

Section 19: Carbon cycle

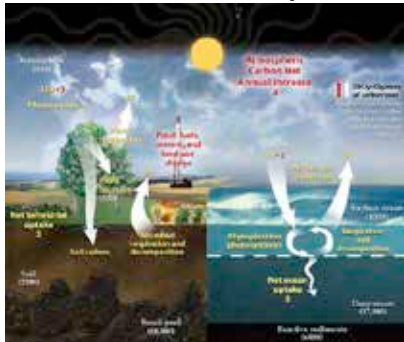
Reading: Chapter 19

Learning outcomes

- explain the major stocks and fluxes of the global carbon cycle
- understand important influences of ecosystems on the global carbon cycle
- describe the human perturbations to the carbon cycle and where the emitted carbon is going
- understand the global and US carbon budgets with respect to ecosystem participation

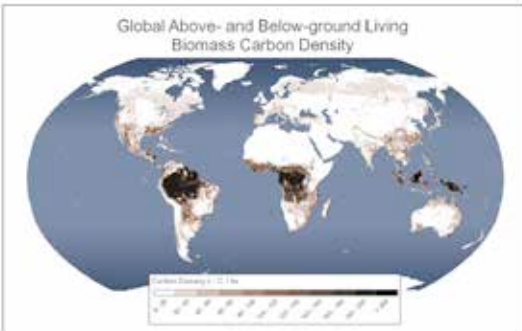
Global carbon cycle

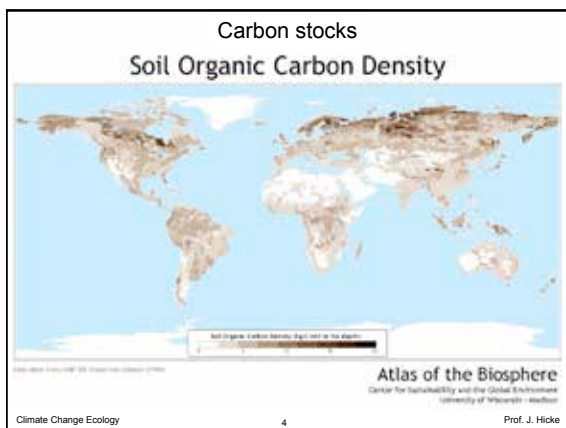
(stocks)
natural
fluxes
human
activities

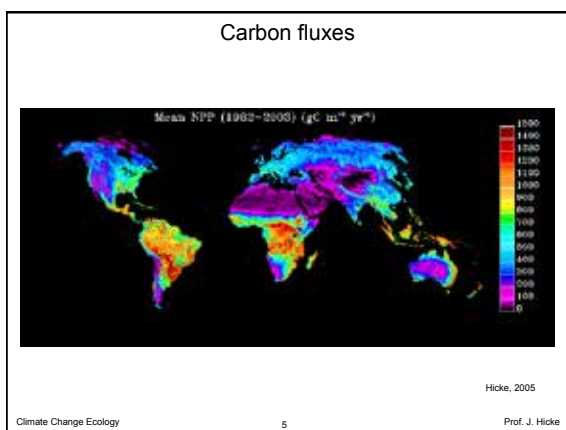


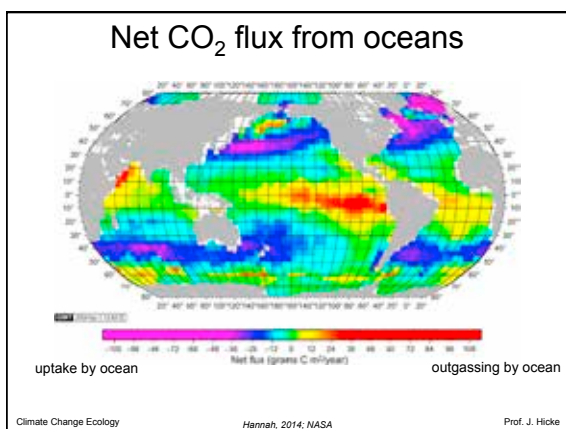
Carbon stocks

Global Above- and Below-ground Living Biomass Carbon Density

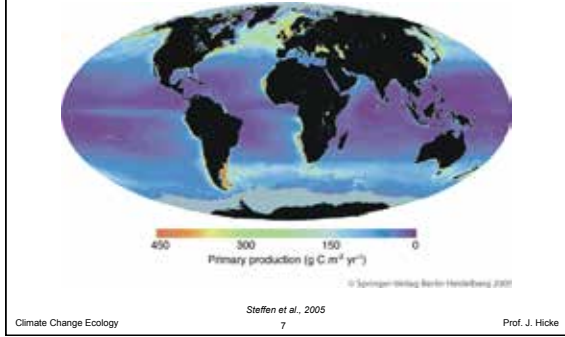




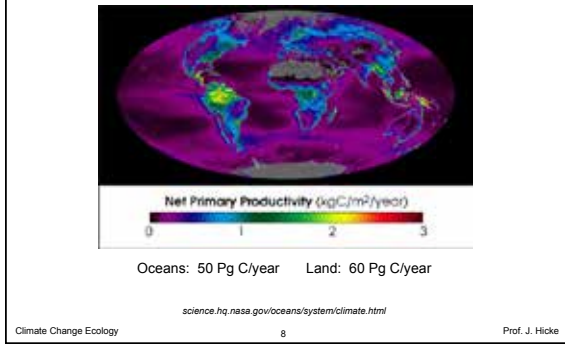




One component of ocean C cycle: biological productivity

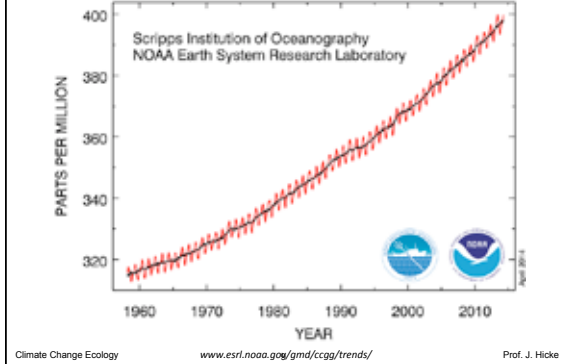


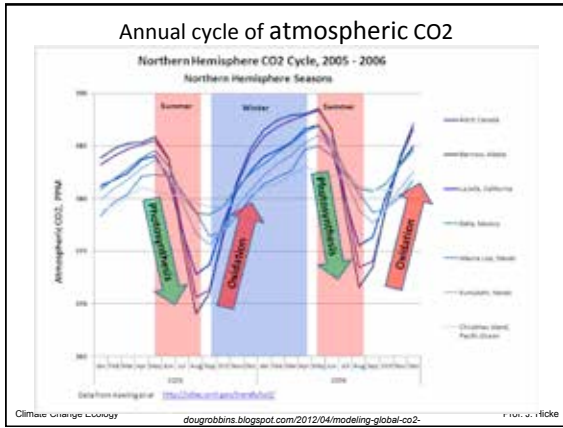
NPP over Oceans and Land

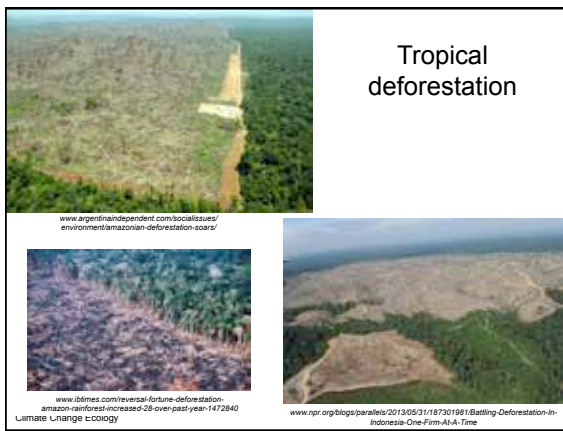


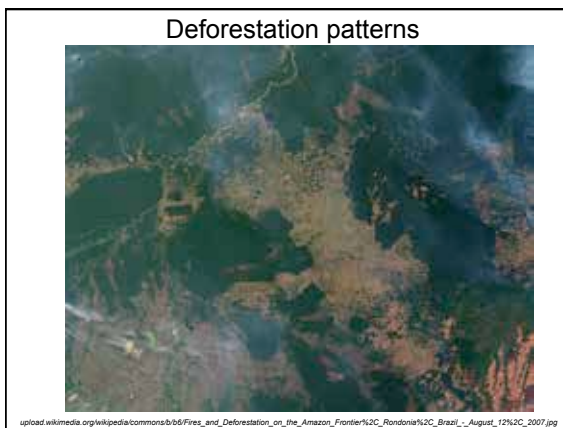
Oceans: 50 Pg C/year Land: 60 Pg C/year

Atmospheric CO₂ at Mauna Loa Observatory









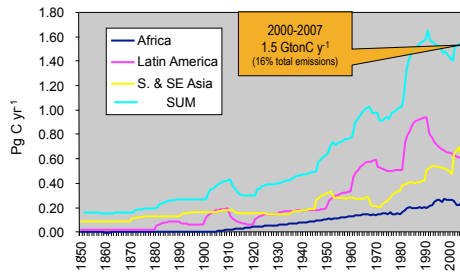
Arc of deforestation (red) in Amazon



http://wwf.panda.org/what_we_do/where_we_work/amazon/problems/

Historical Emissions from Land Use Change

Carbon Emissions from Tropical Deforestation



R.A Houghton, unpublished

Disturbance effects on C cycle: Fires

Global C emissions from fires

Human and climate (change?) influences?

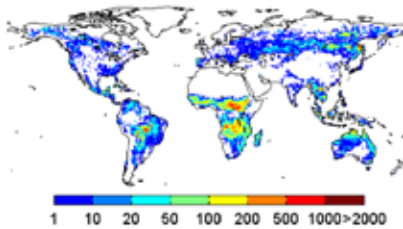


Fig. 6. Mean annual fire emissions ($\text{g C m}^{-2} \text{ year}^{-1}$) averaged over 1997–2004. van der Werf et al., 2006

