

## Phytoplankton Diameter: < 1 mm to over 100 mm</li> • Concentration: 1000's to 1.000.000 per milliliter - If you filled a Coke can with seawater sampled from a thick phytoplankton bloom, the can would contain about 100 million cells! Global Biomass: < 1% of the plant biomass</li> on earth - BUT responsible for nearly half the net photosynthesis of the biosphere! - What does this imply for turnover time?





- nutrients and light Loss of nutrients from light by sinking must
- equal delivery of nutrients by upwelling

- 'Primary production" generates communities of phytoplankton from DIC and nutrients in the presence of light
- Zooplankton "graze" on phytoplankton
- Bacterial decomposition and heterotrophic respiration recycle DIC and nutrients to the water column
- Detrital particles from dead phytoplankton and zooplankton waste coagulate into progressively larger particles
- Larger particles sink faster than turbulence can resuspend them. so fall below euphotic zone









## ATS 760: Global Carbon Cycle































































## Sea-Surface Temperature



- Note baroclinic eddies and "rings" in Gulf Stream
- Slow currents, small Rossby radius
- Much of the meridional heat transport in the oceans is accomplished by these motions
- Effects on vertical motion and biology?











- Little difference in subtropics (weak △pCO<sub>2</sub>)
- More in tropics (lots of △pCO<sub>2</sub>, weak winds)
- Most differences in higher latitudes (big  $\Delta pCO_2$ , high winds)









