

## **Hertentamen Marine Sciences II (2014)**

**Dinsdag 23 decemebr 2014,  
BBG083 - 13.15-17.00 uur**

**NB: schrijf Uw naam en studentnummer op ieder in te  
leveren blad!**

**Answers can be in English or Dutch**

**Please, write with a readable handwriting**

**Veel succes! Good Luck!**

**FRANCESCA SANGIORGI**

***Naam:***

***Studentnummer:***

**Naam:**

**Studentnummer:**

**Questions Francesca Sangiorgi (intro, geomorphology, primary productivity and decomposition, estuaries, disturbance and conservation)**

- 1) A) Based on topography, estuaries can be divided in 4 major types: can you name 2 and describe in few words their main topographic features?

**Estuary type 1:**

**Estuary type 2:**

**B) How would you define an estuary from its water properties point of view? And why are bottom sediments in estuaries frequently anoxic?**

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C) Why are many estuaries and their organisms relatively “young” in geological terms?

2) Diatoms are frequently the dominant primary producers also in Dutch waters. They may generate one or two blooms per year. In what season(s)? And why?

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3) Primary productivity in estuaries and coastal zones is usually not dominated by phytoplankton.

a) What are the (other) important primary producers in coastal areas? Name them.

b) Primary productivity can be important in estuaries, but there is another source of energy for food webs in estuaries, which is generally very important: what is it?

a)

b)

4) Sea-level rise affects and will affect the coastal areas of the entire world. Why are some areas more vulnerable than other? Name 2 factors, which can synergistically operate with sea-level rise to increase the vulnerability of coastal zones (so EXCLUDING eustatic and local sea level).

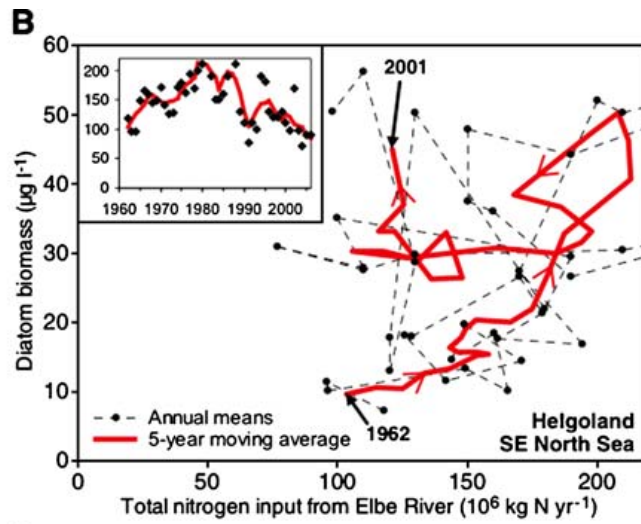
**FACTOR 1**

**FACTOR 2**

**Naam:**

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5) Describe this graph briefly and explain what important concept of ecosystem disturbance it represents.

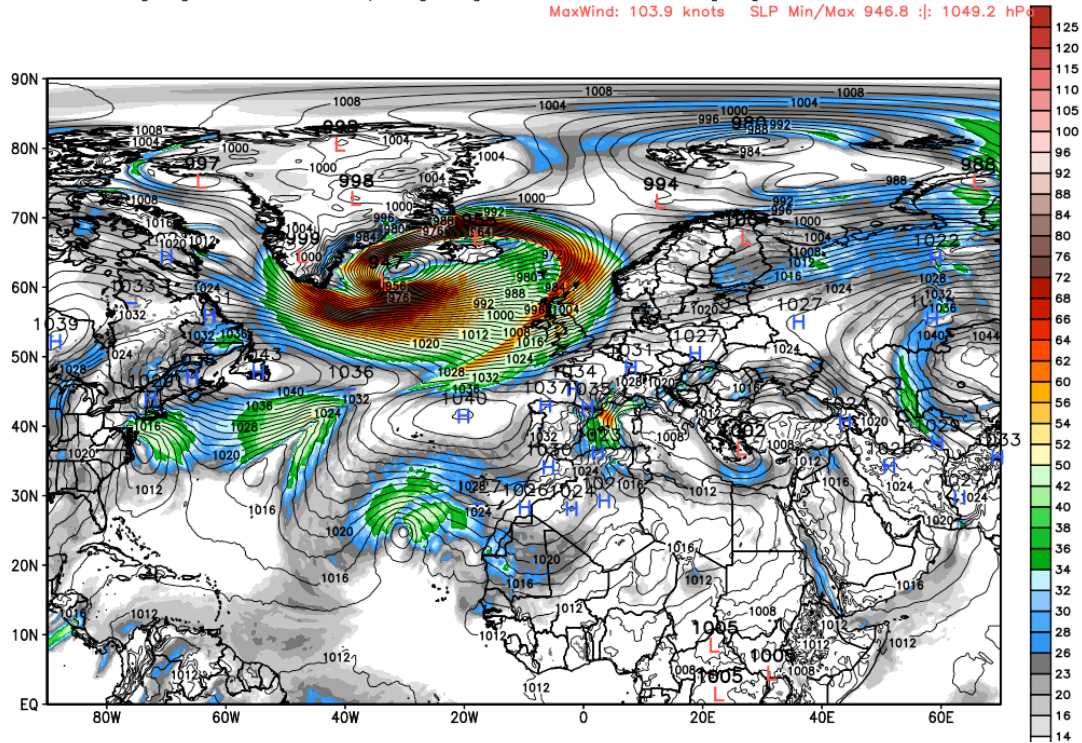


**Naam:**

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**Questions Bas van de Schootbrugge (plate tectonics, waves, tides, rocky shores)**

ECMWF MSLP [hPa] & 900 hPa Wind Speed [knots] INIT: 12Z07DEC2014 fx: [048] hr --> Tue 12Z09DEC2014  
MaxWind: 103.9 knots SLP Min/Max : 1049.2 hPa



1. Op dit kaartje van 9 december 2014 staan isobaren aangegeven (lijnen van gelijke luchtdruk). Langs de kusten van Ierland, Engeland and Schotland werden golven van meer dan 15 meter hoogte waargenomen. Verklaar welke 3 belangrijke factoren hiervoor verantwoordelijk zijn en wat hun samenhang is?

2A) Welke stressfactoren beïnvloeden organismen op rotskusten. Noem er tenminste 3?

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2B) Noem tenminste 2 aanpassingen aan het leven rotskust?



**Naam:**

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**Questions Sabine Gollner (sandy and muddy shores)**

1. What is the particle size of sand?

A: 0.004 mm to 1 mm

B: 0.063 mm to 2 mm

C: 0.5 mm to 3 mm

D: 1 mm to 4 mm

**Answer:**

2. In situ primary production is higher at....

A: sandy shores

B: mud flats

**Answer:**

3. Sediments can be oxidized but also reduced. Where do we find a thicker oxidized layer?

A: at sandy shores

B: at mud flats

**Answer:**

4. What is meiofauna? Name 2 usually abundant higher taxa of meiofauna.

**Answer:**

***Naam:***

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**Naam:**

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**Questions Appy Sluijs (isotope chemistry)**

1. Wat is isotopische fractionatie?

2. Geef

**a:** de reactievergelijking voor het produceren van calcium carbonaat door foraminiferen uitgaande van waterstofcarbonaat (bicarbonaat) als bron.

**b:** de formule voor de saturatie ( $\Omega$ ) van calcium carbonaat.

3. Leg uit waarom de saturatie ( $\Omega$ ) van calcium carbonaat in zeewater hoger/lager wordt door de uitstoot van  $\text{CO}_2$  door de huidige verbranding van fossiele brandstoffen.

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**4a.** Streep de foute, vetgedrukte cursieve woorden door:

“De diepe oceaan heeft een *hogere / lagere* concentratie opgelost inorganisch koolstof dan de oppervlakte oceaan. Verder is de  $\delta^{13}\text{C}$  van DIC in de diepe oceaan vergeleken met de oppervlakte oceaan *hoog / laag*.”

**4b.** Leg bovenstaande antwoorden uit. Leg vervolgens uit waarom de oppervlakteoceaan in opwellingsgebieden een hoge of lage concentratie DIC heeft en het DIC een hoge of lage  $\delta^{13}\text{C}$ .

**Naam:**

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**Questions Stefan Schouten (organic molecules, organic matter)**

1.a. Name two ways in which methane is generated in marine sediments.

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b. Methane is a gas and should bubble upwards but large quantities are still present on the ocean sediment floor. How is this possible?

c. What happens with methane in anoxic environments?

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2.a. To remediate increasing atmospheric CO<sub>2</sub> levels it has been suggested to add iron on a very large scale to the oceans. Why is this and why will it not work?

b. Name at least two factors, which could enhance organic carbon burial in the marine environment.

***Naam:***

***Studentnummer:***

**Tjeerd Bouma (spatial ecology, ecosystem engineering)**

1) What is a window of opportunity for establishment? Mention the three critical windows for mangrove establishment?

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***Studentnummer:***



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