Lesson 2: Water Cycle

Definition

Water Cycle (Hydrologic Cycle) [From Chow et al. 1988]

Water changes states and is transported within a closed system (the earth and its atmosphere). Energy to keep this cycle going is provided by the sun.

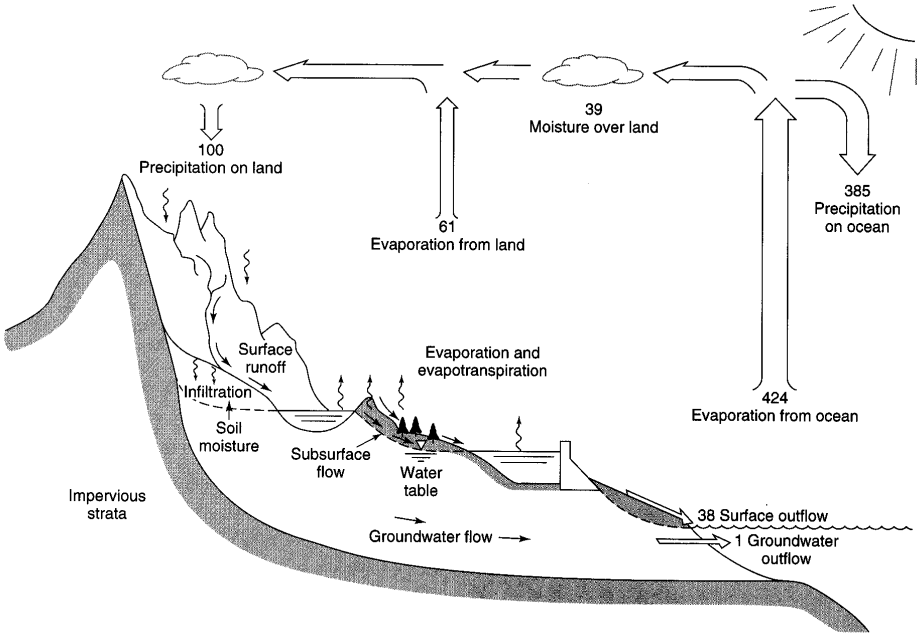

Figure 7.1.1 Hydrologic cycle with global annual average water balance given in units relative to a value of 100 for the rate of precipitation on land (from Chow et al. (1988)).

Global Water Storages [From Dingman 2008]

TABLE 3-1
Stocks in the Global Hydrologic Cycle.[a]

Form of Water	Area Covered (km^2)	Volume (km^3)	Share of World Reserves (%) Of Total Water Reserves	Share of World Reserves (%) Of Fresh-Water Reserves
World oceans	361,300,000	1,338,000,000	96.5	—
Ground waters	134,800,000	23,400,000	1.7	—
Fresh ground water		10,530,000	0.76	30.1
Soil moisture	82,000,000	16,500	0.001	0.05
Glaciers and permanent snowpack:	16,227,500	24,064,100	1.74	68.7
Antarctica	13,980,000	21,600,000	1.56	61.7
Greenland	1,802,400	2,340,000	0.17	6.68
Arctic islands	226,100	83,500	0.006	0.24
Mountain areas	224,000	40,600	0.003	0.12
Ground ice in zone of permafrost strata	21,000,000	300,000	0.022	0.86
Water reserves in lakes:	2,058,700	176,400	0.013	—
Fresh-water lakes	1,236,400	91,000	0.007	0.26
Saltwater lakes	822,300	85,400	0.006	—
Marsh water	2,682,600	11,470	0.0008	0.03
Water in rivers	148,800,000	2,120	0.0002	0.006
Biologic water	510,000,000	1,120	0.0001	0.003
Atmospheric water	510,000,000	12,900	0.001	0.04
Total water reserves	510,000,000	1,385,984,610	100	—
Fresh water	148,800,000	35,029,210	2.53	100

[a]Illustrated in Figure 3-16, page 54.
Data from Shiklomanov and Sokolov (1983).

Lesson 2: Water Cycle

Global Water Fluxes (and Storage) *[From Dingman 2008]*

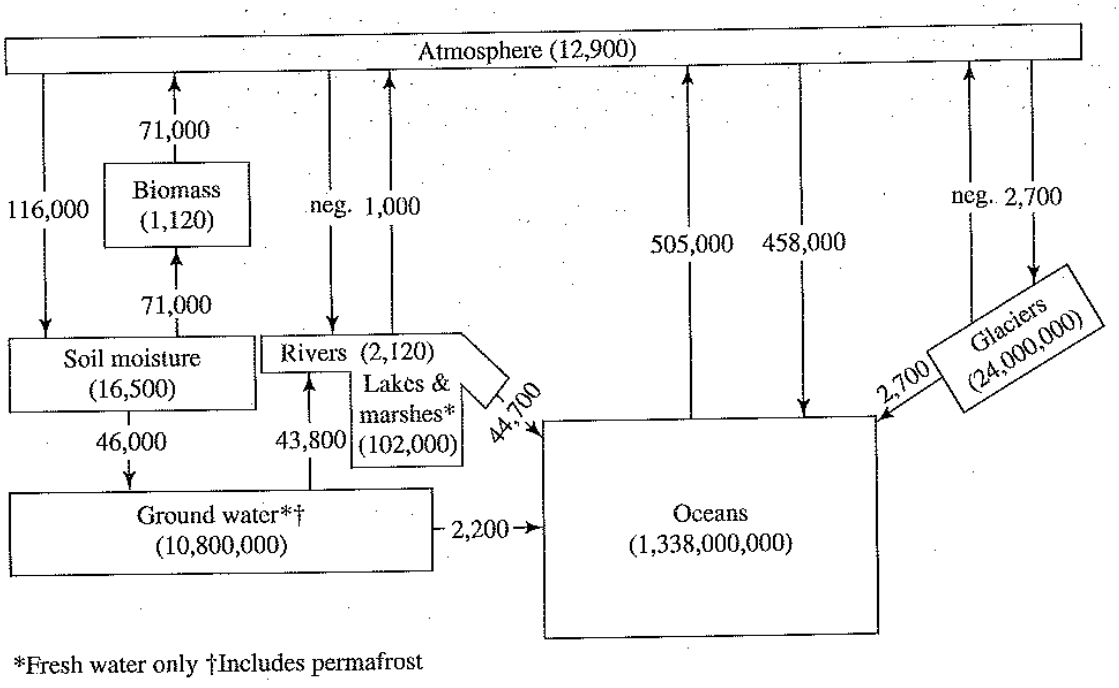

FIGURE 3-16
Schematic diagram of stocks and annual fluxes in the global hydrologic cycle. Based on data of Shiklomanov and Sokolov (1983) (Table 3-1). Inflows and outflows may not balance for all compartments due to rounding.