Box GI.3. The oceanic carbon pump.

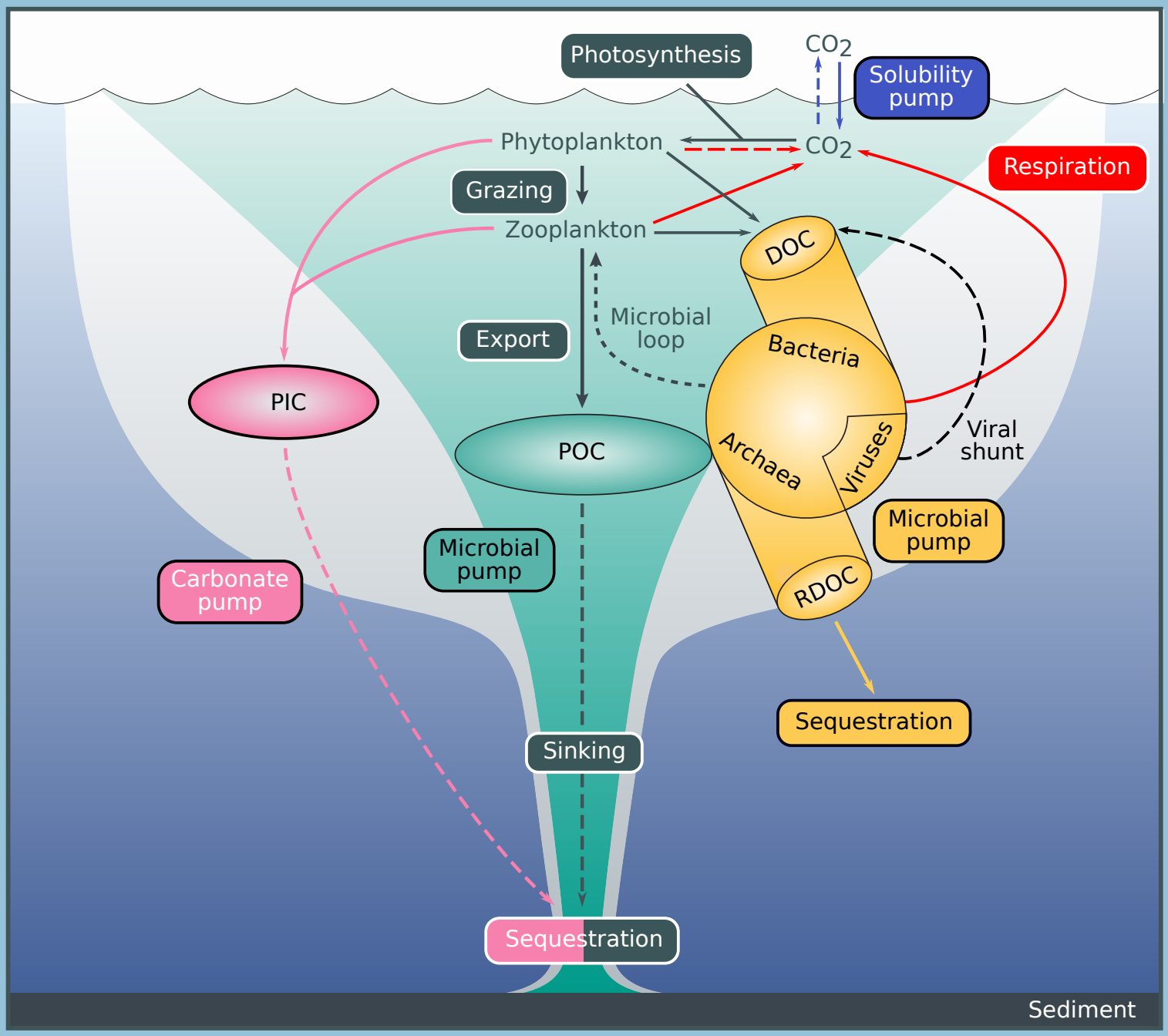

Figure GI.8. Processes that drive carbon sequestration in the ocean.

The ocean contains ~ 38,000 PgC (1 PgC = 10^{15} grams of carbon) (Baltar *et al.*, 2021a): it is the biggest pool of carbon in the fluid layers of the outer Earth. Most of the oceanic carbon is present as Dissolved Inorganic Carbon (DIC, 37,100 PgC), and a minority is present as Dissolved Organic Carbon (DOC, 662 PgC) and Particulate Organic Carbon (POC, 18 PgC, mainly in living biota) (Baltar *et al.*, 2021a). The difference between the dissolved and particulate fractions is operational and relies on the ability to pass through a filter of a given pore size (usually in the range 0.1-0.8 µm (Benner and Amon, 2015).

Four processes drive the sequestration of carbon from the ocean: the **solubility pump**, the **biological pump**, the **carbonate pump** and the **microbial pump** (Siegenthaler and Sarmiento, 1993, Ducklow *et al.*, 2001, Jiao *et al.*, 2010, Herndl and Reinthaler, 2013) (Figure GI.8). The last three mechanisms are driven by microorganisms.