

ABSTRACTS – BALTICA 28 (2) December 2015

Graniczny, M., Čyžienė, J., van Leijen, F., Minkevičius, V., Mikulėnas, V., Satkūnas, J., Przyłucka, M., Kowalski, Z., Uścińowicz, Sz., Jegliński, W., Hanssen, R., 2015. Vertical ground movements in the Polish and Lithuanian Baltic coastal area as measured by satellite interferometry. *Baltica*, 28 (2), 65–80. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.07

The article contains results obtained from realization of the Polish and Lithuanian Baltic case study within the EU – FP 7 SubCoast project, which one of the primary aims was analysis of vertical ground movements, potentially causing geohazards in the coastal areas. To reach this goal Interferometric Synthetic Aperture Radar (InSAR) data were obtained. For the Polish and Lithuanian Baltic coast ERS archive radar data were processed in order to provide Permanent Scatterer (PSInSAR, PSI) results that were then used to create the new innovative product – Dynamic DEM (DDEM). The deformation model defined by the SubCoast project normally needs to be created by merging InSAR, satellite navigation (GNSS), optical leveling and/or gravimetry measurements. Elaboration of DDEM enables more effective comparison between PS and tectonic features. Comparison of PS time series with groundwater changes shows a direct correlation, confirming impact of groundwater on subsidence or uplift of the ground surface. The results of the geological interpretation demonstrated that the examples of movements detected by PSI include subsidence linked to deformation of engineering constructions, compaction of organic or weak soils, and eolian accumulation or deflation processes of the sand dunes. For the Polish and Lithuanian coasts most of the area proved to be stable, nevertheless some local deviations up to –15 mm per year of movement were found.

Keywords • *Baltic coastal area* • *satellite interferometry* • *ground subsidence* • *Dynamic-DEM*

Vallius, H. 2015. Sediment and carbon accumulation rates off the southern coast of Finland. *Baltica* 28 (2), 81–88. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.08

The southern coast of Finland encompasses about one third of the coasts of the Gulf of Finland. It is a mosaic of hundreds if not thousands of islands, peninsulas and bays, which also are reflected in the seabed of the coast. The sea floor is composed of a patchy and fragmented mosaic of mainly quite small basins separated from each other by thresholds of islands, peninsulas or submarine ridges. This affects transport and near bottom currents such that deposition of suspended particles is restricted to certain areas only. Linear sediment accumulation rates along the southern coast of Finland were studied from 28 cores of a sampling campaign in 2000–2004 through gamma spectrometry of ^{137}Cs . Sediment accumulation in this environment with such diverse character was found very patchy and net sedimentation rates varying from less than 0.5 cm/a to values of nearly 3 cm/a as well as mass accumulation rates from 0.5 kg/m²/a to 8.8 kg/m²/a were found. The sediment accumulation rates were observed to be higher in shallower water in coastal sheltered or semi-sheltered bays. Total carbon concentrations varied from 1.3 % to 12.6 % and carbon accumulation rates from 20 g/m²/a to 355 g/m²/a such that the highest carbon concentrations were usually found in deeper water with some distance from the coast, while the highest carbon accumulation rates were found in the coastal shallow basins where sediment accumulation was found strongest.

Keywords • *sediment* • *carbon* • *accumulation* • ^{137}Cs • *dating* • *deposition* • *Gulf of Finland*

Baltrūnas, V., Karmaza, B., Zinkutė, R., Katinas, V., Paškauskas, S., Pukelytė, V., 2015. Inferences from geochemical characteristics of the upper part of the Middle Pleistocene interglacial deposits in Lithuania. *Baltica*, 28 (2), 89–108. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.09

The article presents geochemical characteristics of deposits from the reference sections of the Middle Pleistocene interglacials: 2 from the Butėnai Interglacial and 2 from the problematic Snaigupėlė Interglacial. Geochemical data (the contents of 29 chemical elements, percentages of sediment components) are related to magnetic susceptibility (MS), bedding, lithology and previous palaeobotanical results. Higher content of carbonates and clay in sections of the Snaigupėlė Interglacial can be explained by warmer climate and calmer depositional environment, though the influence of chemical composition of the underlying tills is also obvious. The influence of oxic-anoxic sedimentary environment fluctuations on MS and on the separation between P-Fe and S-Mn is demonstrated. Many geochemical differences between deposits from the intervals of the Snaigupėlė-705 borehole and the Snaigupėlė outcrop sections which presumably include pollen zone S₆ *Carpinus-Quercus* enable the authors to speculate that these deposits were formed during different interglacials.

Keywords • *sedimentary environment* • *palaeoenvironmental conditions* • *major and trace elements* • *sediment components* • *magnetic susceptibility* • *Middle Pleistocene*

Kostrzewski, A., Zwoliński, Z., Winowski, M., Tylkowski, J., Samołyk, M., 2015. Cliff top recession rate and cliff hazards for the sea coast of Wolin Island (Southern Baltic). *Baltica*, 28 (2), 109–120. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.10

The article presents results of studies on the rate of erosion of the Wolin Island cliff-coast (NW Poland) during the last three decades. Trends of geomorphological changes were defined based on multiannual observations (1984–2014). Changes were controlled by secular and extreme processes. Research has shown that the intensity of the processes shaping the Wolin Island cliff-coast were characterized by a clear seasonal variability. Analysis of hydro-meteorological conditions allowed the authors to derive the threshold values of the most important factors initiating cliffs hazard. The destruction of the cliff, differing in range, occurs in the above-threshold conditions. Multiannual research and direct observations of the functioning of the cliff-coast conducted herein provided the basis for proposing the safety shield and information system about the cliff hazard.

Keywords • *cliff coast* • *cliff top recession* • *cliff hazard* • *cliff protection*

Druzhinina, O., Subetto, D., Stančikaitė, M., Vaikutienė, G., Kublitsky, J., Arslanov, Kh., 2015. Sediment record from the Kamyshovoe Lake : history of vegetation during late Pleistocene and early Holocene (Kaliningrad District, Russia). *Baltica*, 28 (2), 121–134. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.11

Newly obtained pollen and diatom data from the Kamyshovoe Lake (previous *Dobauen*, Germ.), Vishtynets Highland, Baltic Uplands, analyzed by radiocarbon dating allowed to reconstruct the history of local vegetation during late Pleistocene and early Holocene. Pollen records show the formation of birch-predominating forest at ca. 13.4 ka cal. BP and the flourishing of pine towards the second half of the Allerød since about 13.2 ka cal. BP. The transition to the Younger Dryas around 12.7 ka cal. BP led to the development of sparse shrub tundra with *Juniperus* and communities of steppe herbs. Amelioration of the environmental regime enabled birch and pine woods to spread during the second part of the GS-1 event and the Preboreal. The late Preboreal time is marked by the appearance of *Populus* and an increase in the role of grasses in the vegetation cover, which can be

correlated with similar open vegetation phases deduced from other pollen records in Europe (11.3–11.1 ka cal. BP). During the Boreal (since ca. 10.0 ka cal. BP) *Corylus* had its maximum value, *Alnus*, *Tilia* and *Quercus* appeared and spread while the birch-pine forests retreated.

Keywords • pollen • diatoms • vegetation changes • Pleistocene • Holocene

Stankevica, K., Pujate, A., Kalnina, L., Klavins, M., Cerina, A., Drucka, A., 2015. Records of the anthropogenic influence on different origin small lake sediments of Latvia. *Baltica*, 28 (2), 135–150. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.12

Sediments in lakes have been formed under the conditions of sensitive ecosystem functions as historical records of micro- and macrocomponents. Besides others, lake sediments preserve macroremain and chemical evidence reflecting environmental changes and human impact. During the last centuries, sediment composition has been influenced by inconsistent urban and industrial developments. This article presents the multi-proxy data obtained from studies of lake sediment composition, chemical analysis and macroremain signatures in the upper sediment layer from tree small lakes of different origin: Lake Lilaste (lagoonal), Lake Velnēzers (glaciokarstic), and Lake Veveri (glacial). The studies of lake sediments revealed that human impact is recognisable in the upper sediment layer of all investigated lakes, but at different depth from the sediment surface. The most recognisable traces of anthropogenic influence can be attributed to the increase of lead (Pb), cadmium (Cd) concentration, number of plant macroremains and charcoal particles in all investigated lake sediments.

Keywords • gyttja • heavy metals • loss-on-ignition • plant macroremains • organic matter

Emelyanov E. M., Gulbinskas S., Suzdalev, S. 2015. Biogenic components and trace elements in the sediments of river mouths and accumulation areas of the Curonian Lagoon (south-eastern Baltic Sea). *Baltica*, 28 (2), 151–162. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.13

Contribution of the Neman (Nemunas) River including the arms Atmata, Skirvytė and Razliv, as well as Matrosovka and Deima rivers to the general enrichment of the Curonian Lagoon with biogenic components and chemical elements is reflected in the composition of surface sediments accumulating in the river mouths. Other part of chemical substances are absorbed by the finest particles and reaches accumulation areas of the lagoon in the south-western and central parts. Results from the study have shown the prevalence of terrigenous and biogenic-terrigenous sediments in the mouths of small rivers. Highest average values of biogenic components (31.46–38.87% of CaCO₃; 0.63–1.03% of N; 0.07–0.1% of P) are observed in the accumulation areas of the coarse silt and fine silty mud. Same areas are characterized by the increased amounts of potentially hazardous metals (Cd, Cr, Cu, Ni, Pb, Zn). Results from this study have shown considerable enrichment of sediments with arsenic. In most places average contents of this metalloid are well above the geochemical background values, determined for the south-eastern part of the Baltic Sea. Absolutely highest values of arsenic (91–93 mg/kg) suggesting presence of serious contamination sources were determined in the south-eastern part of the lagoon, adjoining the mouth of small Matrosovka River.

Keywords • biogenic components • trace elements • sediment pollution • coastal areas • river mouths • accumulation areas

Kabailienė, M., Vaikutienė, G., Macijauskaitė, L., Rudnickaitė, E., Guobytė, R., Kisielienė, D., Gryguc, G., Mažeika, J., Šinkūnas, P., Motuza, G., 2015. Lateglacial and Holocene environmental change in the area of Samogitian Upland (NW Lithuania). *Baltica*, 28 (2), 163–178. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.14

Pollen, plant macroscopic fossil and carbonate analyses supplemented with ¹⁴C dating were applied for sediment sections of Lopaičiai Kettle and Pakastuva Lake. The new data obtained from two sediment cores were used to reconstruct vegetation cover and environmental changes during Lateglacial and Holocene in the Samogitian Upland (NW Lithuania). Different burial conditions of dead-ice blocks caused different times of lake sediment start in studied sites. The depositional and vegetation history is traced at the inception of pre-Allerød time in sediment section from the Lopaičiai core. However, sediment section from the Pakastuva core provides paleoenvironmental information starting only from the very beginning of Holocene. The study results shed more light on the environmental development during the Lateglacial and Holocene of the specific ice marginal area, which belongs to interlobate insular upland.

Keywords • pollen • vegetation • environment • kettle hole

Blažauskas, N., Grigelis, A., Gelumauskaitė, L. Ž., Gulbinskas, S., Suzdalev, S., Ferrarin, Ch, 2015. Towards sustainable use of marine resources in the south-eastern Baltic Sea (Lithuania) : a review. *Baltica* 28 (2), 179–188. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.15

The article provides a consistent insight into the results and experience related to the implementation of activities fostering the development of marine economy in Lithuania. EU Strategy for the Baltic Sea Region and the Blue Growth concept explicitly focuses on maintenance of the good status of the marine environment of the European seas. Recently developed Lithuanian integrated maritime spatial plan aims to create the favourable conditions for sustainable development of marine economy, and particularly the offshore wind energy. Proposed and tested innovative solutions for selection of new disposal sites as well as handling the dredged soil in ports, contributes to more environmentally sound and economically feasible operations of the south-eastern Baltic Sea ports.

Keywords • blue economy • marine spatial planning • beneficial use

Chechko, V., Sokolov, A., Chubarenko, B., Dikii, D., Topchaya, V., 2015. Dynamics of sediments disposed in the marine coastal zone near the Vistula Lagoon inlet, south-eastern part of the Baltic Sea. *Baltica* 28 (2), 189–199. Vilnius. ISSN 0067-3064. doi: 10.5200/baltica.2015.28.16

The article discusses the possibility of protecting the shore by disposing of dredged material at shallow depths. An example of a permanently eroded open marine shore segment located south of the Vistula Lagoon inlet (south-eastern part of the Baltic Sea) is considered. This shore segment is permanently caused by downstream erosion due to the moles bordering the entrance to the Vistula Lagoon (Baltiysk Strait) and interrupting longshore sediment transport. Changes of sediment distribution resulting from a demonstration disposal of clean fine sand at depths of seven to nine metres opposite the eroded segment of the shore are examined. A supplementary numerical modelling analysis of sediment transport for different winds showed that the disposed material is transported northward or southward alongshore depending on the wind direction, and almost none of it is stored at the shore slope. The demonstration disposal and numerical modelling results demonstrate that the only way to use the dredged material to protect the eroded shore near the inlet of the Vistula Lagoon is to dispose it directly onto the beach and not into the shallow water nearby.

Keywords • coastal erosion • bottom sediments • disposal • dredged material • sediment transport • numerical modelling
