WORKSHOP REPORT

Safecoast Actions 2, 5a & 5b

Interreg North Sea Region
ERDF

Workshop Report

Safecoast Actions 2, 5a & 5b

Combined workshop, 18-20 September 2007 in Aabenraa, Denmark

Tuesday, Sept. 18th:

Thorsten Piontkowitz welcomed the workshop members to Denmark and gave an introduction to the scheduled program. Jacobus Hofstede followed up with his welcoming address: "Will there be life after climate change?" Concerning possible coastal adaptation strategies to climate change, he ended with a provocative statement: "it is far more cost and energy efficient as well as environmental friendly to raise the dikes and/or to replenish sand than it is to relocate/adapt millions of people and their infrastructure".

An ice-breaking 2-persons interview explained and moderated by Jacobus was following. This phase comprised four interviews with varying partners for each person. The fixtures were given by Jacobus. All interviews contained one and the same question and had to be answered by both interview partners. This question was: "What does climate change mean to you?" One interview was lasting five minutes in sum and after that time the interview partners had to be changed. Everybody received number- and colour-coded cards to write the outcomes of the interviews on. There was one card for each round in a different colour. The number represented the person. Besides the goal to get to know each other, the aim was to see the change in answering the same question several times, when gaining new information and ideas in every interview. Is there a visible development from the first round to the last? The result represented by Jacobus was that it depends on the person whether he or she is willing to consider and to integrate new aspects in their answers or not. Nevertheless, with the major part of the group developing statements could be found. Primary doubts of some workshop members concerning performance and results of the game were replaced by a nice experience, as nearly everybody agreed afterwards.

In the afternoon of the first day opening speeches to the main subjects of the workshop were given. Some orators were invited for these introducing speeches which should give a basis for everybody to be able to participate in the following discussions. Carlo Sorensen gave a speech on coastal erosion. Andreas Kortenhaus introduced the audience into coastal flooding and vulnerability and reported the progress of the EU project FLOODsite. Furthermore, Heiko Grunenberg explained principles of communication and especially risk communication.

Coastal erosion

by Carlo Sørensen

Carlo introduced the topic coastal erosion in an unorthodox, rather philosophical way (erosion stands for "eros" and "ion"). The intention was to give the participants – all being experts on the topics – hints and eye-openers for the rest of the workshop.

Coastal flooding and vulnerability

by Andreas Kortenhaus

The presentation on coastal flooding and vulnerability started with a definition of risk as it is used in FLOODsite. There, risk is equal to probability of failure times consequences of this failure. The consequences highly depend on the vulnerability of the affected value. The model applied to the risk analysis is the so-called source-pathway-receptor approach. The approach describes the course of events in case of a flood chronologically and causally. The North Sea, actually their water, represents the source of risk. The risk is transferred through the pathway to the receptor. With floods the land itself is the pathway, including protection measures as dikes or flood barrages as well as the hinterland with its stream networks. If the pathway is not locked for the danger coming from the source, the flood is transported to the people and the values at risk and leads to consequences for them. The combination of probability of an existing source and a failure causing an open pathway with an estimated damage leads to a predicted flood risk.

In FLOODsite the source-pathway-receptor approach is applied to pilot sites all over Europe. Not only coastal sites are investigated but also estuaries, river catchments and areas suffering from flash floods. One pilot site is the coastal lowland at the village of St. Peter Ording, located at the North Sea coast of Schleswig-Holstein in Germany. The village is located directly behind high dune belts and the main dike, which are also protecting the very low lying hinterland. Moreover, the area is characterised by its location on a peninsula and by high forelands, consisting of broad beaches or salt marshes.

After the comparison of available numerical models for flood simulations, an overview over one of them, the software SOBEK was given. In FLOODsite some model tests on the implemented breach development approaches and a sensitivity analysis were conducted. Their results were shown and explained in this presentation.

Concerning vulnerability the performance of certain steps is required. At first, statistical data of the flood prone area has to be identified. The data has to be broken down on cost categories, followed by a selection of the most important categories for the flood prone area. Then damage functions and scenarios of flood defence failures are selected. After processing the data, damages depending on flood scenarios and the resulting risk can be calculated by application of geographic information systems (GIS). Here the flooding consequences are defined as the monetary value of inundated assets.

There are different types of values existing. They can be categorised in terms of direct or indirect damages as well as in terms of tangible and intangible values. Another important decision to make is, which scale is applied to the vulnerability assessment. The scale of the pilot site and available and required data determine the scale of the methods to be chosen.

One result of the FLOODsite study on St. Peter Ording was that ca. 90 % of all values at risk are found in only four of about ten damage categories. Those major categories were private buildings, private inventory, fixed assets, and the gross value added. The latter is always given annual sums. Based on this fact, the development of a standardised tool by simplifying the MERK micro-scale risk analysis methodology was carried out. Instruments of simplification were the use of high resolution data, the reduction of damage categories, and the generalisation of value assessment. Only values of the major four categories should be

collected. In order to consider all values, it is recommended to add the missing 10 % for damage assessment.

Finally, some remaining challenges were mentioned. One question is, how to deal with direct intangible and indirect damages. Risk communication and perception, social and ecological resilience have to be discussed as well as risk mitigation and management.

The communication of risks

by Heiko Grunenberg

Heiko started with the problem definition, i.e., people having problems with risk appraisal. Their risk assessment depends upon own experience and anthropological basics. Results of psychometrical risk research reveal that the appraisal depends upon factors like: the catastrophic potential of the consequences, personal involvement, possibilities to personally influence the risk.

Concerning the communication of risks, two alternative strategies exist: (1) defensive (no panic, no topics, ease the situation, and answer only when asked), and (2) pro-active (enlightened and interested citizens, give knowledge and solutions). Subsequently, some technical approaches were presented. In these models, five main perspectives: the communicator, the message, the medium, the recipient, and the context have to be considered. Surrounding questions for the communicator are, for example.

- ✓ Do I want to have interactive partners, or work alone?
- ✓ What do I think about the average citizen (stupid/clever, etc.)?
- ✓ Do I want to inform, control, effect, mislead, enlighten?

At the end of his presentation, Heiko addressed one main difficulty with communication: “One cannot NOT communicate”. If you want or not: no active communication is communication as well. So, try to be ahead of the communication.

Wednesday, Sept. 19th:

Workshop 1: Risk of flooding and risk communication

The first workshop covered the risk of flooding and risk communication. It was scheduled for Wednesday morning. In order to give more detailed information on the topics, four presentations were given by members of the Actions 2, 3b, and 5b. This way, the workshop participants were provided with input and ideas for the following discussion. The presentations dealt with numerical modelling of floods, the vulnerability of values at risk and risk calculations, and risk communication. Mainly last results and current investigations in the different Actions were reported.

Coastal flood modelling – methodological improvements

by Patrik Peeters & Paul Vanderkimpen, Action 3a

A task of Action 3a is on the one hand to investigate the performance of coastal flood modelling, using different numerical models, and on the other hand to improve the methodology.

In order to cope with these tasks, primarily the software MIKE was applied to the project area, the Belgian North Sea coast. Additionally to the use of only one model, a limited benchmark study was carried out for the models MIKE FLOOD and Sobek. Within the study, inter alia different approaches for the simulation of breach growth including the implemented formulae were compared. For this purpose, a sensitivity analysis of parameters and options for breaches was conducted. Beside the breach model, also flood propagation and model settings of MIKE FLOOD were tested by means of a sensitivity analysis.

The hydraulic evaluation of flood scenarios and therefore model parameters was based on three hydraulic indicators. Firstly there was the inundation depth as an average of all flooded cells. Secondly the inundated area and thirdly the flood volume defined as average depth times total flooded area were taken into account. The model's sensitivity regarding different parameters was assessed by calculating the variation of the hydraulic indicators in terms of percentage of deviation from a reference level.

The finding from the sensitivity analysis was a value of impact on the simulations for all tested parameters. Many parameters were found to have minor influence, since in case of their modification the variation of hydraulic indicators was $< 5\,\%$. The most influencing parameters were the variable roughness and the breach growth mentioned before. But also wind induced drag forces and grid resolutions, representing the model topography, were found to have significant effects on hydraulic indicators.

The taken course of actions was recommended to be a 'best estimate' model, including roughness and breach growth. This gives an idea of uncertainties in results. Finally, effects of combined variations of the two parameters and results in terms of damage were shown in the presentation.

Vulnerability and risk calculations

by Wouter Vanneuville, Action 3a

The presentation held by Wouter Vanneuville was about vulnerability and risk calculations. Like the talk of Patrik Peeters the project area for this study was the coast of Belgium. The presentation was started with general statements, concerning methodology of risk modelling and how it is influenced by the availability of data. Another statement was that depth-damage relationships are generally accepted, since the inundation depth is the key element in flooding. Nevertheless, it can hardly be considered as an exclusive parameter. The last statement mentioned the location of vulnerability and risk determination at the end of the calculation chain, which means that uncertainties accumulate in this part of a risk analysis and that again the level of detail should be discussed.

Then, it was explained that events of low occurrence probabilities and large consequences and those of high probabilities but smaller consequences may lead to equal amounts of risk.

The workflow of risk analyses was shown as well. Required input data are on the one hand detailed land use maps and socio-economical data, used to create maximum damage maps. On the other hand, flood maps originate from the input data digital elevation model, hydraulic model, and hydrologic model, which are all processed in numerical flood simulations.

Depth-damage relationships are represented by functions, by which means the damage ratio of a flooded asset can be determined from a given inundation depth. The percentage of damage depends on the type of value and its vulnerability. It was stated in this presentation that these relationships are not sufficient, since they do not consider the influence of flow velocities or wave overtopping on the damage. In order to take those effects into account, additional damage calculations were recommended.

With regard to damages, resulting from high flow velocities and wave overtopping, more detailed investigations were carried out. The approaches and their results were also described here. Two new damage factors were developed. The factor β_v represents the influence of the flow velocity and β_d the influence of the water depth. Their product is equal to the total damage coefficient β, which has a maximum of 1.

At last, the preparation of an approach for the assessment of numbers of casualties was explained.

Flood simulation and flood damage evaluation at two German pilot sites

by Holger Blum & Sandra Burg, Action 3b

The task of Action 5b is the application of state of the art flood simulations and flood damage evaluations to two German pilot sites. Additionally, the necessity for further investigations on hydraulics and damage evaluation methods was one of the outcomes from the former EU project COMRISK. For this purpose, two very different pilot sites in Lower Saxony, Germany, were chosen. One is the small, narrow island of Langeoog located in the East Frisian Wadden Sea and the region of East Frisia with its coastal low lands is representing the second pilot site.

The workflow of a damage analysis is explained in this presentation as well. Importance is attached to the term of flood damage analysis, which should not be mistaken for risk analysis. A flood damage evaluation does not include probabilistic calculations and therefore no information on risk.

The island of Langeoog can be separated into two parts. The western part contains a village, rural areas, and infrastructure, while the very narrow eastern part is mainly unused. The project area was restricted to the western part, since it is the only officially protected area on the island. Dune belts are protecting the project area on its northern and western side, while in the south and east coastal defence consists of a ring dike. A secondary dune belt and a street dam subdivide the flood prone area into three polders.

In the presentation characteristics of damage potential analyses on micro level were described, for the micro-scale MERK method had been used for the island of Langeoog. The most

important difference to meso- or macro-scale methods is the high level of detail in both space and height. The resulting total values up to 19.5 m above sea level are about 1.1 billion €. This value is representing the damage potential of Langeoog and has already been determined in the former COMRISK project.

In comparison to relatively simple flood calculations conducted in COMRISK, a more complex numerical 1D2D model was developed by means of the software Sobek. The development of the model was described in the presentation as well as the considered boundary conditions and model parameters.

The conclusion was that the application of complex models like Sobek is costlier but useful due to more detailed and more accurate results. Damage potential analyses on micro level are very costly as well but contrary to the simulations only applicable to small areas or in projects with high budget.

Due to recommendations from the investigations on Langeoog, for the second pilot site East Frisia the application of a meso-scale damage potential analysis and the use of Sobek as a complex model for flood simulations were decided. East Frisia is surrounded by the North Sea on its northern and western coast. The estuary of the river Ems borders the project area in the south. The entire coast line of East Frisia is defended against floods by dikes. The hinterland is characterised by extremely low lying areas and a dense drainage network. Only some small towns are found in this mainly rural area.

Concerning the damage potential analysis, also the characteristics of methods on meso level were given. In this type of approach free of charge statistical input data and aggregated land use data are appropriate. For present investigations of Action 5b a method developed by Meyer (2005) was used, which was also illustrated in this presentation. The results of the damage potential analysis showed a total sum of values at risk of about 33.6 billion €. Regarding the distribution of values, a concentration in four damage categories was detected. Those categories were private buildings, private inventory, fixed assets, and gross value added. Other investigated categories have been of minor importance (less than 5 % each). This fact was also found in the damage potential analysis of Langeoog and is supported by outcomes of other studies.

The applied depth-damage functions were taken from the earlier KRIM project and represent a statistical combination of certain other damage functions.

For flood simulations of the pilot site of East Frisia a parameter study was carried out prior the calculation of actual scenarios. The variation of model parameters led to a ranking of sensitivity for the tested parameters. It was found that breach width is the most influencing parameter for this pilot area by far followed by roughness and stream cross sections with minor influence.

Then the development of the flood simulation model was described, including boundary conditions and model parameters. In order to gain comparable scenarios the coast line was subdivided into quasi-homogeneous sections and 11 potential breach locations were chosen.

Finally, some results of flood simulations were exemplified and some drawn conclusions were given. So-called break lines in the hinterland, e.g. 2nd dike lines or street dams, take great effect on flow propagation and therefore inflowing volume. Additional information on flood

characteristics like flow paths and flood propagation durations is provided by more complex models like Sobek. Since such kind of information is important for certain target groups, the use of state of the art models for flood simulations was recommended.

The informed society

by Maren Knolle, Action 2

Maren introduced the results of cohesion action 2: "the informed society". Targets were: (1) to raise awareness for flood risks, (2) to raise acceptance for (costly) coastal flood defence measures and own responsibilities and, as a result of 1 and 2, (3) to reduce the flood risks of inhabitants of flood-prone areas. To achieve theses targets, a communication strategy should be developed and tested. Main work-packages were a desk top study, a primary analysis of communication activities in the partner countries, the production and on-site evaluation of a door-to-door circular, and the development and testing of an exhibition. Main outcomes of these work packages were presented.

Based upon the desk-top study and the primary analysis, some recommendations for the production of the circular were established. For example, the more intensive the people are potentially affected, the greater will be their perception of the risk and their readiness to take action. The circular should, therefore, focus on explaining how people are affected. Another example, people take preventive measures only when they are convinced that their measures will have effect. Hence, in the circular, effectiveness should be stressed in the description of personal measures. Further recommendations were that the texts should provide references for further, more detailed information and that trustworthy of the information should be underlined by pointing at the quality of the scientific basis.

The circular was distributed in four flood-prone pilot areas in Schleswig-Holstein in April. Two questionnaires were distributed in May and in June to control the "sustainability" of the circular (did the message get across). It was, amongst others, asked how threatened (very high, high, low, very low) people feel by storm surges. In the first poll, 45% of the responders felt high to very high threatened. It was interesting that this percentage declined to 36% during the second poll. About two third of all responders had read the whole brochure, 5% only headlines. About 75% take the content of the circular seriously, and 69% thought the contents were useful to them. A positive outcome was that 14% of the responders answered that they have taken preventive actions after reading the circular. Of those who did not take preventive measures, almost 40% said that there is no need to take such actions, 17% thought that these actions would have no effect. In general, the surveys revealed that the people need to be convinced about the effectiveness of preventive measures in order to implement them. Based upon the outcomes of the evaluation, the circular has been improved. This updated circular will be distributed in all coastal lowlands of Schleswig-Holstein early 2008.

The last activity under cohesion action 2 is the development and testing of an exhibition. Maren informed about the concept which has been established. The next step will be to build the samples. In March, the exhibition will than start to travel.

Discussion of four questions in two working groups

In order to exchange knowledge of the main topics of the workshop and to gain some new ideas, a couple of prevailing questions was prepared by the hosts. These questions were discussed by the workshop participants, who have been divided into two groups for this purpose. In each group members of all nationalities and fields of activities were present to cover as many aspects of the questions as possible.

The questions to be discussed were:

- How to deal with uncertainties?
- How simple should flood risk analyses be?
- Will the determination of flood hazard zones lead to regional economic disparities?
- How feasible is target group oriented risk communication?

The results of the discussions were summarised and reported to the plenum by the two rapporteurs Gabi Gönnert and Andreas Kortenhaus. After the findings from the discussions were presented, they were again reviewed by the plenum.

The first question was about the problem of uncertainties, which are an important aspect of all flood simulation models. Besides the models, uncertainties arise in every part of risk analyses. Input data contain uncertainties as well as the parameters of calculations or numerical models. The workshop members agreed that uncertainties are significant and can reach very high values (easily a factor of 10). But there was a disagreement, if and in which way they should be communicated. It was stated that on one hand uncertainties need to be communicated, but on the other hand they create scepticism to use the results. Nevertheless, decisions need to be reached. Another position was that always a range of results, probably based on scenarios, has to be given. Moreover, end users do not desire to know uncertainties but interpretations of results or clear recommendations. In this context, the aspect was mentioned that, if uncertainties or values of risk (e.g. in maps) are provided to the people, they have to be clear, since there are expectations on accuracies of results and the acceptance of maps depends on the user.

The next question dealt with the simplicity of risk analyses. The question was not only, how simple such an analysis can be, but how simple it should be. The main argument for models as simple as possible was that there is a need to make it simpler and therefore easier to understand. The major part of the group not fully agreed with this argument, because the analysis can be complex, if the results are communicated in an easy way. The aspects of target groups played a major role in all debates, although it was discussed in the last questions separately. Other arguments against simple analysis were that the use of simple models may stop further scientific developments in this area and that possible risk aversions due to climate change in media represent a demand for best models. A synthesis of these arguments might be to apply complex analysis but to formulate the results depending on who is receiving them.

With the third questions was asked, if the determination of flood hazard zones will lead to regional economic disparities. Nearly everybody agreed that the development of disparities will be the result of defined flood hazard zones, although there are possibilities of regulation and communication to control. One reason might be the importance of feeling of safety. Effects of specific zoning on the one hand can be the development of new ideas for e.g. flood

proof buildings. On the other hand the solidarity principle of insurances might be influenced. It is hardly realistic that all people pay for flood insurance whether they are affected or not. The only argument against the increase of regional economic disparities was the existence of other criteria which make people move to flood prone areas.

With the last question the feasibility of target group oriented risk communication was covered. The use of target groups in risk communication was believed to be very meaningful by everybody, since different groups have different backgrounds and interests in the level of information. Concerning target groups, it was mentioned that the scale of information and communication (national or regional) is important. Various tools of communication, such as TV, flyers, or newsletters, are available and address different groups. But feasibility was said to be the key question, for communication requires lots of effort.

Excursion to Geltinger Birk peninsula (Germany)

Wednesday afternoon, an excursion to the Geltinger Birk, a spit along the Baltic Sea coast of Schleswig-Holstein, was conducted. This spit has a long history of coastal flood defence and protection. Already in 1581, a first dike was erected in the area. Major flood catastrophes occurred in 1625 and 1694, and, in 1750, a second dike was erected. Between 1826 and 1832, two wind mills were built to drain the lowland artificially, and agricultural use of the area started. In 1872, the worst catastrophic storm flood in the region occurred. The whole area was flooded. In the year 1939, a local water board was founded to manage drainage and flood defence. In 1980, due to coastal erosion problems, high costs for maintenance and ecological considerations, a discussion on the future of the Birk started. Ten years later, a planning phase was initiated: "flood defence and development scheme for the Geltinger Birk". This resulted in a parliamentary decision (by Schleswig-Holstein State Parliament) on dike relocation and renaturation. The first measure that is presently being conducted is the building of a new State dike behind the existing one to protect a small settlement. In the "outdiked" area, the groundwater level will be raised subsequently. Almost this whole area is owned by a public nature conservation foundation. In the end, the area will be managed in an environmentally friendly manner.

Thursday, Sept. 20th:

On Thursday morning, the workshop started with a presentation given by Teun Terpstra concerning flood risk perception and disaster preparedness decision. Teun presented results of a household investigation in the northern Friesland (NL). Questionnaires were distributed to investigate the households´ flood risk perception and preparedness intentions.

The results showed that flood risk communication might end up with denial if the responsible persons

- do not pay attention to what people can do to prepare for flooding
- do not give them the idea they have a personal responsibility in flood protection

In conjunction with the results of his investigation, Teun presented the *person-relative-to-Event (PrE) model of coping with threat* by Mulilis & Duval saying:

If the coping resources are perceived as

- insufficient relative to the threat than emotion focused coping (denial, wishful thinking) will arise.
- sufficient relative to the threat than problem focused coping (adopting preparedness actions) will arise .... but only when the person perceives to be personally responsible.

After the presentation by Teun Terpstra, two sessions on coastal erosion and its communication were conducted. In the first session, two separate working groups on coastal erosion (T) and on risk communication (C) discussed technical questions as well as questions concerning risk communication. In the next session, the two groups T and C were mixed (TC1 and TC2) and integrated questions were debated.

Group C discussed with communication experts the following questions:

- Why perform risk communication?
- How to communicate the risk of slow, long-term (invisible) processes?
- How to increase the lifetime (in the heads) of information about risks?
- Why do affected tend to "ignore" risk information and how can we overcome this?

The group agreed not to take notes of this session.

Group T dealt with more technical questions concerning coastal erosion:

- Do we have appropriate models to assess coastal erosion for all coast types?
- Should we divide coastal erosion into prevailing erosion rates and additional future erosion rates due to climate change?
- How precisely can we and should we calculate future coastal erosion?
- What about the uncertainties in calculating coastal erosion? How should they be considered within methods/models?

The first question addressed the assessment of coastal erosion by models. It was concluded that these different models are not available due to the lack of enough data which is needed to feed these models for verification. For many different coast types the lack of data is considered as a main problem. The group agreed on that for the missing coast types appropriate models would be desirable. Moreover, it was clearly stressed that besides the erosion process above the water surface, the processes under water are very important, too, and have therefore to be included in the models.

The second question was about the explicit consideration of additional coastal erosion due to climate change in the future. The group opposed against the division of prevailing erosion rates and additional future erosion rates. As long as the data basis for coastal erosion rates at different coastal types is poor and the knowledge about the priorities of parameters (hydrodynamic forcing, morphological gradient of the seafloor, geological conditions) which control coastal erosion is imperfect, it should not be divided into prevailing and future erosion rates.

The next question dealt with the precision of calculating future coastal erosion. Quick agreement was reached on the fact that we are not able to calculate coastal erosion very precisely, yet. Reasons for this are the lack of appropriate models as well as the large uncertainties within climate change scenarios. However, the group stressed the wish of more precise coastal erosion calculations for the future.

The last question in working group T addressed the problem of uncertainties in calculating coastal erosion. It was agreed on that the uncertainties should be considered very seriously in calculating coastal erosion. One important aspect was discussed which considered the data transfer from one coastal stretch to the neighbouring. Such a transfer is not possible, as coastal segments differ in a lot of parameters. Coastal stretches should always be regarded as "geomorphological units" which means to take into account the whole coastal area from the erosional part via the transition zone to the accumulation area. Moreover, it was mentioned that an increase of the data basis due to e.g. comprehensive survey programmes would decrease the uncertainties.

During the second session, the two combined working groups TC1 and TC2 were confronted with the following questions:

- Is coastal erosion a continuous process and should we communicate it as such?
- Can we exploit "climate change" to communicate the hazards of coastal erosion?
- The positive message of coastal erosion is: accretion?
- Is there a threshold value for coastal erosion with respect to communication?

The results of the discussions of both combined groups were summarised and reported to the plenum by the two recorders Matthias Hamann and Thorsten Piontkowitz.

A common agreement was reached at the first question by both groups, as coastal erosion is accounted of being a continuous process which should be communicated as such. However, the rate of coastal erosion can fluctuate not only on a seasonal scale but as well in different timescales. These fluctuations should be communicated and explained to the public. It was proposed to link the communication of fluctuating erosion rates to specific cases/sites and give examples from history (historical maps) in order to ease understanding. Communication of coastal erosion should also deal with the uncertainties of assessing present erosion rates as well as assessing future development.

The second question resulted in disagreement between both groups. Group TC1 stressed that coastal erosion is a natural process which will be influenced by climate change in future, however climate change should not be misapplied to blame for everything. However, climate change should be mentioned as a long-term process affecting coastal erosion.

In contrast, group TC2 agreed on to use climate change to make public aware of coastal erosion. Present coastal erosion rates should be communicated to raise the awareness of accelerated erosion due to climate change.

The third question entailed again a common agreement by both groups. Both groups affirmed coastal accretion as the positive message of coastal erosion. Without coastal erosion there

would be no sandy beaches and no beach ridges, which are nowadays the settling area for a lot of small villages. Both groups stressed however, that communication of the positive message depends on the location. Concrete examples should be used for communicating the interaction between erosion and accretion.

The fourth question created again diverse thinking in both groups. On the one hand it was argued that coastal erosion should be communicated right away despite the fact how large present or future coastal erosion rates are at certain locations. On the other hand it was specified that each small numbers of natural coastal erosion (not caused by human impact) should not be communicated. In fact, the mindsets of the people should be changed. They should learn to accept a certain amount of coastal erosion as coastal erosion is a phenomenon which we experience since thousands of years along the North Sea and the Baltic Sea.

Agreement was again reached on the fact that coastal erosion management in form of strategies should be prepared before communicating coastal erosion to the public.

After the findings of both combined working groups were presented and again reviewed by the plenum, Thorsten Piontkowitz thanked all attendees for their active participation and valuable input during all workshop sessions. The workshop was closed at 13:00 hours.