

excellent od Heijden

Q5. This question relates to Fig.1.

- The dashed line in Fig.1 does not indicate actual measured data; why not
- Indicate in this figure what profiles you expect for a station in the North Pacific having a water column of 6 km; explain briefly
- If at the site of Fig.1 Fe-fertilization would be used to increase surface water productivity, what would you expect to happen with the $\delta^{13}\text{C}$ of dissolved carbonate in the surface and in the deep water ?

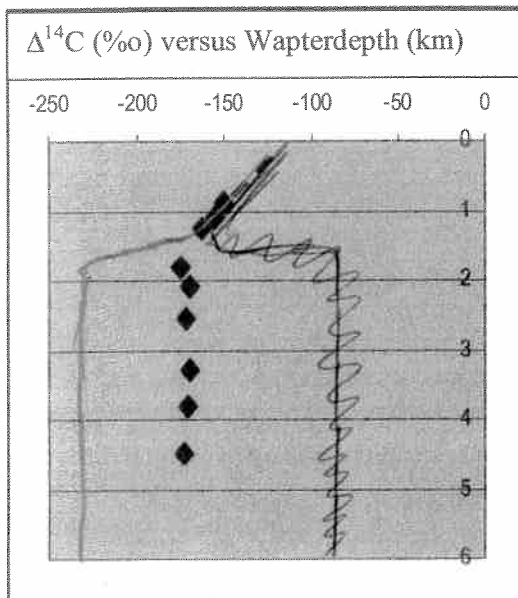


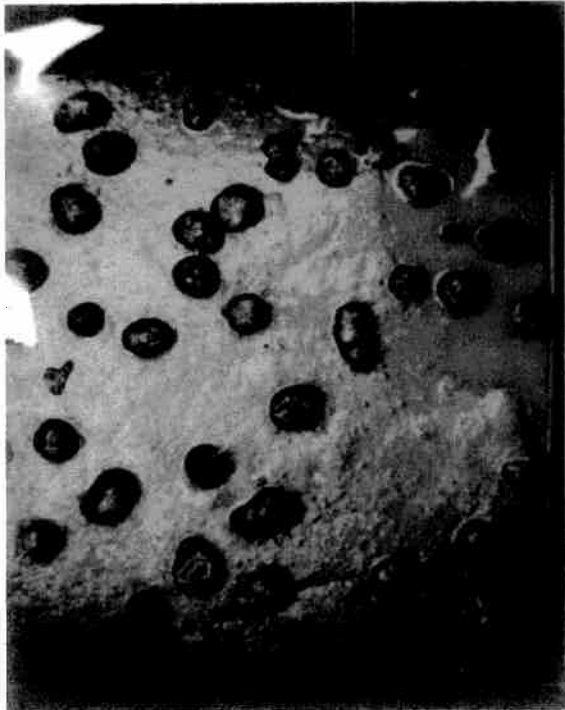
Fig. 1. $\Delta^{14}\text{C}$ (‰) versus waterdepth (km) for a station in the Antarctic Ocean (58°S -66°W) sampled in 1978.

{20 pt}

Q6. ↓

- What are the three most important biogenic components that form in the surface waters of the ocean
- Indicate and explain the most important differences between one of these three, opal, and the other two (mention one or more of the following words if applicable: primary production, alkalinity, acidity, degradation/dissolution occurring ... (where/when)..., deep water, distinct areas of production, exposure time to ..., distinct areas of preservation, global similar production rate,
- Give in your own words a definition/description for export productivity
- Give estimated global average ratios for the three biogenic components export productivities

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- Q6. ¹¹a. what is the average accumulation rate of these Manganese nodules that have a diameter of 3 cm
- b. if the sedimentation rate of the sediments at the same site is 1.2 cm/ka, then calculate the total thickness of sediment accumulated in the same period as the manganese nodules
- c. how would you determine the sedimentation rate for the topmost 50 cm of sediment ?
- d. how would you determine the sedimentation rate for the topmost 50 cm of sediment if this is carbonate-free ?

{12 pt}

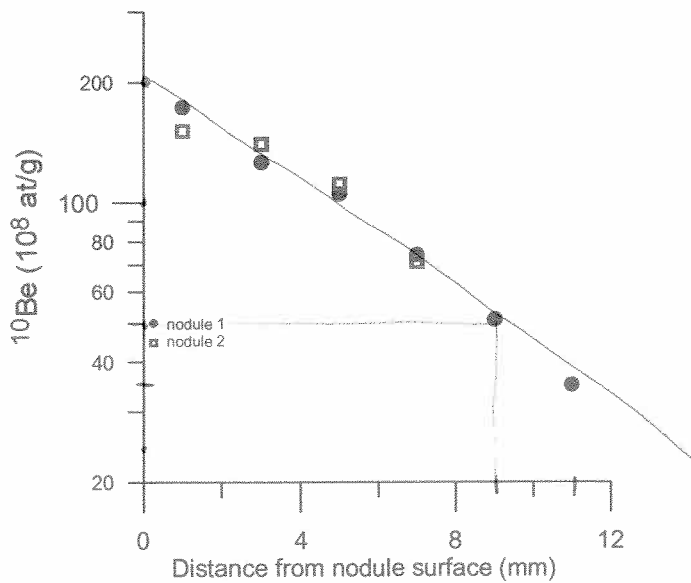


Fig.2. Madeira Abyssal Plain Manganese nodules (after Ebbing e.a., 1991); $T_{1/2} (^{10}\text{Be}) = 1.52 \text{ Ma}$

$$\frac{10^3 \text{ mm}}{\text{Ma}} = \frac{10^{-2} \text{ cm}}{10^3 \text{ ka}}$$

10^3