

12th International SedNet conference "Sediment Challenges and Opportunities due to Climate Change and Sustainable Development", 29 June – 2 July 2021

Simultaneous event with I2SM 7th International Symposium on Sediment Management

Sessions reporting back

- Circular Economy
- Sediment Assessment and Management concepts and policies
- Impacts of Disturbed Sediment Continua and Mitigation Measures?
- Sediments in Coastal-Marine Management and EU Strategies
- (Re)using Sediment to Create, Keep or Restore Habitats
- Climate Change and Sediments: Direct and Indirect Consequences and Opportunities
- How to Deal with Emerging Substances / PFAS / Microplastics

Journal of Soils and Sediments

Poster Price

Final words

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SedNet Conference 2021

Bruno Lemiere, Arjan Wijdeveld, Julia Gebert, Dirk de Decker



We had two days with enthusiastic presenters on sediment use in a Circular Economy.

Luca Sittoni gave an excellent keynote on Beneficial Sediment Use and Nature-based Solutions and showed that the topic is also embraced by other professional communities like PIANC and CEDA all over the world. The challenge is to remove barriers and create enablers.

On the other end of the spectrum, we had a word of warning by Philip Spadaro and Larry Rosenthal that clean up and circular use of contaminated sediments is addressing a failed case.

Why do we have such different perspectives on sediment use a circular economy? Sabine Apitz provided a possible answer by taking us into the world of Conceptual Site Models, illustrating different angles on how to look at sediment use. These angles included not only the environmental concerns and economic costs, but also social indicators.

Joe Harrington demonstrated that economical benefits and job creation by use of sediments can be quantified, helping in gaining support for sediment use. Also, a tool presented by Eldert Besseling to evaluate the carbon footprint of dredging activities helps policy makers to evaluate options on how to reduce greenhouse gas emission.



There were also many excellent presentations on the actual circular economy use of sediments, ranging from technical improvements (sediment stabilization or as filler in concrete), mineral extraction (sand and clay) to agricultural use. Some of these uses are already on application scale (like sediment stabilization), while other uses are still experimental (like agricultural use of sediments and electrokinetic remediation).

Not only the talks were interesting, also the posters and short poster presentations illustrated the CE use of sediments. Examples of CE successful pilots and projects were shown on the Videos session on Thursday, all available as replays.

While the CE session mainly focused on engineered sediment solutions, often dealing with contaminants, there is a clear link with building with nature. One of the remarks made by Luca Sittoni stuck: Nature based solutions are not an alternative for "gray" infrastructure, but an enhancement of the infrastructure and system functioning.

Not to end on a pessimistic note, but the warning by Philip Spadaro and Larry Rosenthal that clean up and circular use of contaminated sediments is addressing a failed case has to be taken to heart. While CE wants to focus on solutions, known and unknown contaminants often hamper what we are allowed to do with sediments.

Rethinking of sediment as primary a natural resource (as gold) and not as a waste product, and by focusing on preventing the introduction of (new) contaminants in water body's, we can stimulate CE use of sediments. Also for successful CE use it is desirable to come up with an integrated risk assessment on a regional level instead of following absolutistic rules on project level.

The SedNet CE workgroup has a clear goal and exciting challenges for the coming years!



- Absoluteness of standards in handling end of pipe problem owners (sedimenthandling stakeholders) instead of absoluteness in regulating the problem creators (e.g. industry, example PFAS). Need to think from the perspective of the initial product. However, manufacturing industry has a lobby, end-of-pipe problem owners such as landfill operators or sediment-handling stakeholders do not.
- Emission of carbon, use of water and energy for the different treatment options all have to be part of the LCA of a sediment remediation/re-use measure
- Sabine Apitz emphasized the need to look at system scale risks and risk reduction



A word on Circular Economy Working Group

We did not meet as planned during the conference, but as we went digital, it did not make sense to add this to a busy agenda.

We prefer inviting all interested participants to a real live event, WGCE6, similar to the successful WGCE3 in Bremen/Delfzjil. Probably in October, we do not yet know where, but definitely in an attractive place for sediment BU visits and social life.

In case the sanitary situation makes travelling difficult, we will run it digital or hybrid. If not yet done, please register with our WG by dropping a line with Marjan ! 19 presentations 13 poster flashes Session Summary Sediment Assessment and Management Concepts and Policies



Sediment Assessment

- Emphasizing the importance of sediments in a river system
- Demonstrating methods to compile necessary information for sediment characterization (experimental and field approaches to e.g. date sediments, assess deposition, quantify sediment transport)
- Showing approaches to identify hotspots and specific contamination
- Frameworks to risk assessment in different countries e.g. through comparison with threshold values
- Concepts how to prioritize contaminated sites for management



19 presentations 13 poster flashes Session Summary Sediment Assessment and Management Concepts and Policies



Sediment management

- Sediment management concepts in different countries (overviews and examples from Germany, Belgium, Sweden)
- Reuse and remediation of sediments



Session Summary

19 presentations 13 poster flashes

Sediment Assessment and Management Concepts and Policies



Our conclusions / observations / perceptions after this session

- Experience with different (new) methods increases which will help to gain information on sediment quantity issues
- Still big differences between countries with regard to assessment approaches (tiered, integrated ...) and threshold values used, as well as the use of ecotox data
- Lack of an integrated approach or a common vision of how to manage sediments or which values to use as a reference in the case of large river systems between the different neighboring countries
- Management of dredged sediments in the frame of the circular economy seems to work for freshwater sediments; marine sediments are currently far behind.



More cooperation and exchange is required!



SESSION: IMPACTS OF DISTURBED SEDIMENT CONTINUA AND MITIGATION MEASURES

CHAIR: KATHERINE CRONIN, DELTARES, NETHERLANDS

CROSS BORDER SEDIMENT RELOCATION PILOT IN THE SCHELDT



- Sediment unbalance caused by dredging for navigation and extraction of sand
- A pilot study is investigating a new area for sediment relocation
- Sediment removed in the Belgian part of the estuary is relocated to the Dutch part
- Special considerations and permits needed
- We had an interesting discussion on the applicability of national and EU legislation on sediment "waste" – helps or hinders?

TESTING WATER INJECTION DREDGING FOR REGULAR PORT MAINTENANCE



- Maintenance dredging is very expensive and inefficient
- In the Port of Rotterdam, Water Injection Dredging is being investigated as an alternative
- Deposits of fluid mud are liquified lowering the navigational depth
- This method is cheaper and more energy efficient → but system knowledge needed to understand where the fluid mud goes
- We had an interesting discussion on applicability of various tools for predicting system response

SedNet conference 2011 (online)

Wrap-up session:

SEDIMENTS IN COASTAL-MARINE MANAGEMENT



Wednesday 30 June 2021 14.05 - 16.00 h (CET)

moderator: Jos Brils, Deltares SedNet Steer Group member



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Presentations



Three presentations:

- Keynote: Sustainable sediment management in coastal infrastructures through the innovative ejectors plant technology. Marco Pellegrini
- Bio-Engineering for Sediment Management And Removal of Turbidity Technologies Miguel de Lucas Pardo and Renaat De Sutter
- Determination of radionuclides and elements' concentration in bottom sediment samples taken from the Azerbaijan sector of the Caspian Sea Famil Humbatov

Three poster flashes:

- Distribution of Heavy Metals in Core Sediment at the Montenegrian coast Danijela Joksimović
- Multiple Stress Factors affecting Sediments in the Estuaries of Elbe and Odra Safia El Toum
- Quality assessment in wild strawberry fruit and basil leaf from plants cultivated on dredged remediated sediment Stefania Nin

Outcome session 8



1) Further underpinning that for management of the coastal and marine zone:

- Sediment plays an essential role in achieving that management
- And therefore, sediment as a resource is critically important in coastal and marine management

2) But missed linkages in the presentations to EU strategies: do they help, or do they hinder management?



https://www.voordeeluitjes.nl/blog/mooiste-duingebieden-nederland/



https://www.deferrers.com/attachments/download.asp?file=5066&type=pdf

Thanks to the presenters!

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(Re)Using Sediments to create, keep or restore Habitats

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Challenges

Main points of the general discussion (after the presentations)







Find a good way to measure "colmation": kolmameter? Other?



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Bring studies & measurements of colmation together





Find a good way to measure "colmation": kolmameter? Other?

Bring studies & measurements of colmation together

Bring (more) researchers together/on board

Find extra (European?) funds













Look to the broader (eco)system get NO nature STAMP (Natura 2000,...) Accept "background" pollution



Write (open) paper about this (contact: Sabine Appitz)



Climate change and sediments: direct and indirect consequences and opportunities

SESSION HIGHLIGHTS

Very pertinent and state-of-the art issues were addressed and discussed. The necessity for a holistic view on the system and management approaches was identified as paramount.

Future works on this topic must include:

- The understanding of carbon fluxes into and out of the sediment:
 - Carbon storage in sediments is needed to inform on carbon foot printing of interventions in the context of net zero C ports and harbours;
 - Improve the understanding of the mechanisms that lead to enhanced C release and C sequestration;
 - All the above also goes for the beneficial use destinations.

SESSION HIGHLIGHTS

Future works on this topic must include:

- Contamination of sediments might be affected by climate change.
 - Researching how technology modifications (introduction of new pollutants or less pollutant features) may affect the contamination of sediments. This effect may increase or decrease the effect, depending on the use of different novel technologies.
 - The change of conditions due to global change can affect the release of contaminants.
- The need for good data for trusting modelling
 - There is a need to calibrate and validate numerical models that include climate change scenarios, as climate change processes are still not well understood.
 - As an example, for the sediment balance in the port: Climate change needs to be considered in predicting siltation in ports, as was demonstrated by ADCP backscatter measurements

SESSION HIGHLIGHTS

Future works on this topic must include:

- Specific issues, as ebullition, can be very interesting to pursue.
 - Ebullition is a transport path for PAH's, and as a process, it can be increased with rising temperatures.
 - Gas production from sediments impedes strength development, increases erodibility, adds to explosion risks if gases accumulate below or within buildings on reclaimed land, delays consolidation.
 - Gas escapes through preferential pathways, which can lead to preferential pathways for contaminants.
 - All these increases challenges in remedial design.
- Influence of climate change on tidal zone
- Gap in the treatment of river's systems





12th International SedNet Conference (online) 28 June – 2 July 2021 "Sediment Challenges and Opportunities due to Climate Change and Sustainable Development"

How to deal with emerging substances / PFAS / Microplastics



TALKS:

1. "Sediment quality assessment framework for PFAS: results from the preparatory study and regulatory implications" by Carmen Casado Martinez, Ecotox Centre Eawag-EPFL, Switzerland

In this presentation, recommendations for setting monitoring strategies for PFAS substances in sediments were provided based on results from a data acquisition campaign in small streams from Switzerland

2. "Landscaping with PFAS contaminated soil and thin permeable barriers" by Stefan Niewerth, HUESKER Synthetic GmbH, Germany

The presentation elaborated the use of thin permeable geotextiles that allow unimpeded water flow, but bound PFAS and prevent them from discharge into the environment.

3. "Contaminants of emerging concern and reuse of sediment" by Ruth Cartuyvels, Witteveen+Bos, Belgium. In this presentation, the authors have given insights into the risk involved in the reuse and relocation of sediments contaminated with emerging pollutants.

4. "Dealing with microplastics pollution in sediments – technologies for prevention and remediation" by Jens Laugesen, Det Norske Veritas (DNV), Norway

In their work, the authors have studied how microplastics from tunneling operations (such as blasting and shotcrete) can be prevented from entering the sea and sediments or how sediments already contaminated with microplastics can be remediated.

5. "Can we use theoretical approaches from natural sediment to describe the transport behaviour of microplastics?" by Kryss Waldschläger, Wageningen University and Research, NL

The authors presented new theoretical approaches based on the physical model verified by the experiments determined to find out the settling and rising velocities of microplastic particles with varying particle properties. It was interesting to learn that different microplastic shapes did not have a statistically significant impact on the transport velocities, although different shapes behaved differently during the transport (in terms of jumping or rolling).

6. "SPlasH! - Stop to plastic in H₂O!" An EU Project to investigate the port environment: results on microlitter contamination in seawater, sediment, and biotic samples" by Anna Reboa, University of Genoa – DISTAV, Italy

This study has been designed to better understand contamination by microplastics in port areas and the results can be used by the local authorities to prevent the entering of microplastics into the sea. It was found that microplastics remain in the fish stomachs and guts with potentially detrimental health impacts for animals and humans.

7. "Distribution and characterization of microplastics in the marine sediments from the Montenegrin coast" by Neda Bošković, University of Montenegro

This study gave the first insight into pollution and spatial distribution of microparticles in sediments of the Montenegrin coast.

POSTER PRESENTATIONS:

1. Chronic impacts of REE in a benthopelagic food web" by Chantal van Drimmelen, Hamburg University of Applied Science / University of the West of Scotland, Germany/UK

The poster introduced the PANORAMA project, and more specifically the identification of the chronic impact of Lantanium (representative of light REE) and Gadolinium (representative of heavy REE) on multiple biological species in a simulated environment.

2. "3D Computed Tomography for Microplastics Analysis" by Jasmina Obhodas, Ruder Boškovic Institute, Croatia

3D CT methodology for the microplastics analysis. Has been presented for the first time. 3DCT is a non-destructive method that allows a rapid examination of the sample concerning different particle densities with micro-millimeter resolution.

Journal of Soils and Sediments (JSS): SedNet 2022 Special Issue (SI)



- SedNet 2021 attendies are invited to submit their contributions to JSS (2020 IF: 3.308, Q2 in Soil science and Environmental sciences)
- Once you enter the JSS Editorial Management System to submit a manuscript select the SI title: "SI: "Sediment Challenges and Opportunities due to Climate Change and Sustainable Development"
- Manuscripts should be prepared in the strict format of the Journal of Soils and Sediments. The instructions for authors can be found at: <u>https://www.springer.com/environment/soil+science/journal/11368</u>
- The page number limit: up to 10 pages of text (Times New Roman, font size 10, 1.5 line spacing, up to 5 figures/tables)
- Submission Deadline: October 1, 2021
- Contact: marjan.euser@deltares.org or jobhodas@irb.hr

Best SedNet 2021 Poster Prize

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12th International SedNet Conference (online) 28 June – 2 July 2021

"Sediment Challenges and Opportunities due to Climate Change and Sustainable Development"

Best SedNet 2021 Poster Prize



Alizée Lehoux

Uppsala University, Sweden

Researcher

"Extreme gas production from fibrous sediments: a potentially overlooked greenhouse gas source" Special thanks to: Bruno Lemière!

with support of - Jean-Remi Mossmann - Aline Coftier

- Marjan Euser





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Hope to see you live at the 13th Conference! www.sednet.org