The primacy of observations in climate prediction

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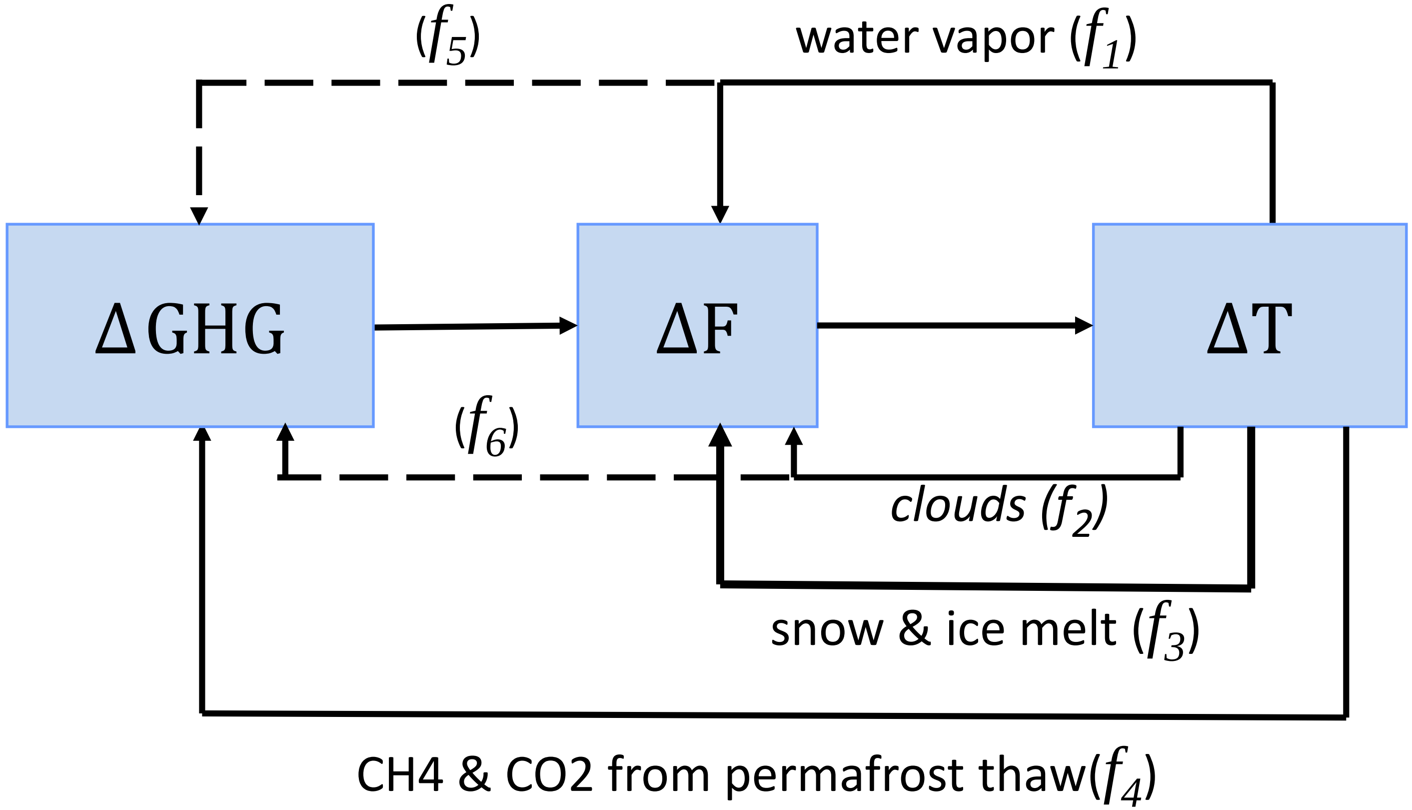
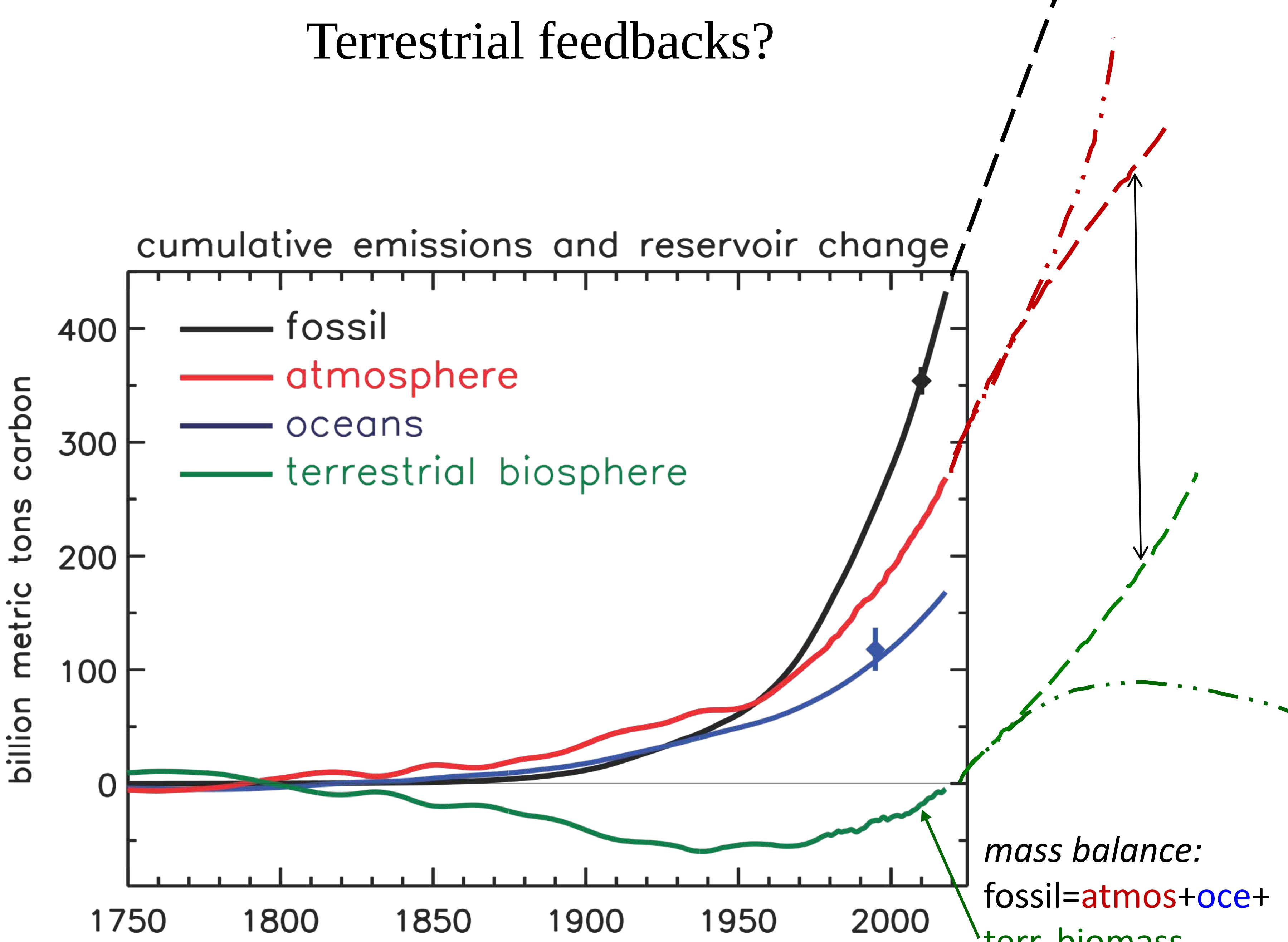
Feedback



$$\Delta T = \Delta F + \Delta F \bullet f_1 + \Delta F \bullet f_1^2 + \Delta F \bullet f_1^3 + \cdots\cdots = \frac{\boldsymbol{\Delta F}}{\mathbf{1 - g}(f_1, f_2, f_3, \cdots)}$$

Terrestrial feedbacks?



mass balance:
fossil=atmos+oce+
terr. biomass

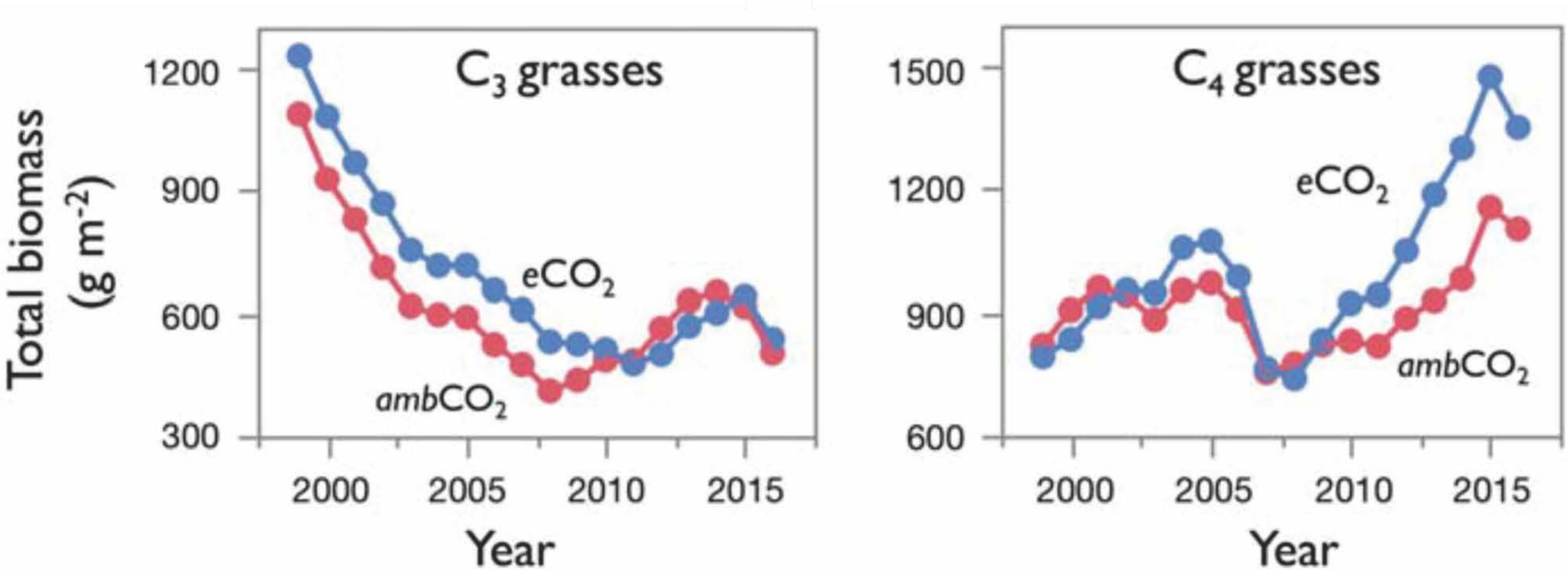
P. Tans, Oceanography 22 (4), 26-35, 2009

Cox et al, Theor. Appl. Climatology, 2004

Don’t assume that a fast response will apply long-term

Unexpected reversal of C_3 versus C_4 grass response to elevated CO_2 during a 20-year field experiment (SCIENCE 20 APRIL 2018 • VOL 360, 317-320)

Peter B. Reich, Sarah E. Hobbie, Tali D. Lee, Melissa A. Pastore



NOAA mission: 1. To understand and predict changes in climate, weather, oceans, and coasts.

Weather is about large short-term variability. A few days later we have observed to what extent the prediction was correct.

In the case of climate, we cannot trust long-term predictions until we have the observations needed to enable understanding.

High quality observations, maintained over many decades, are needed. Very small trends, underlying year-to-year variations, have to be reliably quantified.

NOAA will best improve climate predictions by funding climate-quality observations instead of funding more predictions

Climate-quality observations:
calibrated data from the marine boundary layer