# Ornithogenic tundra and soil respiration

## Written exam biology/ecology

Thick-billed murre, Lomvia
(Aurelia Lampasiak)

Fulmar, Fulmarus glacialis

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# Vegetation pattern of the arctic tundra

„Normal“ oligotrophic tundra

- sparse plant cover
- same climate
- nutrient-poor

Ornithogenic tundra

- dense and thick plant cover
- same climate
- nutrient-rich

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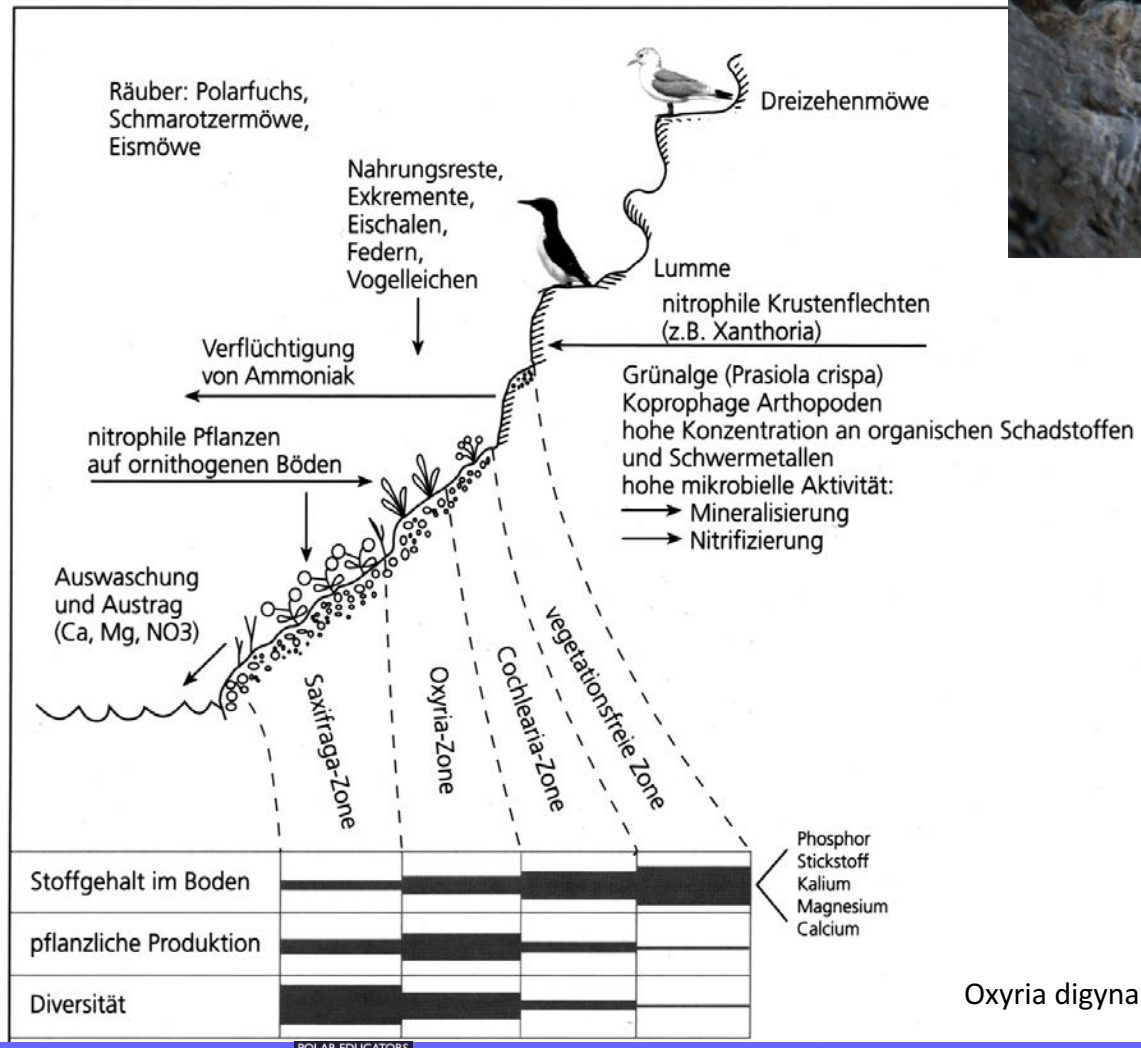
# Nutrien sources and relationship

Abb. 3

**Ökosystem Vogelfelsen**

Kittiwake, Rissa tridactyla

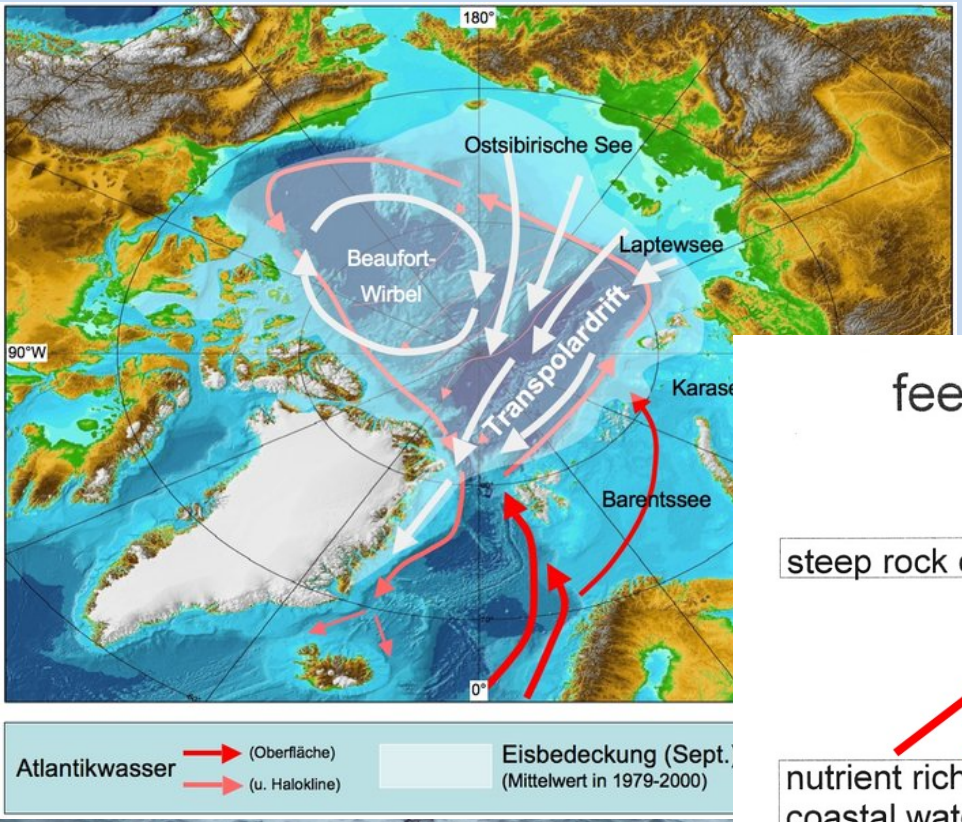


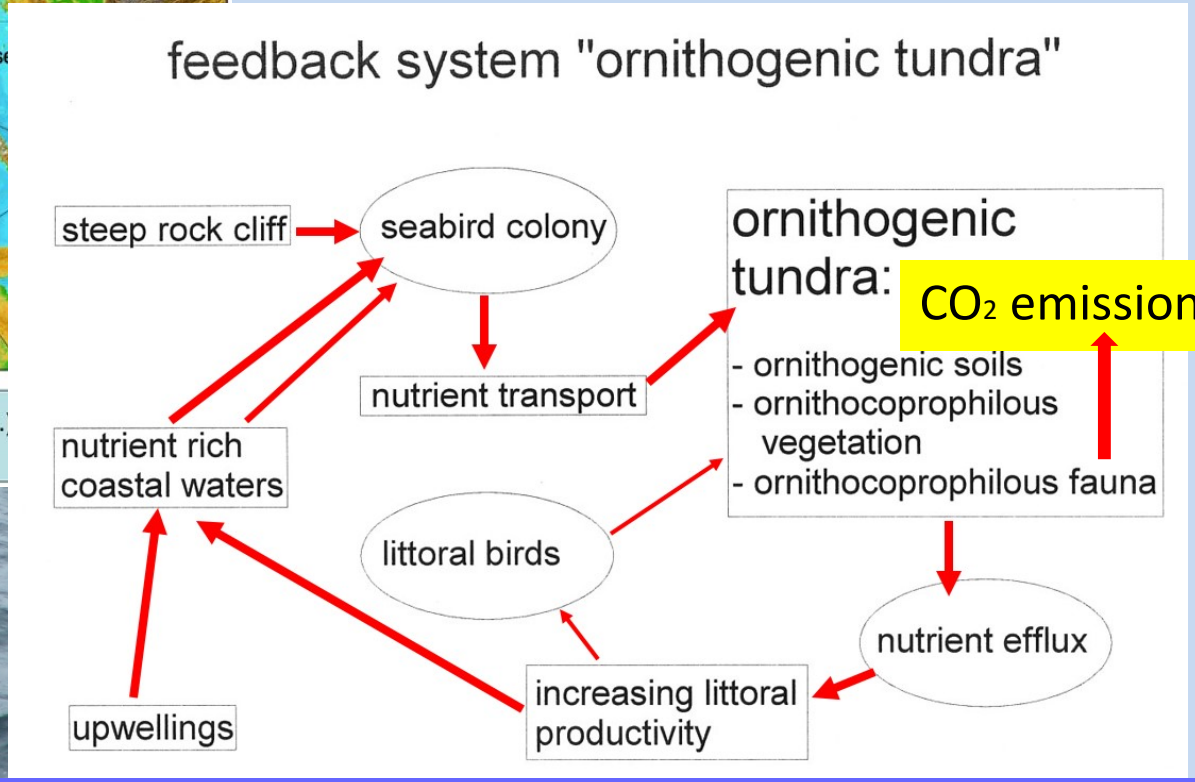

Oxyria digyna

# Nutrient sources and relationship

Mixing of different waters:

- cold, $O_2$-rich polar water
- warm, nutrient-rich Golf stream water
- high productive area
- fish-rich, food for seabirds
- nutrient transport sea – land
- eutrophication → ornithogenic tundra



**13. grade**
**Biology**
**Exam, 12.04.2017**

# Material transport in the arctic tundra

## Exercise 1: General geo-ecological situation

**1.1** Characterise the ecological situation of the High Arctic of Spitsbergen (Fig. 1).
Complete the empty rectangles in the figure: The broader the line the higher the value.

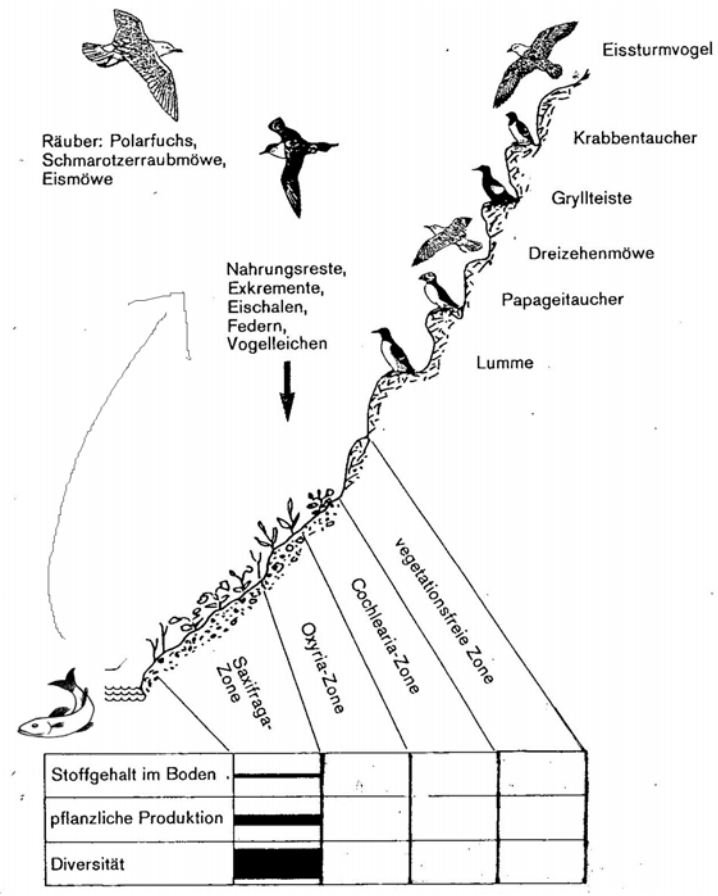



Fig. 1: Zones of an arctic bird cliff tundra

## Exercise 1: General geo-ecological situation

**1.2** Compare the special stuation presented in exercise 1.1 to the normal, oligotrophic tundra. Use also Fig. 2 to explain the reasons for the significant differences. Draw important informations into the map.

Fig. 2: Map of the North Polar Sea

## Exercise 2: Nutrients

**2.1** Constitute the different nutrient contents and respond to the different nutrient behavior (Fig. 3). Use the informations of exercise 1.1 and 1.2.

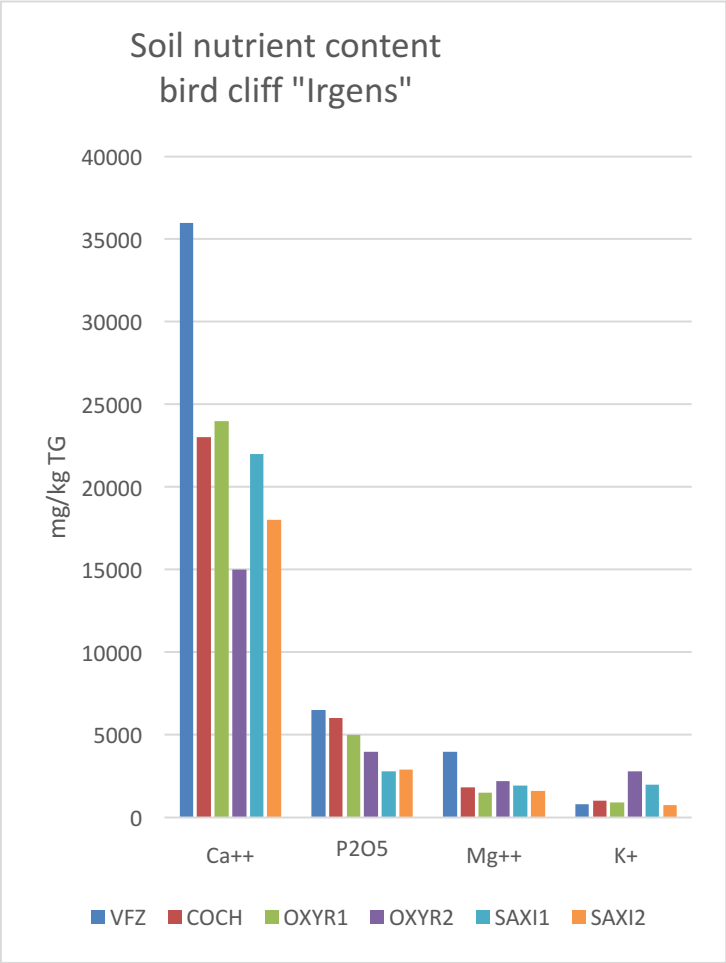



Fig. 3: Nutrient contents of the different zones of the bird cliff tundra

## Exercise 3: Soil respiration

**3.1** Fig. 4 shows soil respitration values of bird cliff „Irgens“. Explain the differences.

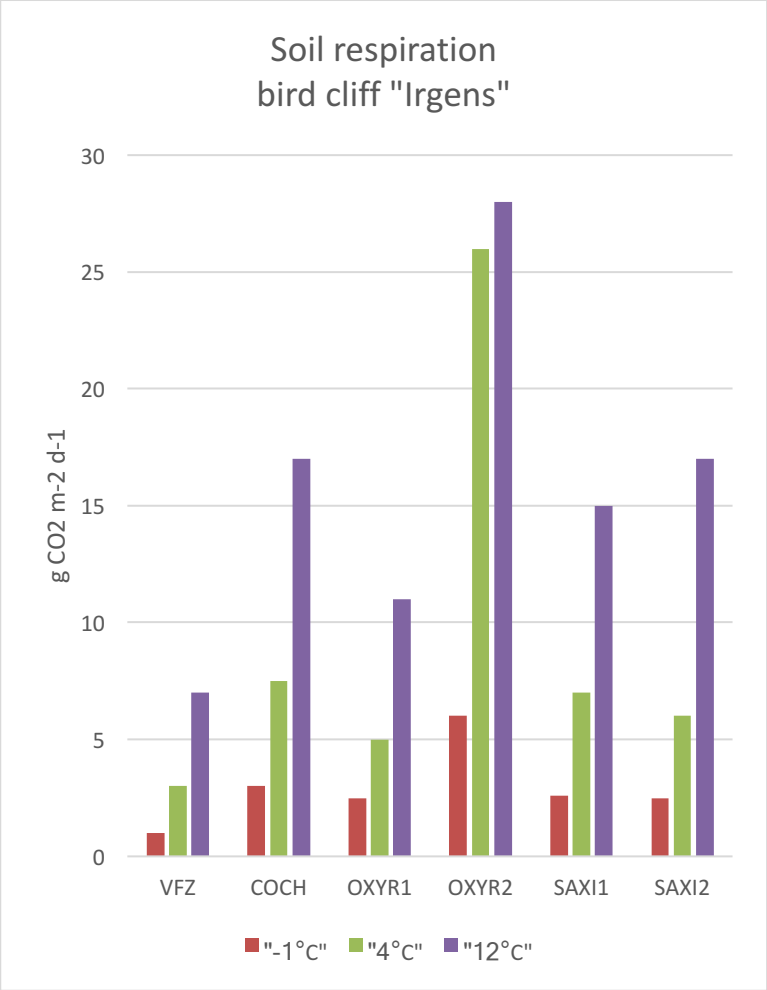



Fig. 4: Soil respiration at an arctic bird cliff tundra.

## Exercise 3: Soil respiration

**Thank you for your attention**

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**3.2** Fig. 5 shows soil temperatures and pricipitation data. Illustrate the respiration at the test sites 11 to 15 of the oligotrophic tundra (Fig. 5). Estabish a relationship between respiration changes and weather progress (Fig. 6).

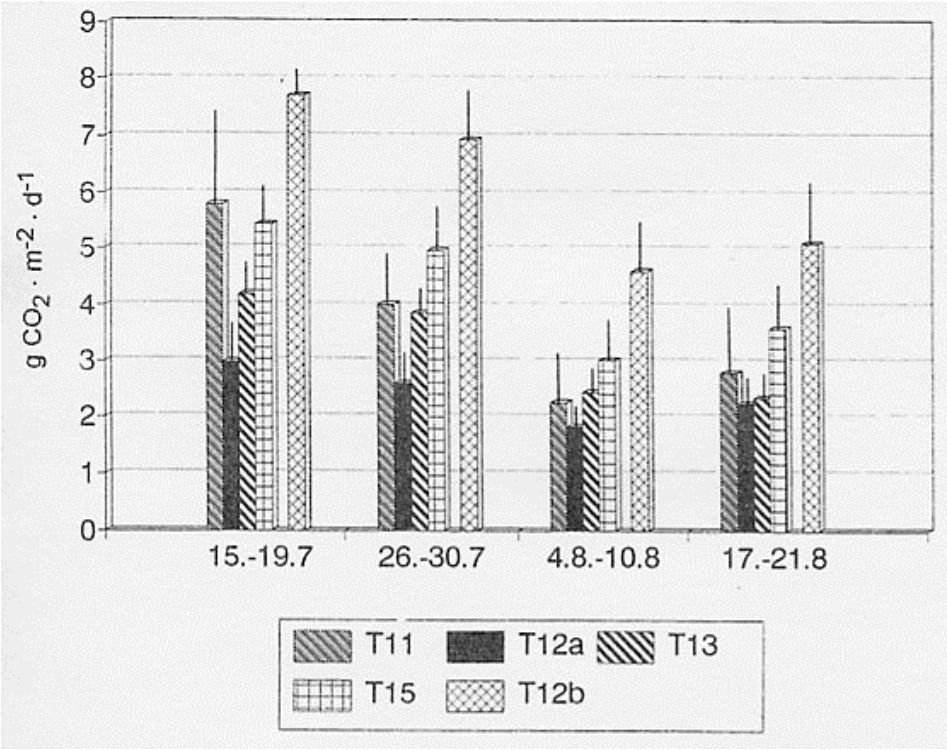


Fig. 5: Soil respiration of the oligotrophic tundra

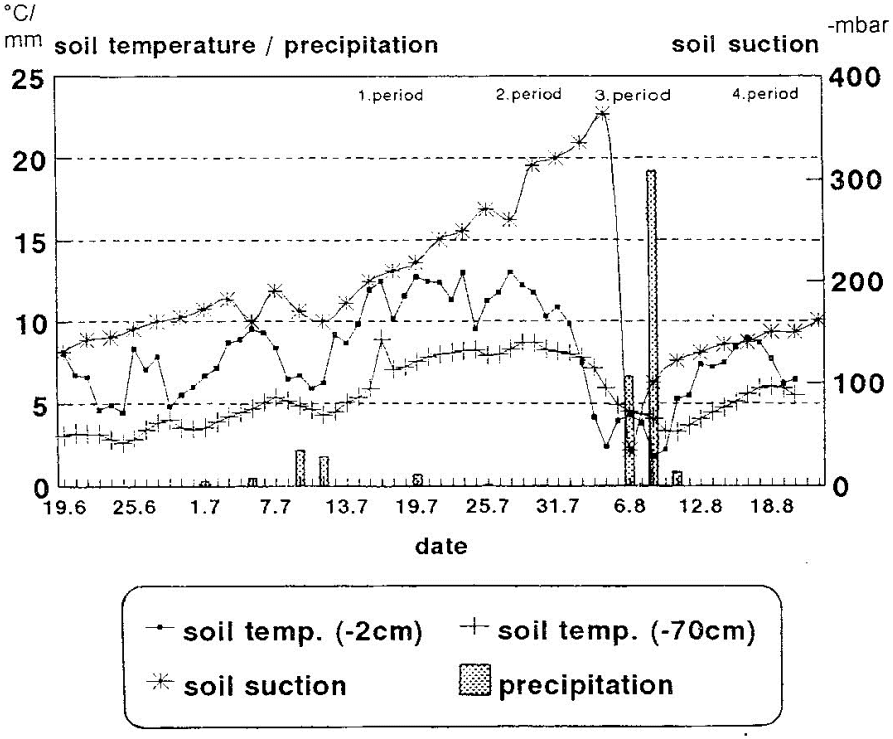


Fig. 6: Soil temperatures and precipitation