Seasonal energy transport and imbalance in the Martian climate system

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The energy budget of a planetary atmosphere is essential to understanding the climate and energy distribution throughout the surface and atmosphere of the planet. Observations from satellites and telescopes provide the most accurate way of measuring the current weather and climate but are limited by orbital patterns and other operational limits.

High-resolution climate models make it possible to observe the whole climate system in a consistent manner and examine the contribution of different parts of the climate. Climate models can also be used to study rare events like global dust storms that happen once each decade on Mars.

As the USRA researcher, you will use a Mars climate model to simulate the present-day Martian climate system over multiple years. You will use the generated datasets to quantify the contributions of the Sun and internal heat sources to the total energy in the Martian climate system, and further evaluate the distribution of energy contained in potential and kinetic energy reservoirs and the energy transported and stored in the dust and water ice processes.

Experience using Python for data analysis is essential. Familiarity with, or interest in, climate or planetary atmospheres will be helpful to the successful completion of the project.

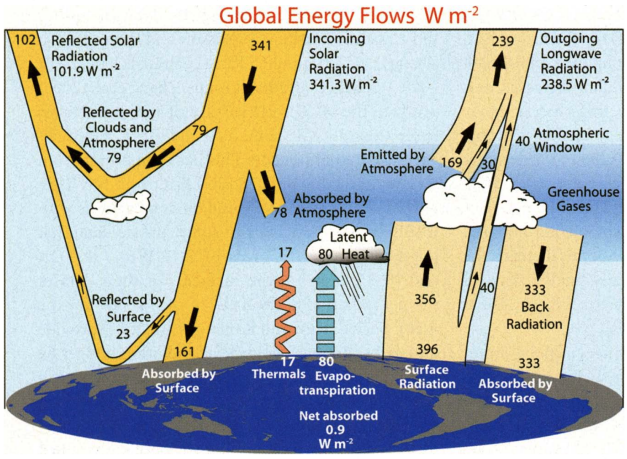

Figure 1: *Global Energy flows diagram for Earth Trenberth, Fasullo, and Kiehl, 2009.*

For more information, please feel free to contact me by email: `clee@atmosp.physics.utoronto.ca`

References

Trenberth, Kevin E., John T. Fasullo, and Jeffrey Kiehl (Mar. 2009). "Earth's Global Energy Budget". In: *Bulletin of the American Meteorological Society* 90.3, pp. 311–324. ISSN: 0003-0007, 1520-0477. DOI: 10.1175/2008BAMS2634.1. (Visited on 11/24/2022).