

# COASTAL & MARINE



*Preparing to Adapt-II*  
Sharing coastal experiences  
With the Young Professionals  
Coastal Community - YPCC

# Statements

**Darius Semaška, Ambassador of Lithuania, The Hague, the Netherlands.**



*Our Lithuanian coast encompasses many valuable resources, which we prudently exploit. In the mean time we face the impacts of global changes along our coastline.*

*As Ambassador of Lithuania in The Hague I recognise the importance of timely and innovative adaptation safeguarding the coastal population and investments as undertaken by the Netherlands.*

*In order to prepare for the impacts of climate change and to develop the coastal assets in a sustainable way we stimulate the exchange of coastal knowledge between coastal countries and between the young and experienced coastal experts in particular.*

*It is therefore that we appreciated the efforts by the Klaipeda University and the Coastal and Marine Union (EUCC) in organising the international coastal conference Littoral 2014 in Klaipeda, our Baltic harbour city. During the Young Professionals Coastal Community – YPCC session, students of three universities: Leeuwarden, Vlissingen and Klaipeda presented their cases to the international audience.*

*This YPCC booklet 2015 reflects their enthusiastic efforts. The involvement of the young generation in applying long term, adaptive and resilient solutions is essential. The exchange through the YPCC initiative strengthening the involvement of students continues through the future biannual Littoral conferences. The participation of Lithuanian coastal students in these conferences will be encouraged.*

*I wish the YPCC programme a successful future empowering our young generation to address their future challenges.*

## YPCC workshop at LITTORAL 2016

**Coastal & Marine Union (EUCC), Leiden, the Netherlands**

We were very pleased to receive the YPCC workshop at our biennial international conference LITTORAL, this year in Klaipeda, Lithuania.

It has been great to see the participating students present their findings. Their views on the impacts of climate change adaptation adds a refreshing vibe to the presentations of leading experts.

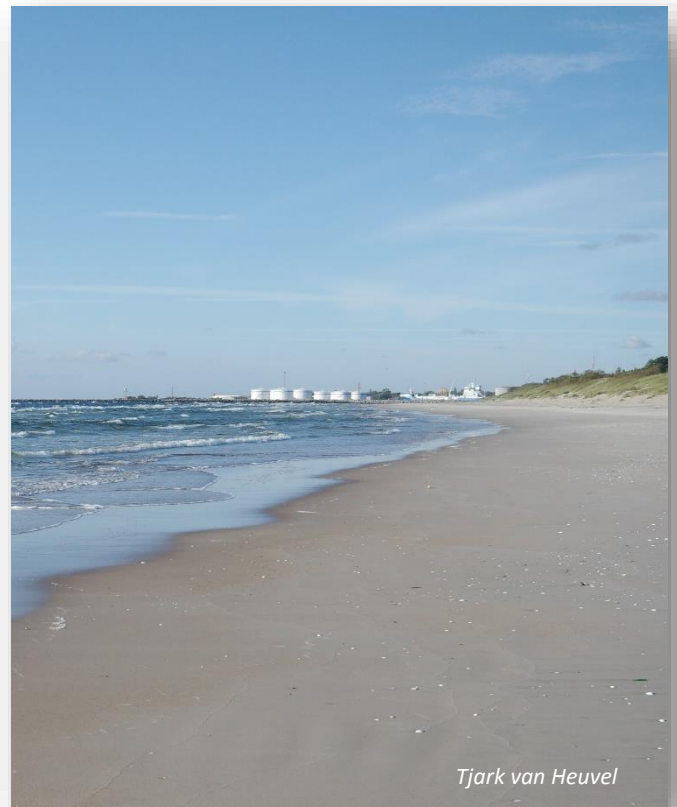
**Ramūnas Povilanskas, Professor at the Department of Recreation and Tourism of Klaipėda University & Director of the Coastal & Marine Union Baltic States office, Klaipeda Lithuania**



*It is a pleasure to address you all in this EUCC publication as result of our successful Bi-Annual LITTORAL Conference that took place in 2014 Klaipeda, Lithuania.*

*During the LITTORAL 2014 Conference in Klaipeda, students of three Universities for Applied Sciences presented their analyses of the impacts of future coastal changes and adaptive, sustainable solutions for 'their' coastal stretch. In this brochure, we share now their enthusiastic and creative efforts.*

*We are convinced that there are others that can provide valuable contributions to these discussions and to increase the level of applied coastal knowledge in the future. For this reason, we hope that the YPCC initiative will expand and involve more Universities of Applied Sciences. I sincerely hope to meet and greet many of you in good number in the future LITTORAL conferences. Share your knowledge and join us!*



Tjark van Heuvel

# Triggers for ICZM

## Is Accelerated Sea Level Rise likely?



**By Robbert Misdorp, Advisory member to board of directors of EUCC and YPCC programme coordinator**

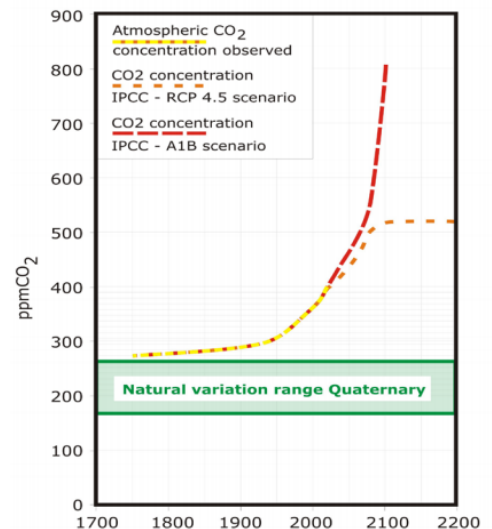
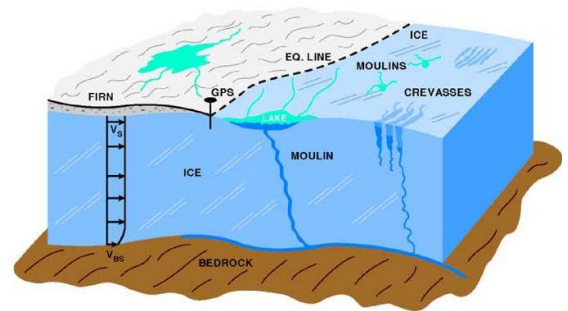
The three main triggers, for applying an integrated approach in planning and execution of resilient, no-regret adaptive coastal measures are the strongly increasing population and economic development, and the impacts of climate change (see YPCC

Brochure 2013 and the 'CCC' [Chapter III-2](#)). About 70 million inhabitants of low lying coastal areas are expected to be subject to yearly flooding in case global sea level will rise with one meter.

Here we will address climate change in a bit more detail. The concentration of greenhouse gases has strongly increased during the last half century in respect to the long term concentration during the last 800.000 years. The natural range of CO<sub>2</sub> varied between 180 and 280 ppm (parts pro million) CO<sub>2</sub> during the Quaternary coinciding with several glacial and interglacial periods and with falling and rising of sea level respectively. During the maximum of the last ice age, 18.000 BP, the sea level was about 120 m lower than today.

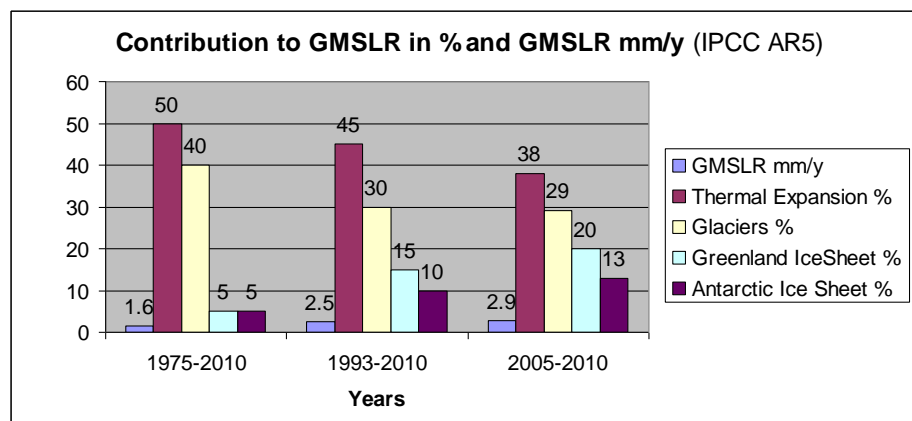
The present CO<sub>2</sub> concentration is 400 ppm, which is well beyond the maximum natural concentration of 280 ppm. During our 21st century strong increases are envisaged ranging from 550 ppm to 800 ppm, depending on the amount of greenhouse gas emissions we will produce. According to the moderate 550 pm CO<sub>2</sub> emission scenario RCP 4.5, the global mean temperature will increase during our century with 2°C and while the polar temperature will increase with 4 – 6°C (IPCC 2013 AR5). Climate change has many different impacts important for low lying coastal nations, e.g. changes in rainfall and river regimes, increase of the frequency and intensity of storms and cyclones, and sea level rise. These impacts will increase the frequency of flooding, coastal erosion and salt water intrusion effecting the safety of the coastal inhabitants, the agricultural production, the industrial output and the capital investment at risk.

Increase of global temperature will increase the thermal expansion of ocean water, and the melting of alpine glaciers and land ice masses. These three factors are contributing to global sea level rise and these are shifting in time.

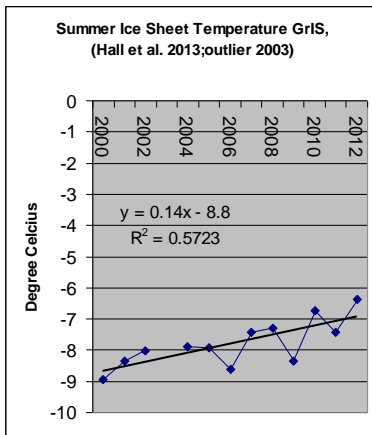


The melting of the two land ice mass is becoming more important, particularly the melting of the Greenland Ice Sheet – GrIS. Greenland Ice Sheet, 2.8 million km<sup>3</sup> ice, is relatively close to the equator, its southernmost tip is laying at 60°N, and therefore more susceptible for melting than the Antarctica land ice. Were the GrIS to melt entirely then the global sea level will rise with 7.2 m, the melting of West Antarctica Ice Sheet – WAIS corresponds with about 5 m SLR and the entire Antarctica with about 65 m SLR.

Greenland Ice Sheet in the Summer: supra-glacial lakes and vigorous currents of water transporting heat to the bedrock through a 'moulin'.



# Triggers for ICZM



Summer Ice Sheet Temperature averaged over the entire ice surface area of Greenland, increased in the period of satellite observations (MODIS): 2000 – 2012 with a high rate of 1.40°C/decade.

Similar rates of increasing (surface) temperatures are observed at the coastal meteorological stations of Greenland during the last 20 – 30 years. The net melting of the GrIS started in the 1990's with high speed according to satellite observations during the period 1990 – 2012.

A maximum of more than 500 km<sup>3</sup> net ice melt (negative ice mass balance) was reached in 2012. Large fluctuation in ice mass balances are however possible, due to factors as massive draining of supra-glacial lakes and massive refreezing of sub-glacial lakes. The moulin-transport of water = vertical heat transport to the bedrock complicates the melting process and may lubricate the sea ward motion of the ice masses, increasing the ice sheet instability. These melting processes are difficult to mathematically model and to predict. The melting of land ice masses contributes to sea level, the melting about 360 km<sup>3</sup> ice corresponds with a 1 mm Global Mean Sea Level Rise (GMSLR).

A black-box approach of the two ways of melting namely thinning of the ice sheet and calving in the coastal region accompanied with forming of icebergs, shows that a five-fold increase of thinning and of calving rate in the GrIS melting, is needed in order to reach a 10 mm SLR/ year. This SLR rate is not unlikely in case the polar temperature will indeed increase with 4 – 6°C and the strong melting rate of the GrIS of the last two decades will continue to increase.

A rate of global accelerated sea level rise of 1.5 m/century is considered as not unlikely, special considering the other contributing factors.

The ongoing thermal expansion of the ocean, and the effects of the so-called "sleeping giants":

- The large scale melting of WAIS. This is however not foreseen before the end of this century and
- The thawing of about 20 million km<sup>2</sup> permafrost has started and is releasing methane – CH<sub>4</sub>, a potent greenhouse gas. The estimated amount of CH<sub>4</sub> in the permafrost is double the amount in the atmosphere at present.

What has been observed up till now:

- The global sea level rise with an average rate of 15 – 20 cm/century started mid 19th century, see the oldest record of the world, the tidal gauge station of Amsterdam (PSMSL long records).
- Accelerated Sea Level Rise is envisaged but not yet clearly visible on the tidal gauge station records of the PSMSL. There is an indication of the possible beginning of acceleration shown in the Figure on page 3: 1975–2010: 1.6 mm SLR/y and 2005-2010: 2.9 mm SLR /y.

However, it is important for the coastal inhabitants, stakeholders, NGOs, managers, policy- and decision makers of low lying coastal nations and regions to anticipate a high estimate of SLR during their planning and subsequent execution of adaptive, no-regret, resilient, sustainable coastal measures. It takes time to plan and execute such coastal measures, so to act now is safer and cheaper. The Dutch Second Delta State Commission – 2008, took into account a worst case scenario of 1.3m SLR/21st century.

An ICZM approach is considered as **the** mechanism to adapt. Monitoring is an essential element during its various phases: sea level monitoring, consulting the PSMSL records of more than 2200 tidal gauge stations worldwide, keep track of the rate of change (temperature and melt) of the large land ice masses consulting 'real time' data bases.

For more information and image sources, see:

CCC- Climate of Coastal Cooperation, Chapter III-2, 2015: 'Triggers for ICZM': <http://www.coastalcooperation.net/part-III/III-2.pdf>

Dutch Second Delta State Commission 2008:

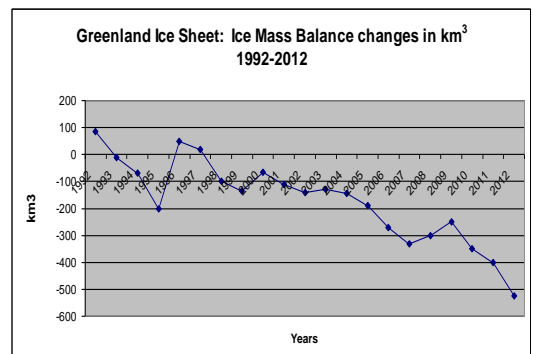
<http://www.deltacommissie.com/>

PSMSL – Permanent Service Mean Sea Level: [www.psmsl.org](http://www.psmsl.org) or;

[http://www.psmsl.org/data/longrecords/ancill\\_rep.htm](http://www.psmsl.org/data/longrecords/ancill_rep.htm)

YPCC- Young Professional Coastal Community Brochure 2013:

<http://ypcc.eu/wp-content/uploads/2013/05/ypcc2013-final-low.pdf>



## Submarine Friesland

### Effects of sea level rise on Friesland, The Netherlands

By *Fleur Holtrop & Arianne de Vries*,  
Students of University of Applied Sciences VHL

#### Introduction

More than one thousand years ago our ancestors started the ongoing battle against the sea by building the first dikes to keep their feet dry. Since then the Dutch have diligently innovated their water defence strategies. Gradually citizens started living in greater densities and more energy was required to keep society moving forward. To meet this growing demand for fuel, bogs and peatlands were drained and excavated to make peat briquettes. Unfortunately, the peat exploitation caused subsidence of the land, sinking it below sea level. To drain this now low lying land, windmills and dikes were built. Due to climate change and the current state of the coastal defences, the Netherlands and Friesland in particular may be facing their greatest challenge yet.

#### Global warming and sea level rise

Sea level rise, induced by climate change, is a threat to low-lying river Deltas such as the Netherlands. The low lying river deltas have to adapt to the rise in water level, otherwise millions of lives will become endangered. The data for the estimated sea level rise used for this research is retrieved from the Delta Programme 2014. This programme predicts a sea level rise of 0.15 to 0.35 meters by the year of 2050 and by the year of 2100 a rise of 0.35 to 0.85 meters. Since the subsidence caused by peat mining, production of natural gas and salt, and groundwater extraction has caused even more subsidence. This subsidence in combination with

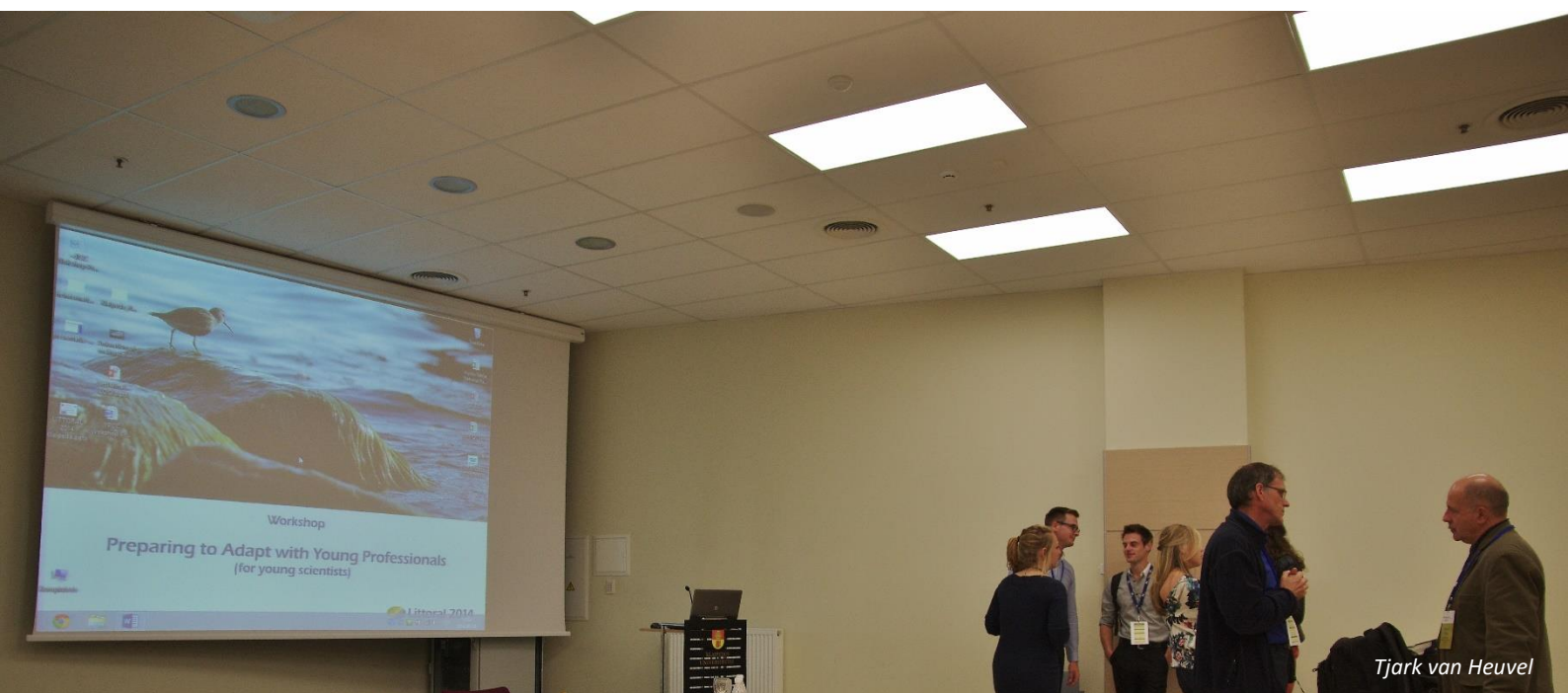
climate change puts the country at risk of flooding. In this study the focus lies on the Frisian coast in the North of the Netherlands.

#### Current situation of the Frisian coast

Sea level is closely linked to coastal systems such as beaches, wetlands, barrier islands and estuaries. These environments adjust to the rising water level by growing vertically, migrating inland or expanding laterally. If the sea level continues to rise, the coastal environments and human populations will be affected. Sand nourishment is a technique that is used to strengthen the soft coasts with sand that was lost due to natural processes. If sand nourishment is not applied, the Dutch coastline would recede 1 metre per year. This process would impact coastal functions, such as coastal defence, water supply, and recreation and tourism (Deltaprogramma, 2014). Where there are no beaches and dunes, dikes protect the mainland from the sea to keep it dry. Strengthening the dikes is also vital to the Dutch safety. The current strategy of the Delta-programme is focussed on efficient and effective maintenance and enhancement of the dikes along the Wadden coast line. Every six years these flood defences are tested to check whether they meet legally set safety requirements. According to the results from this test, performed in 2011, measures are necessary along 120 kilometres of the Wadden area to increase the level of safety. The 120 kilometers of dike are known as 'Dikering 6'. These measures involve raising the dike, enhancement of the outer revetment and inward stability.

#### Evacuation Plan

The flooding of Friesland would be a major threat to the civilians. The government is responsible for developing an evacuation plan to bring citizens to safety. Friesland is home to 650,000 people and it is not realistic to expect that everyone can be escorted personally to higher grounds. The new evacuation plan would encompass vertical evacuation of the people, governmental assistance for the elderly and physically impaired, and providence

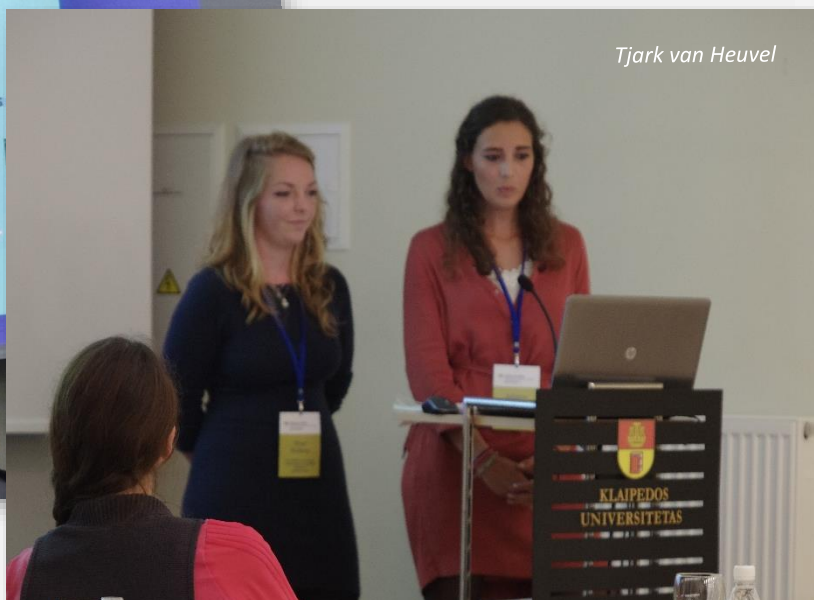


Tjark van Heuvel

# YPCC experiences – VHL Student Case

of survival packages. Citizens of Friesland are obligated to take temporary refuge in the larger cities such as Leeuwarden, Sneek and Dokkum or bordering provinces. Schools, sport facilities and flats are to be rearranged into shelters. The evacuation routes are to the south and east. Evacuation to the south is difficult due to the presence of two aqueducts in the main motorway. It is advised to travel Eastwards where higher grounds can be found.

disaster occurring is minimized. However, by doing this a grave environmental change will occur. Sustainable and adaptive measures are necessary in order to prevent environmental decay. A dike prevents the water from directly flowing inland, but the resulting pressure forces the water underneath. The salt water seeps into the fresh surface water lens. Previously this did not cause problems, but indirectly sea level rise will cause gradual salinisation of the soil as the amount of salt water that seeps under the dike will increase. Because of this, the current crops of the agricultural sector will not be able to survive. Halophyte crops could offer a viable source of income once the soil is too saline for 'regular' crops to grow. In the past many vegetables and herbs were collected in the coastal zone, including 'forgotten' vegetables such as sea kale and saline potatoes.



## Dike innovation and alternative solutions

Raising the dikes increases the used land space and visual limitations may occur. This may have a negative effect on the status of the Wadden area. The goal of the Delta programme Wadden area is to integrate safety with other functions, such as nature, recreation and sustainable economic activities. The current dikes have a hard outside coat which can have negative effects on biodiversity and the recreational and natural environment of the dikes is diminished. Alternative flood defence is a sustainable, cost effective and scenically beneficial solution, which can cope with changing climate conditions. An example of such an alternative flood defence solution is the 'Rijke dijk' (rich dike). The Rijke Dijk's strategy entails preservation and improvement of the existing dikes. Instead of the use of the hard outer coat, materials are used that increase the attachment opportunities for sessile organisms and counteracts dehydration of the dike. An increase of the bio-productivity improves the natural functions of the dike and the ecosystem. (Rijkswaterstaat, 2009). If Dikering 6 is improved and maintained the chance of a

## Conclusion

Sea level rise increases the power of the sea and weakens the dikes. The flooding of Friesland could have devastating consequences. If the worst case scenario were to take place, then it is key to rely on individual evacuation to the Southern and Eastern provinces next to Friesland. Citizens should evacuate vertically and seek refuge in cities on higher grounds. However, if the dikes are maintained and improved using innovative building ideas such as natural flood defences and alternative building materials this disaster can be prevented. Salinization of the soils is inevitable and this calls for adaption and alteration in the agricultural business by innovating in halophyte crops.

# YPCC experiences – VHL Statements

## Statement University of Applied Sciences VHL

**Angelique Kuiper MBA, Vice dean Delta Areas and Resources at VHL University of Applied Sciences, the Netherlands**



Climate change is one of the most pressing topics of our time and because of this the need for sustainable, long term policy making in coastal areas is of utmost importance. To be able to form good policies, solid scientific research should be at the base of this decision making process.

As vice dean Delta Areas and Resources at VHL University of Applied Sciences, it is my great pleasure to endorse this booklet. The professionalization of our students by bringing them together with experts in the coastal and marine field is regarded as a great added value to the education we give them. We train our students to become high-quality, ambitious and innovative professionals who contribute to a more sustainable world.

Thanks to the efforts of the YPCC and our motivated lecturers, our students had the chance to participate in the YPCC Littoral workshop 2014 for the second time. Just like in 2012, the programme entailed many values similar to the competences our students are taught here at VHL and therefore this opportunity has been a valuable addition to our courses. The programme makes theory and practice come together through an assignment that challenges students to find tangible, sustainable and adaptive measures to cope with the local impacts of climate change.

The opportunity to mix and mingle our students with professionals from many different European countries is something VHL fully supports. We encourage the YPCC to continue their programme in future years.

## Statement students VHL

From the 22nd till the 26th of September the 12th edition of the once every two year 'coastal Littoral conference' took place. The conference was this year organized in Klaipeda, Lithuania. A number of studies and initiatives were presented at this conference, including the concepts of ICZM (integrated coastal zone management), GIS & Marine Spatial Planning, dune management and climate change. A wide range of coastal and marine research was discussed during LITTORAL. The conference offered the perfect opportunity for broadening the network of researchers and professionals from across Europe. To be a part of the workshop 'Adapting to the future with young professionals' was a great learning experience. Joining the LITTORAL 2014 gave us a chance to broaden our professional network and to experience working in an international environment. The research we did for the workshop: "The effects of the sea level rise on the province of Friesland, The Netherlands", taught us how to plan and execute a professional research, a research report and a presentation. The goal of the presentation was to inform the international researchers about the situation in The Netherlands and how the Dutch are adapting to the changing climate and the rising sea level.

The Lithuanian experience has been a great motivation for us to pursue our studies so that, in the future, we are able to make a change and improve the coastal zones all around the world.



# YPCC experiences – Klaipėda Student Case

## CLIMATE CHANGE DRIVEN HAZARDS ON THE LITHUANIAN BALTIC COAST AREA

*By Eglė Zuzevičiūtė, Rūta Ramonaitė, Indrė Masionytė, Ričardas Zaicas, Students of the Klaipėda university, Faculty of Natural Sciences and Mathematics, Klaipėda, Lithuania.*

### Introduction

The Baltic Sea is the world's second largest brackish water body. The Lithuanian coastal zone, in the south-eastern part of Baltic, has a coastline of 90 km and sandy sediments. Lithuanian coast can be divided into two parts: The Curonian Spit (51 km), and the mainland (39 km) coast. White fine and clean sand beaches attract holidaymakers mostly during the summer. However, each season portrays its own coastal beauty enjoyed by coastal inhabitants. On the other hand, several coastal problems are appearing and linked with geological and lithodynamical processes, climate change and global warming in the Lithuanian Baltic coastal zone. Lately, extremely strong storms have been noticed in connection with the rising of sea level and neotectonic movement. Human activities such as the reconstruction and deepening of Klaipėda harbour, the protruding jetties into the sea are effecting the coastal dynamics and the longshore evolution of the coast.



waves, which are reaching the coast at a certain angle (Sutherland et al., 2002).



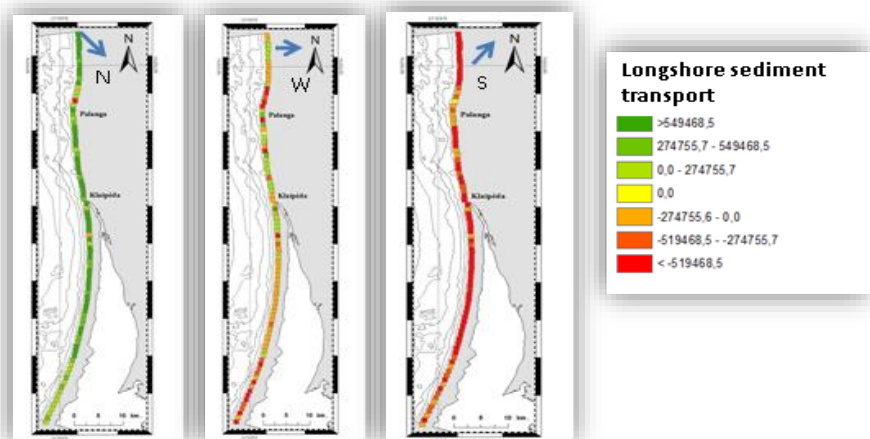
We have analyzed potential variations in the long-shore sediment transport rate due to the changes of the wind and wave directions. Sediment transport rate is estimated by the energy flux model, also known as the Coastal Engineering Research Centre (CERC) model. Our study area covered the entire coast of Lithuania, which was divided into 90 grids, about 1 km long beach sectors, up to the 3 m depth isobaths. Wave directions have been calculated every 10 degrees. When waves reach Lithuanian coast from northern direction, the most intensive positive longshore sediment transport happens at the sectors north of Palanga and towards the Lithuanian/Russian border. When western waves dominate at the Lithuanian coast, a positive longshore sediment transport takes place between Klaipėda and Palanga, and south of Klaipėda. The most intensive negative longshore sediment transport calculated, when waves reach coast from western direction, at northern part of Palanga and at sectors near Lithuanian/Russian border. When waves come from the south, positive sediment transport does not occur. Negative longshore sediment transport begins north from the Juodkrantė and continues to Palanga. The most intensive sediment transport occurs at Smiltynė and Palanga.

### Current meteorological condition of the Baltic coast

Coastal regions are exposed to the westerly wind forces, storm surges and wind waves. During the last few decades, an intensification of the erosion processes at the Lithuanian sea coast has been observed. The increased storminess in the Northern Europe region has been identified as the main cause of the growing rate of coastal erosion. During the period 1991-2013, 52 storms have been recorded by the Klaipėda meteorological station. This is an average of 2.4 two storms per year. The dominant wind direction ranges from S, WSW to W. The highest wind speed: 38 m/s, was recorded from WNW during hurricane "Anatoly" in December 1999.

### Modeling of potential sediment transport

General longshore sediment transport direction is determined by the prevailing wind direction. Prevailing wind awakes





# YPCC experiences – Klaipeda Student Case

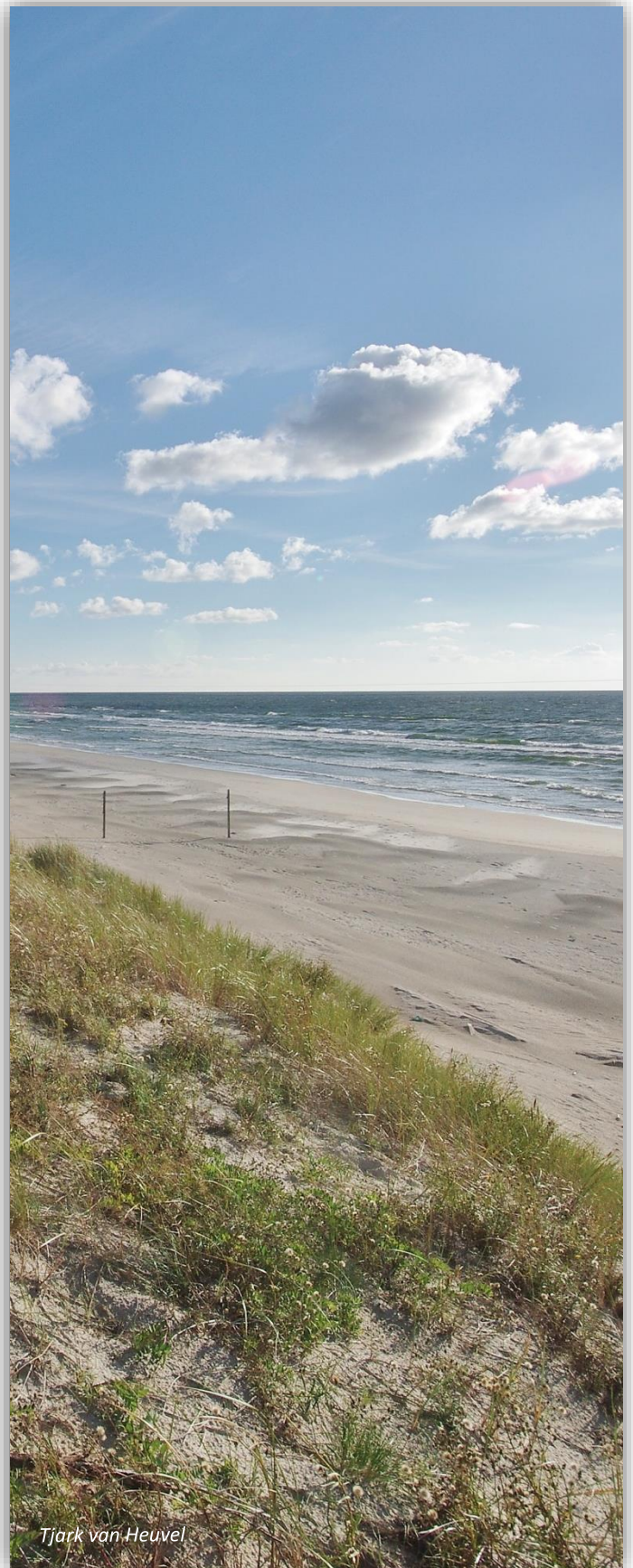
## Adaptive, soft coastal measures

Beach nourishment was performed at the mainland Lithuanian Baltic sea coast, being one of the coastal adaptation methods. A beach nourishment operation with imported sand was carried out for the first time in 1991, when 30 000 m<sup>3</sup> of sand was refilled along a 1 km-long stretch of shore near Kunigiškiai. In 2001, along a 2 km-long stretch between Melnragė and Giruliai, 537,000 m<sup>3</sup> of sand was pumped into the underwater beach slope at a depth of 6-7 m. Based on data provided by Klaipėda Seaport, beach re-nourishment operations along this stretch have been carried out in 2005, 2009 and 2012, totally containing 297,000 m<sup>3</sup> of sand. The effects of these sand nourishments have not been analysed in detail. Most of the attention was focused on the Palanga beach nourishment experiment initiated in 2006, which was continued intermittently until 2012 and there over all were added 570,000 m<sup>3</sup> of sand. The effects of this sand nourishment scheme was positive and the coastal erosion was reduced.



## Conclusion

An understanding of long-term coastal processes is important because it provides important background for interpreting the pervasive forces that have resulted in the shaping of the shorelines. Our study showed that small change of wave direction of propagation (less than 45°) at the Lithuanian coast could cause major changes in the longshore sediment transport direction. Results showed that after the beach reclamation the shoreline partially stabilised: the beach became wider and higher and thus recreational conditions have improved, i.e. the beach recreational space has increased. Moreover, beach nourishment as a no-regret coastal measure has not negatively changed the coastal dynamic patterns.



# YPCC experiences – Klaipeda Statements

## Statement University of Klaipeda

**Dr.Ir. Loreta Kelpsaite, Professor Coastal Dynamics, Klaipeda University, Lithuania**



It was a great experience for the Klaipeda University to organise in cooperation with the Coastal and Marine Union-EUCC the workshop 'Preparing to Adapt with Young Professionals' during the LITTORAL Conference 2014 in Lithuania.

During this event, three groups of students from Holland and Lithuania were offered a podium to present their coastal case for an international audience. This exchange of knowledge about coastal systems between young professionals and skilled international experts is an essential element in identifying future responses to global change. The Klaipeda University hopes to continue the YPCC cooperation during the next LITTORAL conferences.

## Statement students University of Klaipeda

During the international Field Course on the island Ameland we had a chance to broaden our scope on the impacts of climate change, but also to get to know the Dutch culture. Working in an international environment is always challenging, but it is a great learning experience that we enjoyed very much to be a part of. We got the chance to network with international students and professionals and we found this very beneficial for young scientists. During the Littoral 2014 conference, our student group, welcomed the Ameland research group to Klaipeda, Lithuania. As young professionals we had a chance to present our research on climate change driven hazards on the Lithuanian coast to an international group of experts. The workshop: "Preparing to Adapt" was a great learning experience and it will benefit our future research.



# YPCC experiences – HZ Student Case



Possible new functions integrated into the agricultural process

## A future Vision and representative showcase for the island of North-Beveland, NL

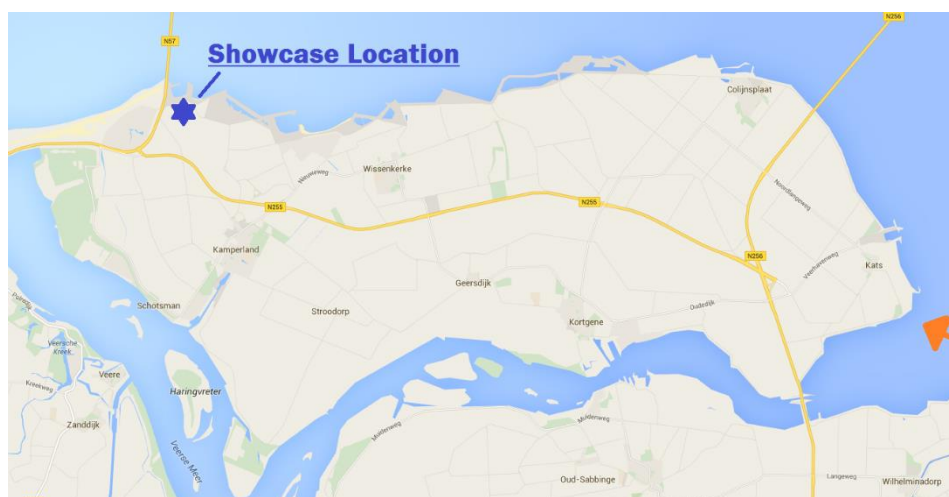
By *Aljoscha Follak, Gerjo Bommelijé, Mike de Witte, Judy Pattiasina, Students of the University of Applied Sciences HZ, Vlissingen the Netherlands*

North-Beveland is a small (former) island in the province of Zeeland in the Netherlands. It has a bit less than 7.500 inhabitants, who are sharing an area of 120 square kilometers, which makes North-Beveland be more than 5 times less densely populated than the average of the country. The main land use of the area is agriculture, despite other spaces which are used for living and tourism. The island is completely surrounded by water, the North Sea on its western border, a former estuary which is now closed off called Lake Veere in the South and the Oosterschelde estuary to the North of the Island. The latter one is protected by a storm surge barrier which remains open under normal conditions and shuts the North Sea out in case of unusual high tides and storm surges. This storm surge barrier also forms one of the three access-points to the former island.

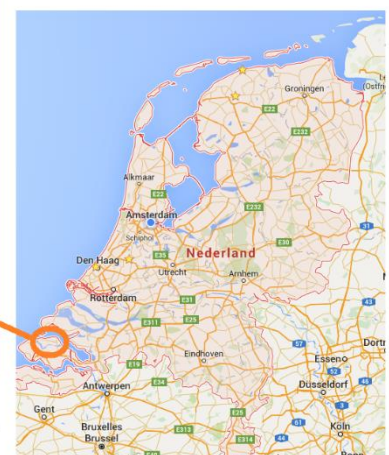
North-Beveland has to cope with an aging and also declining population from 2030 on. Pressures like sea level rise and especially salt-intrusion and the change in rainfall patterns are threats for the agriculture on the island.

In 2013 the Province of Zeeland published a visionary document called 'Vision for Zeeland 2040' for the entire province which outlines the path of the region towards 2040. Our report "Vision for North-Beveland" has been written for the province to come up with a detailed plan for the island of North-Beveland. Our report aims to combine the important aspects of the vision developed by the province and deals with technological and sustainable innovations as well as taking into account wishes of local stakeholders. It also aims to provide a solution to tackle threats and weaknesses mentioned in the vision. The most important known factor is the changing demographic situation, this being an increasing elderly population.

North-Beveland owns beautiful, peaceful natural areas which give opportunities for tourism, recreation and water sports. Based on results of our analyses, North-Beveland is a safe living environment surrounded by water. However, in the future the island has to cope with a number of driving forces, such as an aging population, impacts of climate change, and an increasing demand for sustainability. In order to guarantee a successful approach for sustainable development, it is crucial to involve stakeholders. The most important ones are members of the Province of Zeeland, the municipality of North-Beveland, the Ministry of environment and infrastructure (Rijkwaterstaat), and farmers and businesses on the island.



North-Beveland with Showcase Location (source: Google Maps, 2016)



# YPCC experiences – HZ Student Case

To be able to tackle the beforementioned issues a number of preconditions, defined in the vision of the province, should be met:

- take into account all driving forces and transform obstacles into benefits;
- meet the demands of local stakeholders;
- strengthen current qualities and identity of the Island;
- create opportunities for sustainable energy production;
- increase accessibility to current recreational facilities;
- safeguard local (water-) safety.

These preconditions should be met through creating a sustainable mix of land use functions, focusing on a combination of agriculture and tourism. In order to facilitate the integration of these land use functions provincial regulations, national and EU legislations have been taken into account. Examples of these regulations are zoning schemes and environmental permits.

To give a visual presentation of our ‘Vision for North-Beveland’ a showcase has been developed. The showcase aims to involve stakeholders in the process towards a sustainable mix of land use functions. For this showcase the farm and campsite “The Ontdekking” has been chosen, because the farm applies the principle of mixed land use and the farmer was willing to explore new ideas. The farm already has a small integrated campsite with various activities. This tourist attraction has been expanded by developing a set of activities providing insights in:

- **Cultivation:** Giving people an “inside” look into the plant growth process in the soil by using a glass wall exhibit.
- **Harvesting:** Showing innovative harvesting techniques in comparison to traditional ways.
- **Processing:** Introducing people to the process of harvested yields to food production by giving cooking theaters, public barbeques, and reintroducing locally “extinct” products.
- **Marketing:** Giving insight into the exploitation of harvested products.



Showcase location with zoning scheme

Our cost-benefit-analysis calculated that a project such as this will have a return investment within 6 years after implementation. The project needs to stay flexible and should be monitored constantly. One of the most important monitoring aspect is related to developments of the soil and sea level change as North-Beveland is a low-lying coastal area, which will be threatened by salt intrusion. Possible flexible adaptations for the future are a switch to salt resistant crops or even aquaculture. An agricultural museum on-site could raise awareness of the necessity of sustainable and resilient agriculture, coping with future changes.



Tjark van Heuvel

# YPCC experiences – HZ Statements

## Statement University of Applied Sciences HZ

*Ir. Tjark van Heuvel, Teacher/Reseracher, Delta Academy University of Applied Sciences HZ, Vlissingen, the Netherlands*

A group of our best students undertaking the ICZM course at the faculty Delta Management – Delta Academy, have been selected to present their findings and the 'showcase' during the YPCC Workshop during Littoral International Coastal Conference 2014.



The students used the Vision Report 2014 of the Province of Zeeland to base their agriculture-conversion plan for North-Beveland. The fact that they had to present their results on a real conference, was thrilling for most of them. They enjoyed the international conference meetings and associated activities very much. It is an interesting fact to see that they change from students into young professionals when they are taken seriously. Back home at the University they presented their experiences in Klaipeda, Lithuania and reported their findings to their fellow-students.

## Statement students University of Applied Sciences HZ

We absolutely enjoyed this opportunity to present our project, to get to know people, to network and to get feedback. We are very grateful for this opportunity. YPCC is a very challenging initiative which adds a lot of value to conferences as well as to universities. We are aware that money and time are always short, but even though we wrote down our remarks which (not regarding money and time) where of interest from our perspective. We experienced a lot of stress in the preparation phase for the Littoral, because it was announced to us very late. This might partly also be the problem of the summer holidays in advance and therefore slow communication with our university. To avoid this and to also promote the whole project better we thought of the possibility of announcing a competition among students during their normal semester projects which would suit the topic. This would help to get more time to prepare a project for such an occasion and would in turn also help the popularity of the YPCC. If, in cooperation with the universities, this could be somehow integrated into the regular courses then we believe it would be absolutely perfect. Nonetheless did we really enjoy it the way it was.

Thank you again for giving us this opportunity!



# Preparing to Adapt with the YPCC



Our organization, the Coastal & Marine Union (EUCC), is a stakeholder and network association with the aim of promoting a European approach to coastal conservation and development by bridging the gap between scientists, environmentalists, planners and policy makers. In order to achieve this goal, the EUCC has been organizing biennial international coastal conferences since 2000. Through these conferences the EUCC implements its network's mission, namely "bringing together the scientific community, coastal practitioners and policy makers". Until 1999 the conference was organized uniquely by EUCC under the name "Coastlines", later on it joined forces with other network partners and EUCC national branches giving birth to the "LITTORAL" conference series.

In 2011 we initiated a programme to unite students, their teachers and a core group of international senior experts known as the "Young Professionals Coastal Community" ([www.yppcc.eu](http://www.yppcc.eu)).

This initiative is closely connected to the LITTORAL conference series. The community was established during LITTORAL and groups of students from different backgrounds and universities have presented their work. We have always tried to bring scientists, policymakers, students, and stakeholders together. It is our goal in these occasions to gain a fresh perspective on various coastal and marine matters and to discuss how people can work together to shape coasts in such a way that social, economic and ecological goals are achievable and balanced.

We have also been involved in an increasing number of coastal projects including the OURCOAST, QUALITYCOAST, and CLEANSEA initiatives as well as the MARLISCO project, providing interfaces between the European Union and coastal practitioners, experts, society and community. This has always been in the heart of our role: to ensure the engagement of all relevant stakeholders in conservation, spatial planning and management of our coastal and marine zones.

We intend to continue on this path with the coastal and marine community and to encourage the young professionals to be an active part of it. I have great pleasure to jointly look forward with the Young Professional Coastal Community, our members, coastal stakeholders and other interested parties during the upcoming EUCC Littoral Conferences in Biarritz in 2016, Liverpool in 2017 and beyond!

*By Maria Ferreira, Head International Programme, Coastal and Marine Union (EUCC), Leiden, the Netherlands*

## Colophon & Participating Universities

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KLAIPĖDA UNIVERSITY

Klaipėda, Lithuania  
[www.ku.lt](http://www.ku.lt)



van hall  
larenstein  
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**"Are you interested in the Young Professionals Coastal Community?"**  
Please visit the YPCC website [www.YPCC.eu](http://www.YPCC.eu) and

**Join us at LITTORAL 2016 Conference - Biarritz, France**  
"The changing littoral. Anticipation and adaptation to climate change"