



Figure 11.1. The global carbon cycle. Values in brackets are preanthropogenic reservoir sizes in Pg (10^{15} g); values on the arrows are fluxes in Pg y^{-1} . Dashed lines represent the long-term carbon cycle determined by weathering. Values are normalized to the flux of DIC from rivers (see Chapter 2). Solid arrows are the shorter-term carbon fluxes associated with photosynthesis and respiration. The wiggly vertical line indicates particulate C and DOC transport from the ocean euphotic zone to deep water. Symbols: W, weathering of carbonates ($\text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow 2\text{HCO}_3^- + \text{Ca}^{2+}$) and silicates (silicate + $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{clay} + \text{HCO}_3^- + \text{cations}$); GE, gas exchange; P, gross photosynthesis ($\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{CH}_2\text{O (OM)} + \text{O}_2$); R, respiration ($\text{CH}_2\text{O (OM)} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$); PPT, calcite precipitation (the reverse of carbonate weathering); H, hydrothermal processes; RW, reverse weathering (the reverse of silicate weathering).