

## **Response of 0-D EBM with finite heat capacity to sudden increase in total solar output (a.k.a. solar “constant”):**

- Long-term: Proportional to climate sensitivity; independent of heat capacity
- Adjustment time: Proportional to climate sensitivity *and* heat capacity
- Short-term: Inversely proportional to heat capacity, independent of climate sensitivity; one cannot infer climate sensitivity from “observed” short-term behaviour

## **Coin tossing (“Peter & Paul”):**

- Representative of stochastic climate models
- Expectation value of Paul’s net earnings zero, at any time
- Expectation value of deviation of Paul’s earnings from break-even point (irrespective of sign!) grows linearly with time
- Power spectral density decays as  $\omega^{-2}$ ; increases toward low frequencies (bounded if damping is present)
- Climate excursion might be response to accumulating random perturbations; appropriate **“null hypothesis”**
- Does not imply that response to random forcing is trivial