

Global Significance

It has been known for a long time that diatoms are abundant in aquatic habitats, forming an essential part of many food chains. However, it was not until the 1990s that their huge contribution to the global carbon economy began to be fully appreciated. A back-of-the-envelope calculation (Mann 1999) goes like this:

- total net primary production for the globe is ~ 105 Pg carbon per year (Field et al. 1998)
- of this, about 46% occurs in the oceans and 54% on land (Field et al. 1998)
- of the oceanic component, about one-quarter (11 Pg) takes place in oligotrophic (nutrient-poor) regions, one-quarter (9.1 Pg) in eutrophic (nutrient-rich) regions, and half (27.4 Pg) in the remaining mesotrophic regions (Mesotrophic means a lake or pond that has a moderate amount of plants.) (Field et al. 1998)
- Diatoms account for no more than 25-30% of primary production in nutrient-poor waters, but perhaps 75% in nutrient-rich regions (Nelson et al. 1995); so, assume an intermediate value of 50% for mesotrophic waters the total contribution made by diatoms is then $\{ (11 \times 0.25) + (27.4 \times 0.5) + (9.1 \times 0.75) \} = 23.275$ Pg carbon per year, which is ~ 23.5% of the global total

It's probably an overestimate, but the importance of diatoms is evident nonetheless. For comparison, all the world's tropical rainforests fix 17.8 Pg, all the savannas 16.8 Pg, and all the world's cultivated area another 8 Pg. The fate of the carbon that diatoms fix is now a crucial issue in climate-change research.

Another way to appreciate diatoms is to realize that they give us every fifth breath, by the oxygen they liberate during photosynthesis.