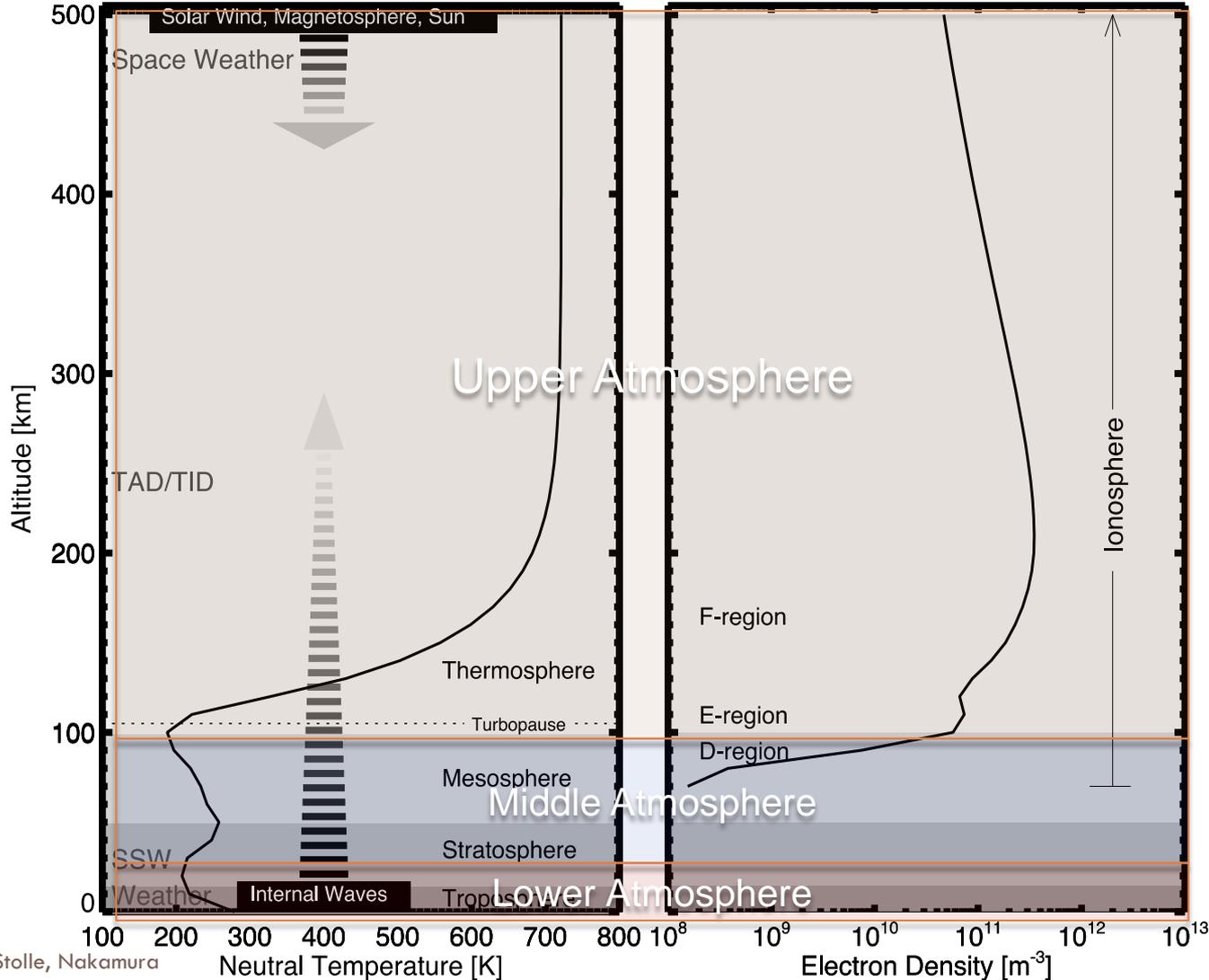
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-- Further members to be confirmed --

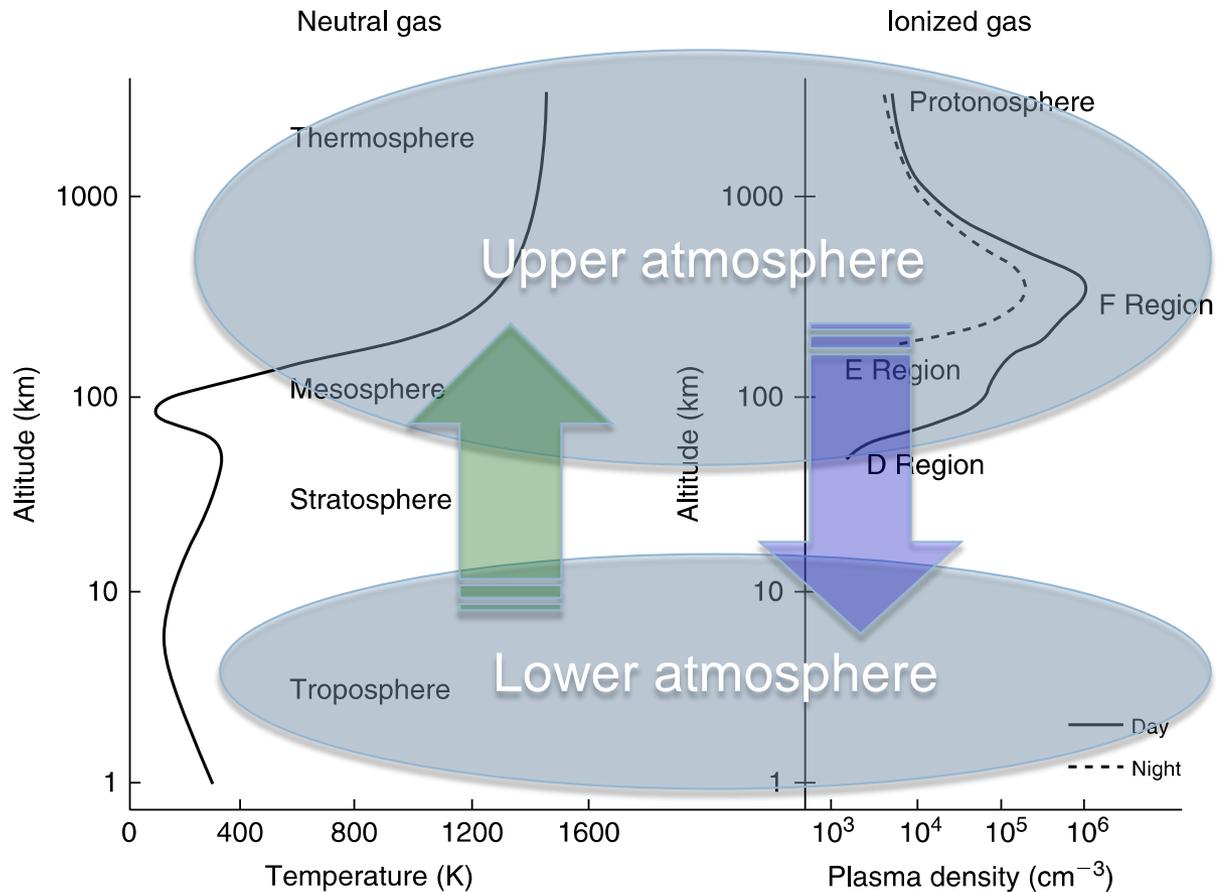
Earth's atmosphere: Structure



Earth's atmosphere: Vertical coupling

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□ Vertical coupling in the atmosphere-ionosphere



ROSMIC-CD Focus

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ROSMIC-CD working group targets, among others,
ROSMIC's science question:

**How does the coupling take place
within
the terrestrial atmosphere?**

ROSMIC-CD: Waves

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□ **Internal waves**

- Primary mechanism for momentum and mechanical energy transfer in the neutral atmosphere from the ground to the thermosphere.
- Gravity waves, tides and planetary waves
- A variety of wave sources
- Propagation is affected by the background temperature and wind fields and in turn they interact with and significantly modify the background fields from the lower atmosphere to the upper thermosphere.

ROSMIC-CD: Electrodynamics

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- **Ionospheric electrodynamic**
 - ▣ Constraints by Earth's magnetic field
 - ▣ Also controlled by forcing from below.
 - ▣ The typical neutral wind patterns together with increasing conductivity during daytime drive the E-region dynamos and determine strength and location of ionospheric currents, e.g., the middle-latitude Sq currents and the equatorial electrojet.
 - ▣ In turn, these currents provide a valuable observational tool for global wave patterns and their variations.

ROSMIC-CD: Variability

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□ Variability

- There is also some evidence of downward propagation of breaking regions (similar to the QBO mechanism).
- May provide information on the characteristics and climatology of these wave fields and their role in various regions of the atmosphere. These results support the robust identification of the effects of solar variability and anthropogenic influences and provide physical insights into the dynamical mechanisms affecting large scale structures and transport.

ROSMIC-CD: Key Science Questions

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- What are the influences of lower atmospheric waves on the state and evolution of the thermosphere/ionosphere?

Wave coupling

- How atmospheric dynamics constrain electro-dynamics in the ionosphere?

Electrodynamic coupling

- How can we characterize significance of small scale structures for the large-scale features in the upper atmosphere?

Small scale dynamics

ROSMIC-CD Business Meetings

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- March 12, 2015
@Faculty of Science, Kyushu University
- June 23, 2015
@Prague Congress Centre
- Next meeting to be scheduled.

Activities

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- Intensive data analysis for specific periods/events
 - ▣ Solar Proton Events
 - ▣ GW Propagation into the Thermosphere
 - ▣ Lunar tides in ionospheric currents
- Inter-model comparisons
- Model observation comparisons
- Summer school

Where to meet?

- Holding sessions/meetings in bigger conferences
 - ▣ COSPAR 2016, Istanbul
 - C2.2 Wave Coupling Processes and Consequences in the whole Atmosphere
 - ▣ ROSMIC workshop in August 2016?