



Ping Zhu

The Earth's Energy Imbalance and its importance to study climate change

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The solar forcing is the primary driver of the Earth's climate. For a balanced climate system, the incoming solar radiation is required to equal to the sum of the reflected visible and the reemitted thermal radiation at-top-of-the-atmosphere (TOA). The Earth's Energy Imbalance (EEI) is the difference between the absorbed solar radiation (the incoming solar minus the reflected solar radiation) and the reemitted thermal infrared radiation. However, the absolute level of the TOA EEI is fixed at the range of $[0.5-1.0] \text{ Wm}^{-2}$ based on the ocean heat content measurements. Considering the atmosphere has a negligible effect on the EEI determination, the surface global EEI is consistent with the values determined from space. How is the EEI linked to the climate change? Why is it a critical indicator of the health of climate? In addition to studying the absolute level of the global EEI, we show that the interannual variation of global net radiation flux, which can be independently derived from the PICARD-BOS experiment, the result is comparable with the NASA-CERES system. In this presentation, we will briefly recall the past and current space missions targeted to track the EEI from TOA and discuss lessons learned from them.

SHORT BIO:

Ping Zhu, he studies the various geophysical phenomena and mainly focuses on solar, terrestrial, and planetary radiation measurement from space. He is nominated as a 100 talent professor of Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Science and a senior scientist at Royal Observatory of Belgium. He was the Co-PI of PICARD-BOS experiment, a French-Swiss-Belgian space mission and the PI of TARO a joint Chinese and Belgian space experiment.