

G – GEOLOGICAL OCEANOLOGY

GC – Geochemistry 98–105

GS – Sedimentology 106–114

G e o c h e m i s t r y – G C

GC.01.

THE OCCURRENCE OF MAJOR AND MINOR CHEMICAL ELEMENTS IN THE MORE COMMON BALTIC SEAWEED

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Oceanologia 1973, no. 2, pp. 81–152.

Abstract

In 73 samples of the most common Baltic algae, the contents of the following inorganic macro- and microelements were determined: ash, Na, K, Ca, Mg, SO₄, P, Sr, Fe, Mn, Zn, Cu, Ni and Co. The species analysed were as follows: (the number of samples is given in brackets): *Enteromorpha* sp. (8), *Cladophora* sp. (5), *Fucus vesiculosus* L. (14), *Furcellaria fastigiata* (9), other *Rhodophyceae* (11), *Zostera marina* (14), *Potamogeton pectinatus* (11) and *Elodea canadensis* Rich. (1).

As result of the low salinity of Baltic water (about 7 PSU at the surface) the sodium and potassium content is half that of algae living in oceanic waters (about 35 PSU), but the salinity has no important influence on the calcium and magnesium content. The amount of sulphate does not indicate any relation with the salinity either, but depends in the main on the quantities of esterified polysaccharides. All the abundance ratios for the main ions are equal to or more than one and can be placed in the series Na < Mg < Ca < K.

The Sr:Ca ratio is less than in seawater for most of these species, with the exception of *F. vesiculosus*, which concentrates strontium 4 times more strongly than calcium, and *Z. marina* for which the Sr abundance ratio is about 1/3 higher than that for calcium.

The amounts of trace elements in Baltic plants considerably exceed the concentrations so far come across in open sea species. This greatly depends upon the type of plant and the site where specimens were collected, seasonal fluctuations not being clearly defined. The average concentrations of individual elements vary as follows (as referred to dry matter): Fe 380–2050 ppm., Mn 100–3860 ppm., Zn 60–310 ppm., Cu 5.6–21.2 ppm., Ni 2.3–15.1 ppm., Co 0.35–4.05 ppm. The average abundance ratios are arranged in the following series: Mn > Fe > Ni > Co > Zn > Cu.

This sequence changes for certain species. Generally, cl. *Rhodophyceae* had the highest abundance ratios, the lowest – cl. *Chlorophyceae*; *Phaeophyceae* and f. *Potamogetonaceae* and f. *Hydrocharitaceae* were intermediate. The distribution of elements in the various parts of *F. vesiculosus* differs considerably depending upon age, the young parts of the plant having a higher ash content and a greater (on average 10–30%) content of the main ions, whereas the older parts of plants have almost twice the content of trace elements.

During the reproduction period, the apical parts of species *F. vesiculosus* with the receptacles accumulate considerable amounts of trace elements and almost double the amount of the main mineral components. Especially large disproportions have been observed in the distribution of nickel, which may suggest that this element participates in the reproductive cycle. The young parts of the plants show a greater variation in trace elements, which would indicate their mobility.

GC.02.

ACCUMULATION OF ^{90}Sr , ^{137}Cs , ^{106}Ru , ^{144}Ce AND $^{239,240}\text{Pu}$ IN BALTIC SEAWEEDS

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Oceanologia 1977, no. 7, pp. 89–104.

Abstract

The concentration of strontium 90, caesium-137, ruthenium-106, cerium-144 and plutonium-239, 240 in nine species of seaweeds collected in the Baltic in 1973, and in three species of freshwater plants collected from the river Radunia in 1974, were determined by radiochemical methods. The concentration ranges, expressed in pCi/kg dry matter, were as follows: ^{90}Sr 40–150, ^{137}Cs 30–1270, ^{106}Ru 10–900, ^{144}Ce 20–18190 and $^{239,240}\text{Pu}$ 0.8–30.

Of the species analysed, *Fucus vesiculosus* contained a much higher concentration of ^{90}Sr than the other species, *i.e.* 100–190 *vs.* 9–22. The highest concentrations of ^{137}Cs were found in brown and red algae, the concentration factors being between 28 and 265. Green algae and flowering plants did not differ with respect to their ability to concentrate caesium, showing similar concentration factors of from 5 to 18. Both strontium and caesium were unevenly distributed within the thallus of *F. vesiculosus*, the highest concentrations being located in the oldest parts of the plant and the lowest in the receptacles. Likewise, in *Zostera marina*, the roots contained six times as much caesium as did the leaves.

Concentrations of cerium, ruthenium and plutonium did not follow a clear-cut distribution pattern, although these radionuclides seem to be preferentially accumulated in some species of red algae.

Generally, the activities of ^{90}Sr , ^{137}Cs , ^{144}Ce , and ^{106}Ru are all of the same order of magnitude, and the sum does not exceed 6% of the natural radioactivity due to the presence of ^{40}K in the plants.

GC.03.

ON THE OCCURRENCE OF URANIUM AND THORIUM IN THE BIOSPHERE OF NATURAL WATERS. PART 1. URANIUM AND THORIUM IN PLANKTON AND SESSILE PLANTS

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Oceanologia 1981, no. 13, pp. 35–44.

Abstract

The literature dealing with the occurrence of uranium and thorium in plankton and sessile plants in natural waters has been reviewed. According to this, some tiny freshwater algae absorb thorium to a greater extent than uranium. The respective contents of uranium and thorium in marine plankton are 0.01–1.8 ppm U and 0.27 ppm ^{232}Th (converted to dry mass). The contents of the other two isotopes of thorium expressed per 1 g dry plankton mass are 4.7×10^{-16} g ^{228}Th and 1.7×10^{-12} g ^{230}Th . Phytoplankton tends to accumulate greater quantities of these isotopes than zooplankton.

The ratio of mean activities $^{228}\text{Th}:$ ^{232}Th is approximately the same as that of seawater – *ca* 15.

The occurrence of uranium and thorium in sessile plants in fresh- and seawater is characterised. The concentrations of these elements in tropical aquatic plants is 0.07–1.64 ppm U and 0.02–0.62 ppm Th. The uranium concentrations in these plants are 1–2 orders of magnitude greater than in plants of the Black and Adriatic Seas; this can be explained by the greater degree of calcification of the tropical species. The mean ratio of U:Ca concentrations in sessile plants is not much lower than that calculated for seawater.

The opinion of some authors on the mechanism of uranium and thorium accumulation in sessile plants is presented.

GC.04.

ON THE OCCURRENCE OF URANIUM AND THORIUM IN THE BIOSPHERE OF NATURAL WATERS. PART 2. URANIUM AND THORIUM IN CORALS, MOLLUSCS AND FISH

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Oceanologia 1981, no. 13, pp. 45–57.

Abstract

The literature covering the occurrence of uranium and throrium in corals, molluscs, fish and echinoderms has been reviewed. It was found that live corals contain from 2 to 4 ppm uranium; these concentrations depend not only on the area of growth and individual characteristics but also on such factors as the transparency, temperature and illumination of the water and the presence of zooxanthelles in these organisms. The activity ratio $^{234}\text{U}:$ ^{238}U and the concentration ratio U:Ca in corals are very close to the values typical of seawater. The major significance of diagenetic processes in the shaping of uranium concentrations in older corals is pointed out.

The uranium content in the shells of contemporary molluscs varies from 0.001 to 0.6 ppm. As is the case with corals, differences in uranium content occur depending on the region the animals inhabit and the specific characteristics of the molluscs. The U:Ca concentration ratio for shells is lower in comparison with the value calculated for seawater and the the activity ratio $^{234}\text{U}:$ ^{238}U is the same as the analogous ratio in corals.

The distribution of uranium in freshwater and marine fish is characterised, and the substantial amounts of uranium and thorium in the remains of dead fish is indicated. Attention is drawn to the unequal distribution of uranium in some internal organs in fish. The uranium content in fish is shown to depend not only on specific features and the region inhabited, but also on the nature of the food ingested by these animals.

The mechanism of uranium accumulation in these animals is taken into consideration and the nature of uranium distribution in corals and molluscs is outlined.

GC.05.TRACE METALS IN SUSPENDED MATTER AND SUPERFICIAL
BOTTOM SEDIMENTS FROM THE SOUTHERN BALTIC

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Oceanologia 1984, no. 18, pp. 59–77.

Abstract

Superficial bottom sediments and suspensions from the Polish economic zone of the Baltic as well as suspensions collected in sedimentation traps placed at the bottom of the Gulf of Gdańsk have been analysed. The metals in the suspended matter were determined by flameless AAS (Cd, Hg, Pb, Cu, Zn) and by NAA (Hg, Zn, Co, Cr, Cs, Ag, Se, Sb, Fe), in the sediments by both flameless and flame AAS (Cd, Hg, Pb, Cu, Zn, Cr, Co, Ni, V, Mn, Fe).

Statistical evaluation of the data indicates significant spatial differences with respect to the concentrations of the majority of trace metals in suspensions and bottom sediments. They are mainly due to the action of various biogeochemical and hydrological factors, as well as to the strong but irregular emission from anthropogenic sources. The approximate amounts of Pb, Zn, Hg, Cr, Cu and Cd deposited on the bottom of the Gulf of Gdańsk, the character of their redistribution in the sea and chemical transformation of deposits with respect to trace metals have been estimated.

GC.06.TRACE METALS IN SOME ORGANISMS FROM THE SOUTHERN
BALTIC

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Oceanologia 1984, no. 18, pp. 79–94.

Abstract

Plankton, mussels and fish species caught in the Polish economic zone of the Baltic in 1979 have been analysed. The metals in the plankton were

determined by flameless AAS (Cd, Hg, Pb, Cu, Zn) and by NAA (Se, Cr, Ag, Sb, Cs, Co, Fe). In mussels and fish they were determined by AAS only.

Significant variations in the contents of metals between particular regions and species of the organisms from the southern Baltic were observed. The data obtained were compared with the concentration levels of metals observed in other marine regions. Metal bioaccumulation coefficients are of the order of from 10^5 to 10^2 decreasing from phyto- and zooplankton, through zoobenthos to fish.

GC.07.

PROCEDURE FOR CHEMICAL ANALYSIS OF SUSPENSIONS IN EZCURRA INLET

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Oceanologia 1984, no. 18, pp. 117–126.

Abstract

The paper presents the results of chemical analyses of suspensions. A procedure for their combustion on membrane filters was developed. Total concentrations of Si, Al, P, Ti were determined spectrophotometrically. The contents of Na, K, Mg, Ca, Fe, Mn were determined using flame absorption and emission atomic spectroscopy. Trace metals – Cu, Zn, Pb – were analysed by anodic stripping voltammetry. It was shown that the main sources of impurities were the chemical reagents used.

GC.08.

RADIUM-226 IN THE WATER AND SEDIMENTS OF THE SOUTHERN BALTIC SEA

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Oceanologia 1986, no. 23, pp. 65–76.

Abstract

The distribution of radium-226 in the southern Baltic was investigated. Surface and near-bottom seawater samples as well as sediment samples were collected at 22 stations in July 1981. Radium-226 was determined by the emanation method. The average radium-226 activity in southern Baltic

waters was 1.8 mBq dm^{-3} ($0.5 \times 10^{-13} \text{ g dm}^{-3}$); the activity in sediments was more differentiated and ranged from 3.6 to 47 mBq g^{-1} of dry matter (1 to $13 \times 10^{-13} \text{ g g}^{-1}$), depending on the kind of sediment. A highly significant positive correlation between the salinity and radium content, was found both in bottom waters and in sediments.

GC.09.

THE DETERMINATION OF Cu, Pb, Cd AND Zn IN SOUTHERN BALTIC WATER, SUSPENSIONS AND SEDIMENTS

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Oceanologia 1988, no. 25, pp. 75–85.

Keywords: Trace metals, Baltic Sea

Abstract

This paper presents the results of the determination of Cu, Pb, Cd, and Zn in solution and in suspension in southern Baltic water by dc anodic stripping voltammetry (ASV), and in sediments by atomic absorption spectroscopy (AAS). The mean total concentrations of the metals in seawater and suspension were Cu – $0.58 \pm 0.10 \mu\text{g dm}^{-3}$; Pb – $0.57 \pm 0.14 \mu\text{g dm}^{-3}$; Cd – $0.09 \pm 0.02 \mu\text{g dm}^{-3}$, and Zn – $13.0 \pm 2.5 \mu\text{g dm}^{-3}$. 68% of Pb and Cd occur in suspended form, 75% of Cu and 85% of Zn in soluble form. The mean concentrations of the metals in the sediments were Cu – $57 \pm 7 \mu\text{g g}^{-1}$ dry weight; Pb – $209 \pm 54 \mu\text{g g}^{-1}$ dry weight; Cd – $4.3 \pm 0.5 \mu\text{g g}^{-1}$ dry weight and Zn – $273 \pm 20 \mu\text{g g}^{-1}$ dry weight.

GC.10.

CONCENTRATION OF ELEMENTS IN SOME SEAWEEDS FROM THE COASTAL REGION OF THE SOUTHERN BALTIC AND IN LAKE ŻARNOWIEC

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Oceanologia 1988, no. 25, pp. 87–98.

Keywords: Seaweeds, Concentration of metals, Lake Żarnowiec, Baltic Sea

Abstract

The contents of Fe, Mn, Pb, Ni, Cu, Co, Zn, Cd, Ti, Al, Ca, Mg, K, and Na were determined in samples of some seaweeds from the coastal region of the southern Baltic and in Lake Żarnowiec. The levels of metals found were essentially similar to those reported by other authors for seaweeds from various areas of the world. The Baltic seaweeds contained significantly larger amounts of K, Al, Fe, and Zn, and similar levels of Mn compared with plants taken from Lake Żarnowiec. The mean concentration, selectivity, and enrichment factors for analysed metals were calculated. The concentration factors are arranged in the following order: Al > Fe > Pb > Mn > Co > Ni > Zn > Cd > Cu > K > Ca > Mg > Na. The correlation coefficients for all pairs of metals were also calculated.

GC.11.

NOTE ON INTERCALIBRATION OF TRACE METALS IN A MARINE SUSPENSION CARRIED OUT BY THE CO-ORDINATION CENTRE OF THE COMECON COUNTRIES AT THE INSTITUTE OF OCEANOLOGY OF THE SOVIET ACADEMY OF SCIENCES (Communications)

JERZY BOLAŁEK

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Oceanologia 1990, no. 28, pp. 127–128, (no abstract).

S e d i m e n t o l o g y – G S

GS.01.

VARVE STRATIFICATION OF A 10-METRE CORE FROM THE BOTTOM OF THE GDAŃSK DEEP

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Oceanologia 1975, no. 4, 133–151.

Abstract

The aim of the work was to analyse stratigraphic units, so-called varves, which de Geer and others interpreted as annual deposits in Scandinavian Quaternary residues. The question to be answered was whether or not the dark and light laminae measured in the 10-metre core taken from the bottom of Gdańsk Deep recorded changes in quantity and quality of glacial deposits. Do two of these laminae correspond to a one-year sedimentation – the conception of varves?

GS.02.

FROM STUDIES OF THE FORMATION PROCESSES ON ACCUMULATIVE BEACHES

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Oceanologia 1975, no. 4, pp. 153–171.

Abstract

This work presents the results of studies carried out in the field to determine the process by which accumulative beaches are formed by storm waves.

Certain factors have been found that are responsible for the direction and intensity of this process, *i.e.* derivatives of the hydrodynamic parameters of storm waves. A relationship has been found for the beach regression (or build-up) rate of dx/dt versus the time derivative of sea level variations, which can be put down in the following simple form: $dx/dt = -\mu dH/dt$.

The data conform to the physical model of the wave-induced transformation of accumulative beaches, derived by one of the authors.

GS.03.

LITTORAL PROCESSES IN THE SWASH ZONE

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Oceanologia 1978, no. 8, pp. 5–56.

Abstract

The paper gives the results of investigations of coastal processes conducted by the writer in the surf zone on one of the western Crimea coast accretion sections in the years 1971 to 1973.

The major objective of the investigations was to elucidate the dynamics of the accretion and abrasion processes in the swash zone and to discriminate the main hydrodynamical factors responsible for the rate, as well as the trend of these processes.

The investigations performed and the analysis of the data obtained have shown that a major shortcoming of most studies of coastal processes done hitherto lies in the underestimation of sea level variations.

Wave transformation on the bottom slope acts as a controlling factor which passes shoreward waves with a very narrow height interval, practically independent of initial heights.

The length of this interval depends primarily on the sea bed slope and the sea level. It is proposed that the phenomenon of wave filtering described here be referred to as wave 'strettation'.

The wave strettation phenomenon lessens the differences between wave conditions during various stages of a storm and even in various storms.

Analysis of the information collected during the investigations shows that no a direct relationship exists between beach transformation processes and parameters such as wave height and sea level variation $\Delta H/\Delta t$.

A positive increase in $\Delta H/\Delta t$ corresponds to beach abrasion, while a negative one is due to with accretion. The same is true for the mean ratios wave height $\Delta h/\Delta t$ and wave lengths $\Delta \lambda/\Delta t$ over a certain narrow range. In the study is also given the quantitative relationship between beach advancement or retreat $\Delta x/\Delta t$ and the mean temporal growth of wave parameters and sea levels, its form being as follows

$$X = X_o - \int_0^t \left(\mu \frac{dH}{dt} + \xi \frac{dh}{dt} + \chi \frac{d\lambda}{dt} \right) dt$$

in which

μ, ξ, χ – dimensionless coefficients depending particularly on sea bottom slope.

$$\mu = - \left| \frac{\partial x}{\partial H} \right|_{h,\lambda} \quad \xi = - \left| \frac{\partial x}{\partial h} \right|_{H,\lambda} \quad \chi = - \left| \frac{\partial x}{\partial \lambda} \right|_{H,h}.$$

These quantitative relationships indicate that the beach profile takes shape in the wake of sea level changes with waves superimposed thereon. Changes in wave heights and wave lengths on inshore flats are of secondary importance.

This study contains the first attempt to determine the quantitative relationships between the hydrodynamic parameters of storm waves and littoral processes in the swash zone.

GS.04.

PARTICULATE MATTER IN EZCURRA INLET: CONCENTRATION AND SIZE DISTRIBUTIONS

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Oceanologia 1984, no. 15, pp. 65–74.

Abstract

This paper gives the preliminary results of research into the concentrations and distributions of the dimensions of marine suspended matter in the 2–32 μm range in Ezcurra Inlet, a typical Antarctic fjord on King George Island.

The measurements of the mass concentration of the suspended matter were carried out by filtering the seawater through a membrane filter of 0.45 μm pore diameter; however, the quantity concentration and the size distributions were measured using a Coulter counter with a 100 μm nozzle.

The concentration of suspended matter, most of which consists of mineral particles from the shores of the fjord, was found to vary considerably with time and space (Tabs. 1 and 2, Figs. 1 and 2).

The suspended matter concentration displays a high, negative correlation with the salinity, the correlation coefficient being equal to -0.8 . Thus, changes in this concentration are due to the currents and turbulence in the fjord, which cause highly saline oceanic water to mix with the less saline water at the surface of the fjord; the latter, in turn, contains a large quantity of matter in suspension that enters the sea with the freshwater runoff from the land.

The particle size distributions of the suspended matter (psd) in Ezcurra Inlet can be described by the kD^{-m} function with good precision within the $\sim 3.7\text{--}32\ \mu\text{m}$ diameter range, though less accurately when $D \sim 2\text{--}3.7\ \mu\text{m}$ (Fig. 3).

The $\sim 2\text{--}3.7\ \mu\text{m}$ size range should be treated as transitional to the $D \geq 2\ \mu\text{m}$ size range, the type and parameters of which could not be evaluated precisely because of the insufficient number of measuring stations for this range of diameters.

The gradients m of both measurement distributions varied within a much smaller range than did the concentrations k (Tab. 3), which indicates that the shape of the size distributions of marine suspended matter in the basin in question over the $2\text{--}32\ \mu\text{m}$ range is stable.

GS.05.

THE SHORE AND BOTTOM GEOMORPHOLOGY OF EZCURRA INLET

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Oceanologia 1984, no. 15, pp. 209–220.

Abstract

A secondary bay in Admiralty Bay $19.2\ \text{km}^2$ in area, Ezcurra Inlet is a typical fjord. It fills a deep and steep-sided glacial hanging valley $100\text{--}130\ \text{m}$ above the bottom of the main trough valley, which makes up the long axis of Admiralty Bay. Bathymetrically and geomorphologically the bottom of Ezcurra Inlet can be divided into two distinct sections. The deep, eastern part lying to the east of the Jardine Peak traverse is a typical U-shaped glacial valley with lateral moraine, well preserved in the bottom morphology, near the northern edge, and medial moraine in places. It is in this section that the greatest depths occur ($282\ \text{m}$). The western section, separated from the eastern one by a steep slope, is shallower and is crowned by terminal moraine lying some $70\ \text{m}$ below the water surface perpendicularly to the fjord's axis; the bottom morphology is undulating, with depressions. This morphology is considered to have been formed as a result of glacial accumulation. In the NW part of the fjord (the Cardozzo Cove region and that to the N of Dufavel Island) there is a depression of great area ($-155\ \text{m}$) interpreted as a exaration form, protected from being filled in by glacial ice overloaded with moraine material.

Some $26\ \text{km}$ in length, the shoreline of Ezcurra Inlet has been only slightly transformed by wave action. The dominant shore type was formed

by glacial ice – 42% of the shoreline comprises ice cliffs. Large sections of shoreline consist of weathered shore, of material screening from the rocky, insolated slope of the glacial valley – this is the effect of frost weathering. The rocky shorelines are characterised by a distinct change in the extent of morphological metamorphosis from E to W. The E part has advanced further in its development; the shores of the western end, where deglaciation took place later, have a structural-glacial morphology (*e.g.* extensive moutoneed surfaces).

GS.06.**PRELIMINARY CHARACTERISTICS OF SOME BOTTOM SEDIMENTS OF THE BALTIC SEA**

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Oceanologia 1985, no. 20, pp. 97–106.

Keywords: Bottom sediments, Baltic Sea

Abstract

Ten bottom sediments of the Baltic Sea were investigated by differential thermal analysis (DTA), thermogravimetry (TG) and X-ray diffraction as well as by Baline's method of measuring specific surface area. On this basis, the percentage of organic matter and the mineral composition of the sediments were established. The results are supplemented by elemental analyses.

GS.07.**PROPERTIES OF SELECTED BOTTOM SEDIMENTS OF THE BALTIC SEA AND THEIR SORPTION ABILITY TOWARDS COBALT (II) IONS. PART 1.**

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Oceanologia 1988, no. 25, pp. 65–73.

Keywords: Sediments, Cobalt (II) ions, Sorption ability, Baltic Sea

Abstract

The sorption of Co^{2+} ions on 12 bottom sediments of the Baltic Sea devoid of organic substances was studied. The results were compared with those obtained for non-mineralised sediments. Infrared spectra were recorded in addition to investigations carried out by means of DTA, TG, X-ray diffraction, specific surface, and elemental analysis. The sorption of cobalt (II) ions on some sediments previously saturated with copper (II) or nickel (II) ions was also examined.

GS.08.**OXYGEN UPTAKE KINETICS AT THE SEDIMENT–SEAWATER INTERFACE IN PUCK BAY**

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Oceanologia 1991, no. 30, pp. 57–75.

Keywords: Oxygen, Sediments, Chamber experiments, Puck Bay

Abstract

The paper presents the parameters of oxygen exchange at the seawater-sediment interface in Puck Bay. The calculations were based on data on oxygen concentration changes in water, obtained at two stations in chamber experiments in June 1989. Oxygen consumption in respiration and the mineralisation of organic matter was determined on the basis of oxygen concentration changes, data on the plankton biomass in water, and data on the biomass of macro- and meiobenthos in the sediment.

The following parameters of oxygen exchange at the water-sediment interface were calculated using the quasi-stationary model of oxygen uptake: oxygen consumption in benthic water A_w , oxygen uptake by the sediment at the beginning of the experiment J_0 , oxygen penetration depth into the sediment x_1 , diffusive sublayer height h , oxygen concentration in the diffusive sublayer $C_{w,o}$, oxygen concentration at the bottom of the diffusive sublayer at the initial moment.

The parameters obtained agreed very well with the nature of the sediments, as well as the number of meiobenthic organisms and their biomass in the sediment, and plankton biomass in water.

GS.09.

INVESTIGATIONS ON THE TRANSFER OF CHEMICAL SUBSTANCES
AT THE WATER–SEDIMENT INTERFACE IN PUCK BAY

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Oceanologia 1991, no. 30, pp. 105–123.

Keywords: Sediment, Bottom water, Chamber experiments, Puck Bay

Abstract

The magnitude of fluxes of chemical substances exchanged between the bottom water and the sediment at two measuring stations of different sediment types was determined. The investigations were carried out in June 1989 and entailed the measurement of pH changes, as well as the concentration of oxygen, bicarbonates, nitrogen and phosphorus compounds, and dissolved silicates, in closed water systems. Two chambers were placed at each measuring station, one of them isolated from the bottom. Water samples were drawn from the chambers and their vicinity once a day for 15 days.

The reducing conditions formed in the chambers in contact with the sediment favoured the liberation of phosphorus, ammonia and silicates from the sediment to water. The oxygen consumption by the sediment was $78.7 \text{ mmole m}^{-2} \text{ day}^{-1}$ at the first station and $46.1 \text{ mmole m}^{-2} \text{ day}^{-1}$ at the second one. The fluxes of the liberated phosphates, ammonia and silicates were 0.8, 0.2 and $1.7 \text{ mmole m}^{-2} \text{ day}^{-1}$ at the second station. The nature of the sediment exerted the greatest influence on the amount of the liberated phosphate phosphorus.

GS.10.

THE APPLICATION OF IR SPECTRA AND TG AND DTA CURVES
IN TESTING THE SORPTION OF SELECTED TRACE METALS ON
CERTAIN COMPONENTS OF BOTTOM SEDIMENTS

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Oceanologia 1991, no. 31, pp. 97–106.

Keywords: Humic acids, Bottom sediments, Sorption of cations on minerals, Complexes of cations with humic acids

Abstract

Studies were carried out the sorption of the cations Ni^{2+} , Cu^{2+} , Co^{2+} , Fe^{2+} , Hg^{2+} , Zn^{2+} , Cr^{3+} and Pb^{2+} on the main components of the Baltic bottom sediments – quartz, illite, montmorillonite, kaolinite, humic acids and mixtures of humic acids with bentonite. The IR spectra method, differential thermal analysis (DTA), thermogravimetry (TG) and differential thermogravimetry (DTG) were applied. It was found that sorption is mainly by humic acids and montmorillonite, which is illustrated by changes in the spectra.

GS.11.

IONIC MACROCOMPONENTS OF THE INTERSTITIAL WATERS OF PUCK BAY

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Oceanologia 1992, no. 33, pp. 131–158.

Keywords: Interstitial waters, Puck Bay, Macrocomponents, Sediments

Abstract

The article analyses the principal ionic components in the sediment interstitial waters of Puck Bay. It was found that the vertical and horizontal distributions of chloride, sulphate and bicarbonate anions, and sodium, potassium, magnesium and calcium cations are affected by underground inflows of fresh water, the hydrostatic pressure of the seawater above the sediment, sulphate reduction and oxidation of organic matter, ion exchange reactions as well as mineral formation and decomposition. Differentiation of ion concentration is most marked in the western part of the Bay, where the proportion of underground inflows in interstitial waters is as high as 90%. Chloride and sodium ions dominate in interstitial waters; the next most abundant anion is either bicarbonate or sulphate, depending on the stage of sediment diagenesis and the proportion of fresh water. The same applies to magnesium and calcium among the cations. The interstitial waters of Puck Bay were classified into three groups representing composition and genesis: sea, mixed, and saline waters, and three subgroups: magnesium-bicarbonate, magnesium-sulphate and calcium-sulphate waters.

GS.12.

PHOSPHATE AT THE WATER–SEDIMENT INTERFACE IN PUCK BAY

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Keywords: Interstitial water, Puck Bay, Phosphate, Sediments

Abstract

The quantity of phosphate transferred from sediments to near-bottom water was determined from phosphate concentration gradients across the near-bottom water-interstitial water interface. In Puck Bay, phosphate was found to be released from sediments into the overlying water. The mean flux is slightly over $20 \mu\text{mol m}^{-2} \text{day}^{-1}$, and the total annual load of phosphate from sediments is *ca* 100 t. Phosphate concentrations in near-bottom water, interstitial water and in the sediments of Puck Bay are also analysed in this paper. Phosphate concentrations increase eastwards from the western end of the Bay. Concentration changes depended on diagenetic processes related to the oxidation of organic matter, freshwater inflow from the proglacial valleys of the Reda and Płutnica rivers and sorption processes in sediments.

GS.13.

METALLOPORPHYRINS IN RECENT SEDIMENTS OF THE BALTIC SEA

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Keywords: Metalloporphyrins, Nickel(II), Vanadyl(II), Sediments, Sea, Baltic

Abstract

Recent sediments of the southern Baltic Sea were investigated for the possible occurrence of metalloporphyrins. The content of both vanadyl(II) and nickel(II) metalloporphyrins estimated in the sediment samples studied is of the order of magnitude $(1-6) \times 10^{-2} \mu\text{g g}^{-1}$ (d. w.). The results also suggest that the porphyrins in recent Baltic sediments are of anthropogenic origin. The highly significant correlation of the metalloporphyrin content with chlorophyll *a* indicates either that these metalloporphyrins are formed in the water column or that phytoplankton contribute to metalloporphyrin transfer from water to sediments.