Załącznik 3 – Annex 3.

SELF-PRESENTATION

1. Fist name, last name: **TERESA RADZIEJEWSKA**

2. Diplomas and degrees held (type, place and year of conferral, Ph.D. thesis title)

- **1972:** higher education diplomat (M.Sc.): Faculty of Marine Fisheries, Agricultural College in Szczecin (subsequently: Agricultural University in Szczecin; at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin); **M.Sc.** in Marine Fisheries
- **1981: Ph.D.:** Faculty of Marine Fisheries, Agricultural University in Szczecin (at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin); Ph.D. thesis title: **"Studies on distribution and ecology of the southern Baltic meiofauna in 1975-1979"**

3. Employment history (research institutions only)

- **1972**: technical assistant, Department of Oceanography, Faculty of Marine Fisheries, Agricultural University in Szczecin (at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin);
- **1972-1974**: research-teaching assistant, Department of Oceanography, Faculty of Marine Fisheries, Agricultural University in Szczecin (at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin);
- **1974-1981**: senior research-teaching assistant, Department of Oceanography, Faculty of Marine Fisheries and Food Sciences, Agricultural University in Szczecin (at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin);
- **1981- 1995** and **2000-2002**: assistant professor, Department of Oceanography, Faculty of Marine Fisheries and Food Sciences, Agricultural University in Szczecin (at present: Faculty of Food Sciences and Fisheries, West Pomeranian University of Technology in Szczecin);
- **since 2002**: assistant professor, Palaeoceanology Unit, Faculty of Geosciences, University of Szczecin

- employment in **1995-1999**: Chief Specialist in Hydrobiology, INTEROCEANMETAL Joint Organization (IOM), Szczecin.

4. Scientific achievements, as defined by Art. 16 Para. 2, Act on Scientific Degrees and Titles of 14 March 2003 (Dz. U. No. 65, Issue 595 with alterations):

a) **Title of achievement**

The monograph

Radziejewska, T., 2014: Meiobenthos in the Sub-equatorial Pacific Abyss: A Proxy in Anthropogenic Impact Evaluation. Springer, Heidelberg, 105 pp. (ISBN 978-30642-41457-2; DOI 10.1007/978-3-642-41458-9)

The monograph presents, in a systematic and synthetic manner, the current state of knowledge on the meiobenthos of nodule-bearing abyssal areas in the sub-equatorial zone of the North-East Pacific. The term "meiobenthos" (or alternatively "benthic meiofauna") is used to denote small (body size range of 0.030-1.0 mm) invertebrates inhabiting seafloor sediment; this grouping is treated as distinct ecological entity. The monograph focuses on the meiobenthos as a component of sedimentary biota, with a potentially high importance as a proxy in the assessment of intensity of disturbance in the deep-sea sedimentary habitats produced by anthropogenic interventions involving development of mineral seabed resources.

The deep seafloor supports deposits of mineral resources of a potentially enormous commercial importance. Those resources include polymetallic (ferro-manganese) nodules which are chunks of minerals containing commercially valuable metals. The largest deposits are to be found in certain areas of the abyssal plain, at depths exceeding 4000 m. In the Pacific Ocean, the most abundant deposits occur in the Peru Basin (South Pacific) and in the so-called Clarion-Clipperton Fracture Zone (CCFZ) in the sub-equatorial North-East Pacific. This is the area the studies discussed in the monograph focus on. The CCFZ is a huge (about 2 million km^2 surface area) nodule field managed by the International Seabed Authority (ISA) established pursuant to the United Nations Convention on the Law of the Sea (UNCLOS). ISA is charged with activities related to preparation of commercial development of nodule deposits, including conclusion of contracts with states as well as national and international consortia (initially termed the "pioneer investors" and currently known as the "ISA contractors") applying for concessions for nodule mining. Although nodule exploitation is the ultimate goal of every contractor, no contract on exploitation has been signed yet. Such a contract has to be preceded by a contract for long-term exploration and research of a nodule-bearing area assigned to a contractor. The recent years have seen intensified interest of various countries as well as national and international consortia in obtaining rights to conduct such research and exploration of nodule-bearing areas assigned by ISA separately to each contractor. It should be mentioned here that Poland – by virtue of the country's involvement, since 1985, in the international consortium INTEROCEANMETAL Joint Organization belonging to the group of "pioneer investors" – aspires, too, to participate in nodule development and processing.

Although the commencement of commercial nodule development is still a matter of the future, it is commonly assumed that the development is imminent. At the same time, it is clear that the nodule mining will be associated with heavy disturbance of the marine environment integrity, and that the brunt of the impact will affect the sedimentary milieu the nodules are a part of. Pursuant to regulations contained in UNCLOS, it is each ISA contractor's duty to prepare and conduct mining so that adverse effects in the sedimentary habitats and their biota are reduced as much as possible. This is turn necessitates research aimed at developing assessments of mining environmental impacts; a reliable assessment is only possible with knowledge on indicators and proxies that could, and should, be used to collect as much information on the scope and intensity of disturbance as possible.

By analogy with research in shelf areas, it is assumed that a pool of such indicators and proxies includes parameters describing the structure of meiobenthic assemblages. The monograph discussed, based on the research of nodule-bearing Pacific abyssal meiobenthos carried out so far, addressed the question if, and to what extent, this assumption is rational and feasible.

b) discussion of the scientific objective of the work described above and its results, including discussion on their application potential

The scientific objective of the monograph in question is finding an answer to the question whether – considering the current level of knowledge of nodule-bearing areas' meiobenthos in the sub-equatorial Pacific abyss, the CCFZ nodule field in particular – it is feasible to use the parameters describing the structure of meiobenthic assemblages to assess the extent of disturbance produced in the sedimentary habitat as well as to assess the recovery potential of the areas impacted by nodule mining.

I was striving to meet this objective by characterising, in the monograph chapters:

- meiobenthos as an ecological entity,
- environmental conditions in the Pacific abyss, with a particular reference to the conditions prevailing within CCFZ,
- the current state of knowledge of the CCFZ meiobenthos,
- results of field experiments in which parameters describing the structure of meiobenthic assemblages were used to evaluate the intensity of sedimentary environment disturbance in the Pacific nodule fields.

At the beginning, using a large set of publications, I prepared a characteristics of the meiobenthos as a distinct ecological entity important for the functioning of benthic community on account of its high contribution to the benthic metabolism and secondary production. It is noteworthy that, although in most studies the meiobenthos is analysed at a fairly low level of taxonomic resolution (at the level of the so-called major taxa, i.e., phyla, orders or families), the more detailed analysed conducted so far contributed to the awareness of the extremely high biodiversity of the meiofaunal major taxa. Detailed taxonomic identifications, whenever performed, bring fruit in the form of descriptions of numerous new species, genera, and higher taxa. Nevertheless, the knowledge of this biodiversity, particularly with respect to the deep-sea meiobenthos, is still very limited. On the other hand, research on the ecology of shelf meiobenthos demonstrated this ecological entity, even when analysed in terms of major taxa, is a sensitive indicator of environmental changes. This is increasingly frequently taken advantage of in marine environmental monitoring and in the assessment of factors impacting the natural status of the marine environment. The accuracy and reliability of the assessment can be enhanced by increasing the taxonomic resolution of the analyses, and also by including information on functional traits of meiobenthic taxa represented in the assemblage. Such approach is gaining popularity in studies conducted in shelf areas, but is still rare in deep-sea research.

I moved on to present a synthetic characteristics of environmental conditions in the sub-equatorial NE Pacific, with a particular reference to conditions prevailing in the CCFZ nodule field. With reference to a long list of publications documenting results of oceanographic, geological and sedimentological research and surveys conducted in the Pacific, I discussed environmental conditions and gradients (including the ocean surface productivity gradient), seafloor topography, and characteristics of the CCFZ sedimentary cover. In particular, I focussed on the main reason Man has become interested in the CCFZ, namely the nodule deposits occurring primarily on the sediment surface, at abundances frequently exceeding 10 kg/m^2, but occasionally interspersed by nodule-free bottom areas. The nodules contribute to the characteristic habitat heterogeneity of the CCFZ seafloor for deep-sea animal communities. The nodules themselves are unique, extremely interesting for benthic ecologists, habitats as fragments of a hard bottom on the otherwise soft-bottom abyssal seabed.

The subsequent chapter presents, based on the analysis of relevant literature, including a number of publications I was an author or a co-author of (**Radziejewska and Modlitba, 1999**; **Radziejewska et al., 2001 a, b**; **Radziejewska, 2002**; **Radziejewska and Kotliński, 2002**; **Vanreusel et al., 2010**) a synopsis of the current state of knowledge on the metazoan meiobenthos of the sub-equatorial NE Pacific abyss, including the CCFZ. The meiobenthic assemblages, consisting of several major taxa, are dominated by two of them: free-living nematodes (Nematoda) and benthic harpacticoid copepods (Harpacticoida). The two groups are characterised by a high taxonomic richness (number of taxa), evident when the analysis is carried out at the level of genus (and more seldom species). Lists of nematode and harpacticoid genera generated based on the research carried so far in the CCFZ contain 10-246 and 34-62 genera, respectively. Some genera (e.g., *Acantholaimus* among the Nematoda and *Pontostratoites* among the Harpacticoida) seem to occur throughout the CCFZ, although the dominants change with location. For example, nematodes of the genus *Terschellingia* are dominants in the eastern part of the CCFZ, while the nematode taxocoenes in the central and western parts are dominated by the genus *Acantholaimus*. Most of the individuals extracted from the sediment samples represent new, undescribed species. Meiobenthic abundances in the CCFZ range within the order of 10^1-10^2 ind./10 cm^2, i.e., an order or two less than in shallower and shelf areas. The abundance variability of the CCFZ meiobenthos is considered to be habitat-dependent, controlled primarily by the sediment type, the presence or absence of nodules in particular. The nodules themselves serve as a habitat for specific meiobenthic assemblages. In this context, I reanalysed – using the non non-metric MultiDimensional Scaling (NMDS), updated (in terms of conformity with the current systematics and species name validity) sets of data on the nematode and harpacticoid occurrence in nodule-free and nodule-bearing seafloor areas. The genus-level composition of both taxa showed differences related to the differences in the habitat type. the differences being more pronounced in nematodes than in harpacticoids. In addition, the variability of qualitative and quantitative characteristics of meiobenthos distribution in the CCFZ may be related to the small-scale patchiness of the sedimentary environment, resulting from effects produced by natural factors and processes such as intensified near-bottom water dynamics, activity of the megabenthos, the presence of biogenic structures, for example large protists (Xenophyophorea and Komokiacea; **Kamenskaya et al., 2012**). Moreover, during my research in the CCFZ (**Radziejewska, 2002**; **Radziejewska et al., 2001 a, b**) it was possible to record a meiobenthic response to an episode of organic matter supply in the form of phytodetritus, i.e., remains of the surface phytoplankton bloom sedimenting down to the seafloor. This phytodetritus supply to the bottom sediment could be documented by measuring contents of plant pigments (chlorophyll *a* and phaeopigments) in the sediment. Particularly pronounced was the response to the phytodetritus supply among the nematode family Desmoscolecidae and the harpacticoid family Argestidae, their abundance increasing dramatically in samples from phytodetritus-enriched sediment, compared to those with lower sedimentary pigment contents.

I proceeded to highlight, in the next chapter, the use made so far of the meiobenthos as a component of assessment of anthropogenic disturbance to the abyssal seafloor. Laboratory or in situ studies on the degree of disturbance of the marine environment have been using various proxies reflecting changes in attributes of benthic communities (e.g., abundance, biomass, composition, taxonomic richness, biodiversity). In practice, most frequent is the use of those attributes as they pertain to the macrobenthos. However, as already mentioned, the attributes of meiobenthic communities are increasingly frequently recommended for use. Those recommendations were taken into account when designing and conducting a series of field experiments carried out in anticipation of the commencement of nodule development in the Pacific abyss. The experiments involved alteration of the sedimentary environment mimicking that produced by effects accompanying nodule mining, or effects assumed to be produced by nodule extraction were generated in the sediment. The seafloor disturbance was effected with various devices. In the American DOMES experiment (CCFZ;1975-1980), the device was a test miner; the German DISCOL experiment (1989-1996) in the Peru Basin (S Pacific) involved a specially designed plough-harrow; a series of programmes conducted in the 1990s in the CCFZ (the Joint US-Russian BIE, 1991-1993; the Japanese JET, 1994-1997; IOM BIE, 1995-2000 I was involved in, with results described in a number of publications: **Tkatchenko and Radziejewska, 1998; Radziejewska et al., 2001 a, b; Radziejewska, 2002; Radziejewska and Kotliński, 2002**) used a specially designed device known as the Benthic Disturber. All those programmes relied, more or less heavily, on changes in parameters describing the meiobenthic assemblage structure as the major proxies with which to assess the magnitude and intensity of sedimentary environment disturbance. The proxies included both qualitative (genus-level taxonomic composition of nematodes and harpacticoids) and quantitative (abundance of the total meiobenthos and dominant taxa as well as the relative abundances of the latter). It was also attempted to determine the degree of recovery in the disturbed areas and their recolonisation by resampling during follow-up cruises undertaken at various time intervals post-disturbance. As expected, the meiobenthic assemblages did respond to disturbance of their habitats, the major response being seen in the reduction of abundance immediately after the disturbance. Effects observed during the follow-up studies differed considerably between the programmes. In most cases, the overall community recovery was recorded, sometimes as early as several months after the disturbance. However, this numerical recovery was accompanied by an alteration in the taxonomic composition of nematode and harpacticoid taxocoenes. The most important effect of disturbance in the nodule-bearing areas was the removal of nodules, whereby recolonisation proceeded in a habitat dramatically altered relative to its original form, for which reason the changes observed in the meiobenthic assemblages can be interpreted in the context of habitat change. Nevertheless, changes in the taxonomic composition of nematodes and harpacticoids were observed also when the disturbance was applied to nodule-free areas of the bottom. That was the case in, i.a., the IOM BIE, and nodule removal as a dramatic habitat change could not be invoked when interpreting the changes observed. Then, an unequivocal explanation of the causes underlying the changes becomes difficult, particularly in view of the length of intervals between follow-up cruises (from a few months to a few years). The patch mosaic effects, whereby the disturbance leaves patches of undisturbed sediment serving as refuges for small benthic invertebrates, could have been at play. They could have been accompanied by effects of some natural phenomena such as episodes of phytodetritus sedimentation known to affect deep-sea meiobenthic communities and to induce responses of those communities contributing to the changes observed.

When summing up the analysis of different programmes discussed in the monograph in the context of their using the meiobenthos as a proxy in evaluation of deep seafloor disturbance I concluded that the parameters used to described the meiobenthic community structure prove, generally, useful as tools with which to elucidate two interrelated aspects of impact: its severity and persistence. The severity of impact can be inferred from a reduction in the meiobenthos assemblage abundance and change of its composition, particularly with respect to the taxon richness of the dominant taxa (provided there are data on the taxonomic composition, which requires involvement of taxonomic experts). However, the actual type of impact has to be taken into account, as individual studies that are discussed in the monograph differed in the impact type they addressed. While DISCOL and IOM BIE, particularly the latter, focused on changes in the seafloor directly physically affected by the disturbance-producing device (e.g., Disturber runner grooves in the IOM BIE) the Joint US-Russian BIE and JET concentrated on the impact understood as sediment blanketing by resedimentation (burial). In both types of impacts, the meiobenthic communities as a whole and their major components – nematodes, and in certain instances also harpacticoids – did show undisputable local responses visible as reduced abundances in the area directly affected by the disturbance-producing device and/or in the area of resedimentation. On a longer term, some community functions were observed to have been altered. However, although it was postulated that a general direct measure of impact severity from changed abundances and assemblage composition could be sought in a quantitative relationship between, e.g., the resedimentation layer thickness (burial depth) and faunal change, no such measure could have been developed so far. Another aspect is the persistence of impact, in other words the rate of recolonisation of the disturbed area. In nodule-bearing areas experiencing an obvious effect of an extreme habitat alteration due to nodule removal and the accompanying quantitative changes in meiobenthic assemblages, the recolonisation rate will be assessed as the rate at which the total abundances are rebounding. This in turn will depend on provision of food resources available to the meiobenthos and, as predicted by the patch mosaic theory, on the presence of a pool of colonisers in refuges left in the impacted area itself or in its vicinity. The results analysed allow to concluded that such a pool did exist in all cases. The actual recolonisation rate, however, could have hardly been evaluated given the long time span between the post-impact and follow-up samplings (e.g., 6 months in JET, 22 months in IOM BIE). During such a time span, some unexpected and/or unrecorded events could have occurred, some of which – for instance the phytodetritus sedimentation – could have enhances the recolonisation process. Therefore, when planning studies with a focus on the meiobenthos, aimed at refining environmental assessments of nodule mining impacts, a suite of associated measurements and observations should be included to facilitate interpretation of results. Such measurements and observations (e.g., long-term current data, video footage of megafaunal activity close to and on the seabed, sediment geochemistry with a focus on proxies of labile organic matter supply, bacteria- and protist-related variables) will provide means with which to get a glimpse on past events which would leave traces persisting until the time of meiobenthos sampling.

I concluded by stating that – considering the present state of knowledge – parameters describing the meiobenthos community structure are important proxies in the evaluation of anthropogenic intervention in the deep sea. Utilisation of a full potential of those proxies, however, will depend on the advances in enhancing the taxonomic resolution of meiobenthos analyses, particularly with respect to the dominant taxa – nematodes and harpacticoids, as well as on overcoming methodological and logistic constraints. It is important that appropriate sediment sampling gear (particularly the multiple corer) be used, multivariate techniques for the analysis of data be applied, a statistically sound number of sampling sites be planned, and additional measurements and observations of the deep seafloor habitat be performed. The present climate of international scientific collaboration offers an opportunity to overcome those constraints in the interest of good governance over deep-sea areas replete in mineral resources.

<u>5. Description of remaining scientific achievements</u>

Having graduated from the Faculty of Marine Fisheries, Agricultural University in Szczecin, and having presented and defended an M.Sc. thesis on the occurrence of zooplankton in the southern Baltic Sea, I was, for a brief period of time, involved in research on the Baltic zooplankton, focusing on new species in the Baltic zooplankton. This research was reflected in a few publications (e.g., **Radziejewska et al., 1974**). Inspired by my teachers, Professors Idzi Drzycimski and Władysław Mańkowski, I became interested in the meiobenthos (meiofauna), a poorly explored – particularly in the Baltic Sea – ecological entity in the benthos. This interest redirected my research which, since then, has been concerning primarily questions related to the occurrence and ecology of the meiobenthos in various aquatic areas.

I began with studies focusing on the distribution of the **meiobenthos in the southern Baltic Sea**, using materials collected, in the 1970s and 1980s, during my participation in cruises on board research vessels operated by the Sea Fisheries Institute in Gdynia and the Marine Branch of the Institute of Meteorology and Water Management. The first part of that research was summarised in my Ph.D. thesis (**Radziejewska, 1981**). In the meantime, in 1975, I stayed at the DAFS Marine Laboratory in Aberdeen (Scotland, UK) for 6 months as a UNESCO fellow. There I had an opportunity to continue my studies on the meiobenthos under the guidance of professors A.D. McIntyre and W.D. Hummon and obtained a sound methodological and theoretical basis for my future research. Extremely helpful in enhancing this knowledge was my stay (1982-1983), as an IREX fellow, at the laboratory of professor W.D. Hummon at the Ohio University, Athens, Ohio (USA). I continued my studies on the Baltic meiobenthos in the 1980s and 1990s using materials collected during cruises throughout the entire southern Baltic Sea (**Radziejewska, 1989; Szulwiński et al., 2001**) and during short expeditions to the coastal areas of the southern Baltic on board small research boats (**Radziejewska and Drzycimski, 1986**; **Radziejewska, 1992; Rokicka-Praxmajer et al., 1998**). Studies described in the publications referred to allowed to characterise distribution of the southern Baltic meiobenthos on various spatial scales.

When working on the <u>sub-regional scale</u> (the entire southern Baltic; **Radziejewska, 1981, 1989**), I was able to demonstrate a distinct zonality in the distribution of abundance and diversity of the meiobenthos, in relation to depth, sediment type, and the presence of hypoxia and anoxia in the near-bottom water.

My work on the meiobenthos on the <u>scale of sub-areas within the sub-region</u> of the southern Baltic involved participation in the analysis of co-occurring assemblages of meio- and macrobenthos in the south-western part of the Arkona Basin (**Radziejewska and Masłowski, 1997**) which revealed differences in responses of those two ecological entities of the benthos to episodes of hypoxia: the macrobenthic responses in the form of reduced abundance, biomass, and diversity were much more distinct than those of the meiobenthos, thus confirming the high adaptability and fast recolonisation potential of the latter in areas degraded by, in our case, hypoxia. This research was carried out in the framework of Project ODER (Oder Discharge Environment Response), the EU Framework Programme 3 in which the Agricultural University research team I was heading was involved.

My research on the scale of <u>smaller coastal areas of the southern Baltic</u>: off the south-western Polish coast (**Radziejewska, 1992**) and in the Pomeranian Bay (**Rokicka-Praxmajer et al., 1998**) allowed to reveal variability in the occurrence and structure of meiobenthic assemblages associated with direct and indirect effects of riverine discharge to the coastal zone. The analysis of nematode taxocoene, conducted – on the same scale – off Kołobrzeg along an about 60 Nm long transect (**Szulwiński et al., 2001**) allowed to follow a change in functional composition of the taxocoene (relative abundance of individual trophic guilds) in relation to sediment type and depth: the domination of epistrate feeders and non-selective deposit feeders on the sandy bottom in shallow areas made way to the domination of selective deposit feeders on the deeper muddy-sandy and muddy bottom. The research on the scale discussed here includes also studies, supported by the Polish Committee for Scientific Research (grant No. 5 5481 9102; "The structure of benthic communities of the southern Baltic in terms of size and biomass distributions") on size and biomass spectra of the benthos in the inshore part of the Gulf of Gdańsk. Our analysis of benthic biomass spectra (**Drgas et al., 1998**) showed a clear separation between the meio- and macrobenthos regardless of the sediment type sampled.

My research on the scale of small areas in the coastal zone of the Baltic Sea involved analysis of a small-scale impact of sediment enrichment with organic matter from biodeposition of blue mussel (*Mytilus edulis*) on meiobenthos assemblages (**Radziejewska, 1986**). I was able to demonstrate an enhancing effect, visible as increased abundance, by the enrichment, particularly visible in the nematode taxocoene, in the vicinity of larger *Mytilus* aggregations. This group of my studies includes also analysis of the effects of artificial reefs deployed in the Pomeranian Bay on the composition and abundance of meiobenthos (**Radziejewska, 1998**). I was able to document effects of organic enrichment, produced by biosedimentation and biodeposition on the part of sessile communities inhabiting the reefs, on meiobenthic assemblages around them. The effects were visible as enhanced abundance and reduced taxonomic richness in the immediate vicinity of the reefs. My studies on the scale of small areas include also participation in analysing variability of the occurrence and genus-level diversity of free-living nematodes at a site in the Pomeranian Bay directly affected by the discharge from the Szczecin Lagoon, a site featuring sediment particularly enriched by organic matter exported from the Lagoon (**Rokicka-Praxmajer and Radziejewska, 2002**). The analysis presented in the paper illustrated variability of taxonomic (genus-level) and functional (trophic guilds) structure of the nematode taxocoene with depth in sediment and over time.

My research on the Baltic Sea meiobenthos allowed me to participate in the work of an international group concerned with the Baltic ecosystem biodiversity research conducted within the Census of Marine Life programme (CoML; 2000-2010). This work resulted in a publication (**Ojaveer et al., 2010**) to which I contributed by preparing a section dealing with the Baltic meiobenthos.

The Fulbright-Hayes Award I received in 1991 made it possible for me to work, for 10 months, at the laboratory of Professor J.W. Fleeger in the Louisiana State University, Baton Rouge, Louisiana (USA). My collaboration with professor Fleeger, Dr Nancy Rabalais, and Professor K. Carman there involved studies on meiobenthos of the Gulf of Mexico (**Radziejewska et al., 1996**) in areas which were directly affected, on the one hand, by the Mississippi River plume in the Gulf, and by annual episodes of hypoxia in shallow-water areas west of the Mississippi delta. The paper referred to highlighted the influence of conditions on hypoxia-affected bottoms and pelagic-benthic coupling on distribution of meiobenthic assemblages. The pelagic-benthic coupling resulted in the sediment, within the Mississippi plume, being heavily enriched with organic material of the pelagic origin: sedimented phytodetritus and copious zooplankton faecal pellets. The meiobenthic responses were visible in a significant relationship between abundances and distribution of the meiofauna in the sediment and the degree of plant material enrichment as assessed via measurements of sedimentary plant pigment (chlorophyll a and phaeopigments) contents.

The second line of my research interests involves the structure and functioning of the **ecosystems of Baltic lagoons**, with a particular reference to sediment-dwelling communities in the Szczecin Lagoon. My research produced a characteristics of the Lagoon environment (**Radziejewska and Schernewski, 2008**), publication of first papers on the meiobenthos of the Lagoon (**Radziejewska and Drzycimski, 1988, 1990**), analysis of long-term variability of Lagoon's benthic communities in the context of hydrographical and climatic effects (**Radziejewska and Chabior, 2004**), and interest in effects of the zebra mussel (*Dreissena polymorpha*) aggregations on characteristics of the sedimentary environment and benthic communities in the vicinity of large zebra mussel aggregations in the Lagoon (**Radziejewska et al., 2009**). This line of my research includes also studies on effects, in the historical and contemporary context, of pelagic plant material (phytodetritus) sedimentation on the sedimentary environment and benthic communities of the Lagoon. This research is a part of an on-going study supported by the National Science Centre grant No. N N305 397538 ("Dynamics of changes in sedimentary environment communities of the Szczecin Lagoon under conditions of an intensive supply of plant organic material from the water column: contemporary and historical aspects").

The third line of my scientific activities involves studies on communities inhabiting **deep-sea areas**. This line of my research interest, which I was able to develop thanks to my work at the INTEROCEANMETAL Joint Organization (IOM), participation in oceanic research cruises on board research vessels chartered by IOM for surveys in the Clarion-Clipperton Fracture Zone (CCFZ) of the Pacific, and collaboration with numerous deep-sea specialists brought fruit in the form of results presented in publications on CCFZ meiobenthos in general, on harpacticoid and nematode diversity, and on effects of anthropogenic activities. Those publications served as a basis for the monograph described above (**Radziejewska, 2014**), so they will not be treated here. In addition to those publications, my research on deep-sea communities was reflected in some other papers. One of them is a publication, co-authored by a large group of scientists, dealing with effects of deep-sea habitat heterogeneity on the diversity of deep-sea nematodes (**Vanreusel et al., 2010**). My contribution to the paper involved analysis of data on the diversity of nematodes occurring in the Pacific nodule-bearing areas.

Another publication on dwellers of deep-sea habitats, but outside of the scope of the monograph discussed above, presents analysis of data on the occurrence of megafauna in the CCFZ (**Radziejewska and Stoyanova, 2000**). The spatial and temporal variability of megafaunal occurrence in the CCFZ, described in that paper, was dependent on, first, the sediment type. Nodule-covered areas showed a domination of sessile organisms (e.g., the Porifera and Hydrozoa) as opposed to nodule-free stretches of the bottom where the megabenthic – much more abundant than in the nodulised areas – was dominated by motile organisms (primarily echinoderms: holothurians, brittle stars, and echinoids). The second aspect of the variability observed had to do with time, or rather with environmental changes occurring over time and affecting the megabenthic assemblages. The major factor in those changes, which it was possible to detect in the materials analysed, involved effects of sedimentation of phytodetritus originating from surface phytoplankton blooms. The deposited phytodetritus resulted in organic enrichment of the sediment, thus augmenting food resources available to the megafauna. The data analysed reflected megafaunal responses to the enrichment, observed primarily as increased abundance of taxa particularly efficient in utilising this food supply (e.g., brittle stars).

My research on the deep-sea communities includes also interest in protists inhabiting the CCFZ sediments: non-calcareous foraminiferans classified, on account to their size, with the meiobenthos, and representatives of large abyssal Protista – the Xenophyophorea and the Komokiacea which, on account of their size, are classified with the megafauna.

Non-calcareous foraminiferans (agglutinating and soft-walled forms) belong to the most abundant life forms in abyssal sediments; molecular studies show them also to be extremely biodiverse. The degree of knowledge of those organisms in the CCFZ sediment is relatively low, whereas relevant research has the potential of supplying, first, new data extending our knowledge on the abyssal sediment communities. Second, on account of the ubiquity of those organisms and their reactivity to environmental changes (e.g., phytodetritus sedimentation) known from other oceanic areas, research on those organisms may prove important in the context of using their potential bioindicative qualities in environmental impact assessments in the deep sea. With this idea on mind, I studied the CCFZ non-calcareous foraminiferans with the support of the Polish Committee for Scientific Research grant (No 3 P04 F004 25; "Recent Foraminifera in surface sediments of the abyssal plain in the North-East Pacific (the Clarion-Clipperton nodule field)"). The study made used of the already collected abyssal sediments from the CCFZ. The research team conducting the study determined qualitative and quantitative characteristics of non-calcareous foraminiferan assemblages in the CCFZ sediments (**Radziejewska et al., 2006**) by indentifying the morphotypes found and describing their abundances and distribution in the sediment.

Representatives of the Xenophyophorea and the Komokiacea – large (frequently described as "gigantic") protists of the abyss occur in the deep sea under eutrophic and oligotrophic water masses, respectively. As the CCFZ is located in a zone intermediate between the eutrophic and oligotrophic areas, the sediments support both groups. Xenophyophoreans are frequently observed attached to nodules, whereas the presence of komokiaceans is visible both on the sediment surface ("mud balls") and through the abundance of their fragments in the sediment. Both groups, classified within the Foraminifera, are regarded as important for carbon cycling and storage in the deep sea, but knowledge on their status in the CCFZ is highly insufficient. Using the materials already collected from the CCFZ as well as those from an area further north, at the foot of the Monterey Canyon (the so-called Station M) and thanks to the support of the National Science Centre's grant (No N N303 371036; "The Komokiacea – gigantic deep-sea foraminiferans: distribution and diversity in two oceanographically different abyssal areas of the NE Pacific"), I had an opportunity to ensure collaboration of Dr Olga Kamenskaya of the P.P. Shirshov Institute of Oceanology, Russian Academy of Science in Moscow, an outstanding expert on the Komokiacea. The collaboration resulted in the analysis of the occurrence of the two protist groups and developing a collection of images of specimens and their fragments found in sediments of the two oceanographically different areas of NE Pacific: the CCFZ, with domination of komokiaceans, and Station M, dominated by xenophyophoreans. Materials from the latter areas were kindly supplied by Dr Stace Beaulieu of the Woods Hole Oceanographic Institution w USA. So far, the CCFZ data were used in a paper published by the team conducting the study (**Kamenskaya et al., 2012**); the paper is one of the few publications dealing with this aspect of benthic communities in the nodule-bearing Pacific areas.

In recent years, my research interests have encompasses **introduction of alien species** to the Baltic Sea and adjacent areas, primarily by transport in ships' ballast tank water and sediment. This line of my research was reflected in a paper (**Radziejewska et al., 2006**) on meiobenthic organisms found in the ballast tank sediment of a ship undergoing repairs in the Gryfia Repair Shipyard in Szczecin. This was the Baltic Sea's first analysis of meiobenthic invertebrates supported by a ship's ballast tank sediment. A particular attention was drawn to identification of free-living nematodes found in that sediment. My interest in the "biological cargo" carried in ships' ballast tank water and sediment, particularly with organisms of an invasive potential in the River Odra estuary (including the Szczecin Lagoon) was reflected in studies carried out in support of the National Science Centre grant (No. N N304 163736; "The fauna of ships' ballast tanks as potential immigrants to the River Odra estuary") in which I was involved as an investigator. The study focused on the fauna of ballast tanks of several ships brought to repairs at the Gryfia Repair Shipyard in Szczecin, located in the Odra estuary. Preliminary results of the study were summarised in a paper by **Gruszka et al. (2013)** which concluded that, although the "biological cargo" examined proved very diverse, it contained few indentified alien species. However, numerous species could not be identified. Moreover, the densities of organisms in the ballast tank water always higher than the allowed thresholds, thus a risk of alien species introduction to the estuary via discharge of ballast water from the ships to the shipyard basin cannot be ruled out.

My publication track record contains also papers dealing with **topics other** that those described above. Those topics include, among others, environmental effects on seafood quality (**Radziejewska, 2011; Tórz et al., 2011**); marine protected areas (**Radziejewska and Gruszka, 2005**); analysis of diatom assemblages occurring under extreme environmental conditions (**Witkowski et al., 2011**); valuation of marine environment (**Węsławski et al., 2006**); state of knowledge on the Baltic Sea environment and its problems (**Witkowski and Radziejewska, 2006; Piechura et al., 2006**)

Bibliometric indicators of my publication track record, as per the Web of Science data base accessed on 27 August 2014 are defined by the Hirsch index of 8 and the number of citations (without self-citations) of 190.

Other aspects of my scientific track record cover, *inter alia*:

- leading and participation of research projects::

- Project ODER – Oder Discharge Environmental Response (EU Framework Programme 3; contract No. PL 910398), leader of the Polish research team under subcontract (No. ERBCIPDCT930007) with the project coordinator, the University of Edinburgh (1994-1995);
- Polish Committee for Scientific Research grant No. 5 5481 91 02 ("The structure of benthic communities of the southern Baltic in terms of size and biomass distributions"), Principal Investigator (1991-1993);
- Polish Committee for Scientific Research grant No. 3 P04 F 004 25 ("Recent Foraminifera in surface sediments of the abyssal plain in the North-East Pacific (the Clarion-Clipperton nodule field)"), Principal Investigator (2003-2005);
- Polish Committee for Scientific Research grant No. 2 P04 F 097 27 ("Benthic diatom assemblages in the River Odra system: assemblage structure and the assessment of the state of natural environment"), Investigator (2004-2007);
- National Science Centre ,grant No. N N303 371036 ("The Komokiacea – gigantic deep-sea foraminiferans: distribution and diversity in two oceanographically different abyssal areas of the NE Pacific"), Principal Investigator (2009-2011);
- National Science Centre grant No. N N304 163736 ("The fauna of ships' ballast tanks as potential immigrants to the River Odra estuary"), Investigator (2009-2012);
- National Science Centre grant No. N N305 397538 ("Dynamics of changes in sedimentary environment communities of the Szczecin Lagoon under conditions of an intensive supply of plant organic material from the water column: contemporary and historical aspects"), Investigator (in progress)

- presentations at international and national scientific conferences (i.a., BMB Symposia, Baltic Sea Science Congresses, World Marine Biodiversity Congresses, European Marine Biology Symposia, Deep-Sea Biology Symposia, conferences of the Polish Hydrobiological Society, Geopomerania) (totalling more than 50 presentations)

- active participation in international scientific workshops, including those arranges within the Census of Marine Life – sub-programmes CoMarge (Gent University, 2008) and CeDaMar (Friday Harbour, USA, 2009)

- reviewing manuscripts submitted for publication in scientific journals (Deep-Sea Research; Journal of Experimental Marine Biology and Ecology; Central European Journal of Biology; Oceanologia; Oceanological and Hydrobiological Studies)

- 2005-2006: serving as Associate Editor for the journal „Acta Ichthyologica et Piscatoria" (in the JCR journal base);

- participation in developing the BONUS ERA-NET Science Plan (2003)

- participation, as a European Commission expert, in reviewing projects and programmes submitted and conducted within EU Frameworks Programmes 6. and 7. and Horizon 2020;

- membership of the Baltic Marine Biologists (BMB); in 2005-2007 serving as the BMB Committee President; at present BMB Committee Secretary

- membership of Steering and Scientific Committees of the Baltic Sea Science Congresses (Sopot 2005, Tallinn 2009, St. Petersburg 2011, Klaipeda 2013)

- membership of Organization Committees of international conferences, including the BMB Symposium Szczecin 1989; International Diatom Symposium, Międzyzdroje 2005; Geopomerania, Szczecin

- collaboration with the industry, including studies serving as a basis for the development of environmental impact assessments (the LNG facility in Świnoujście); monitoring of marine environment surrounding the pleasure pier at Międzyzdroje for Adlerschiffe Polska Sp. z o.o. (2009); 2008-009 – participation in HELCOM monitoring of the Baltic Sea conducted by the Marine Branch of the Institute of Meteorology and Water Management in Gdynia; since 2010 – participation in implementation and post-implementation monitoring of the marine environment in areas of the LNG facility construction in Świnoujście.

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