Zuzevičius, A., 2010. The groundwater dynamics in the southern part of the Baltic Artesian Basin during the Late Pleistocene. *Baltica, 23 (1),* 1-12. Vilnius. ISSN 0067–3064.

Abstract The reconstruction of hydrogeological conditions during the Late Pleistocene and Holocene has been performed for the southern part of the Baltic Artesian Basin (BAB) situated on the slope of the Belarusian–Masurian crystalline basement. The reconstruction was accomplished modelling the freezing–and–thawing of the subsurface and migration of unfrozen water under the permafrost, which covered the whole 250-270 m thick fresh water zone before the Nemunas (Late Weichselian) glacier advance (22 000-23 000 BP). Due to anomalous high gradients (0.003-0.004) caused by glacier loading (in the north) and draining periglacial lake (in the south), the unfrozen mineralised water could fill a 10-35 km wide strip in the lower beds of the sedimentary cover at the BAB's southern margin. This can explain the current small thickness of the fresh water zone, as well as the older age of water in deeper beds and water mineralisation in the southern part of the BAB as compared to the northern part of the basin what is in a similar geological setting.

Keywords *Late Pleistocene, permafrost modelling, glacier, groundwater dynamics, Baltic Artesian Basin, Lithuania.*

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Chubarenko, I., Chubarenko, B., Esiukova, E., Baudler, H., 2010. Mixing by Langmuir circulation in shallow lagoons. *Baltica, 23 (1),* 13-24. Vilnius. ISSN 0067-3064.

Abstract Field measurements and observations in shallow basins (Vistula Lagoon and Darss–Zingst Bodden Chain, the Baltic Sea) are reported, revealing characteristics of Langmuir circulation (LC) patterns during moderate winds. A system of large–scale rolls with horizontal axes is shown to be different in the open ocean as compared to shallow areas. CTD horizontal tows across the windrows, GPS registration of the cell' width, videotape recording were used. Regular patterns of windrows, marking the roll–shaped circulation cells, develop within 5-10 min. after the wind onset. The most probable distance between streaks is about double the local water depth, so that the width–to–depth ratio for the rolls is equal to 1; 78% of the rolls have a ratio of width to depth from 0.65 to 1.6, with peak values at 0.75, 1, 1.2, 1.4. It is shown, that in a shallow basin the pattern of windrows is fully developed, and the growth of the roll' diameters is limited by the depth of the basin. Thorough analysis of video–records of the rows' breakdown and reconstruction has revealed four possible kinds of Y-junctions, whilst in deep areas only one of them is reported to prevail. One

more major difference of shallow water LC is caused by the presence of shores: eventually, the wind, waves and water current in a lagoon propagate in different directions. This makes the streak lines curved, and they drift in the direction of the cross–current component of the Stokes wave transport. Mathematical analysis of the behaviour of suspended particles has revealed, that the flow within the LC transports particles of different size and buoyancy along different trajectories, making mixing more effective.

Keywords *Water mixing, Langmuir circulation, shallow water, Darss–Zingst Bodden Chain, Vistula Lagoon.*

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Krzymińska, J., Przezdziecki, P., 2010. Fossil lacustrine bodies in the Gulf of Gdańsk as recorded by seismoacoustic data and ostracodological analysis. *Baltica, 23 (1),* 25-32. Vilnius. ISSN 0067-3064.

Abstract The studies were carried out in testing grounds (*polygon-1 and polygon-2*) located in the western part of the Gulf of Gdańsk. They included lithological, biostratigraphic and seismoacoustic investigations of sediments, whose Late Glacial to Atlantic Period age was determined by the ^{14}C method and verified by palynological analyses. Ostracodological study indicates that the sediments represent both freshwater and marine environments. The species composition of freshwater ostracods from the sections confirms that the sediments were deposited in local lacustrine bodies. Seismoacoustic survey shows that these bodies are ca. 200 to 1000 m in size with spaces of 2 to 5 km between them. They were depositedduirng the Late Glacial and developed up until the onset of marine transgression.

Keywords *Gulf of Gdańsk, Ostracods, seismoacoustic data, ostracodological analysis.*

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Jakimavičius, D., Kovalenkovienė, M., 2010. Long–term water balance of the Curonian Lagoon in the context of anthropogenic factors and climate change. *Baltica, 23 (1),* 33-46. Vilnius. ISSN 0067-3064.

Abstract The Curonian Lagoon has been intensively used by the activities of the Klaipėda State Seaport. Presently there is concern about the impact of climate change on physical–geographical factors. The question is what impact climate change and port modernization projects had on the hydrological regime of the Curonian Lagoon. For this reason the water balance of the Curonian Lagoon was calculated for the period of 1960–2007. Analysis of the balance was used to evaluate the changes in the hydrological regime. The dynamic of water exchange via the Strait is very much important and depend on: the change of water level between the Baltic Sea and the Curonian Lagoon, the hydrological regime of the rivers and the changes in the permeability of the Strait as a result of dredging projects.

Keywords *Curonian Lagoon, Baltic Sea, water balance, climate change, hydrological regime, river runoff.*

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Suuroja, K., Suuroja, S., 2010. The Neugrund meteorite crater on the seafloor of the Gulf of Finland. *Baltica, 23 (1),* 47-58. Vilnius. ISSN 0067-3064.

Abstract The Neugrund impact structure is located on the southern coast of the entrance to the Gulf of Finland (59°20’ N, 23°31’ E), straight eastward of the Osmussaar Island (Odensholm, *Swed.;*Odin’s Grave, *Engl.*). The structure is very well preserved and the only one with morphological units, visible and easily accessible for the researchers and skin–divers. The Neugrund is a complex meteorite crater about 20 km in diameter. In the centre of the structure emerges the inner crater with a two–ridged rim wall having approximately 7 km rim–to-rim diameter: an inner ridge of about 6 km and an outer ridge of about 8 km. The presence of a central peak (uplift) of about 5.5 km diameter in the deep part of the crater is not proven. A 4-5 km wide terrace or zone of dislocations surrounds the inner crater. The Neugrund impact structure formed in the Early Cambrian (ca. 535 Ma ago) as the result of impact of an asteroid about 1 km in diameter.

Keywords *Estonia, Gulf of Finland, Osmussaar, Odensholm, meteorite impact, impact structure, complex impact structure, inner crater, outer crater.*

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University, Ravila 14a, 50411Tartu, Estonia. Manuscript submitted 10 March 2010; accepted 20 May 2010.

Jungerius, P.D., Riksen, M.J.P.M., 2010. A contribution of laser altimetry images to the geomorphology of the Late Holocene inland drift sands of the European Sand Belt. *Baltica, 23 (1),* 59-70. Vilnius. ISSN 0067-3064.

Abstract This paper explores the possibilities of applying the analysis of laser altimetry images to Dutch drift sands. All along the European Sand Belt, which stretches from Great Britain to the Ural Mountains, Late Glacial cover sands, river dunes and other ice–age deposits were reactivated as drift sand during the Holocene. New insights were obtained in three aspects of drift–sands geomorphology. Firts, the variety in forms of drift–sand landscapes is often described as chaotic. Laser altimetry images show that complex clusters are formed elongated in the direction of the prevailing SW wind and consisting of three zones which correspond to the successive aspects of the aeolian process: deflation, transport and deposition (dune formation). In densely populated areas, this structure has been ruined by human activities. Second, contrary to common belief, the drift–sand cells expanded against the prevailing SW wind, whereas the characteristic comb dunes at the opposite NE edge remained fixed by vegetation. Third, the authors questioned the view that drift sands are due to anthropogenic activities. The origin of drift sands can best be explained by the climate with violent storms in the first part of the past millennium.

Keywords *Wind erosion (deflation), inland dunes, parabolic dunes, comb dunes, Netherlands.*

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