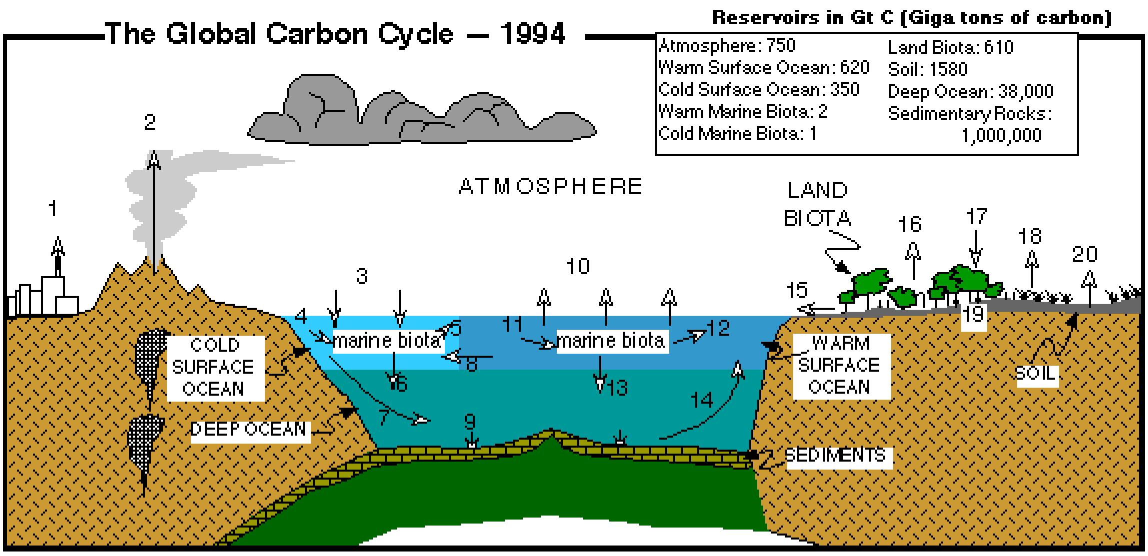

Key to Flows:

1) Fossil Fuel Burning — 5 Gt C/yr
2) Volcanic Emissions — 0.6 Gt C/yr
3) Uptake of CO_2 by cold surface waters of the oceans — 90 GtC/yr
4) Photosynthesis of marine biota in cold surface waters — 8 GtC/yr
5) Respiration of living marine biota and rapid recycling of dead biota in cold surface waters — 14 GtC/yr
6) Sinking of dead marine biota (both organic and inorganic carbon) from cold water into deep water — 4 GtC/yr
7) Downwelling of cold surface water (mainly near the poles) — 96.2 GtC/yr
8) Advection (horizontal transfer) from warm to cold surface water — 10 Gt C/yr
9) Sedimentation on sea floor (both organic and inorganic carbon) stores carbon in sedimentary rocks — 0.6Gt C/yr
10) Release of CO_2 by warm surface waters of the oceans — 90 GtC/yr
11) Photosynthesis of marine biota in warm surface waters — 32 GtC/yr
12) Respiration of living marine biota and rapid recycling of dead biota in warm surface waters — 26 GtC/yr
13) Sinking of dead marine biota (both organic and inorganic carbon) from warm water into deep water — 6 GtC/yr
14) Upwelling of deep water (at equator and along edges of continents) — 105.6 GtC/yr
15) River runoff transfers carbon from the land to the sea — 0.6 Gt C/yr (2/3 to warm ocean, 1/3 cold)
16) Deforestation and land clearing releases CO_2 into the atmosphere — 1.5 Gt C/yr
17) Photosynthesis of land biota — 110 Gt C/yr
18) Respiration of land biota — 50 Gt C/yr
19) Litter fall and below-ground loss from plant roots transfers carbon to the soil — 60 Gt C/yr
20) Respiration of micoorganisms in the soil releases CO_2 into the atmosphere — 59.4 Gt C/yr

Figure 7.00. The global carbon cycle, as best estimated, in 1994. Data slightly modified from Siegenthaler and Sarmiento, 1995; Kwon and Schnoor, 1995.

Regard position 1. of flows: These 5 GtCtyr are in accordance in IPCC-graph Global Sources

The global carbon cycle is currently the topic of great interest because of its importance in the global climate system and also because human activities are altering the carbon cycle to a significant degree. The potential effects of human activities on the carbon cycle, and the implications for climate change were first noticed and studied by the Swedish chemist, S. Arrhenius, in 1896. He realized that CO_2 in the atmosphere was an important greenhouse gas and that it was a by-product of burning fossil fuels (coal, gas, oil). He even calculated that a doubling of CO_2 in the atmosphere would lead to a temperature rise of 4-5°C -- amazingly close to the current estimates obtained with global, 3-D climate models that run on supercomputers. This early recognition of human perturbations to the carbon cycle and the climatic implications did not raise many eyebrows at the time, but the experiment was just beginning then.

Source: http://www.geosc.psu.edu/~dmb53/DaveSTELLA/Carbon/carbon_intro.htm

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