ATS/CIRA Colloquium

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What the Earth's energy budget tells us about committed warming: Are we already committed to more than 2 deg C?

Hosted by Maria Rugenstein

3 p.m. Thursday, Oct. 22
via Microsoft Teams

Our planet's energy balance is sensitive to spatial inhomogeneities in sea surface temperature (SST) and sea-ice changes, but this is typically ignored in climate projections. Here we show the energy budget during recent decades can be closed by combining changes in effective radiative forcing, linear radiative damping, and this pattern effect. The pattern effect acts like a negative forcing, so it is cooling the climate relative to a planet with the equilibrium pattern of warming. After the pattern effect is accounted for, the best estimate value of committed global warming at present-day forcing rises from 1.31 K (0.99-2.33, 5th-95th percentile) to over 2 K, and committed warming in 2100 with constant long-lived forcing increases from 1.32 K (0.94-2.03 K) to over 1.5 K, though the magnitude is sensitive to SST dataset. In other words, we have likely already dumped enough carbon into the atmosphere for us to exceed the Paris Agreement goal of stabilizing temperatures well below 2 K.

Colloquia page: atmos.colostate.edu/colloquia