6th International Symposium of Sediment Management 20 – 24 June 2018, San Cristobal de las Casas, Chiapas, Mexico - Event report

View of Chiapas region from the plane into Tuxtla Gutierrez airport

DAY ONE - Wednesday 20 June

Today, the 6th International Symposium of Sediment Management (I2SM) congress started in the presence of many dignitaries. On the photo are the members of the USAR team with the Rector of the University of Chiapas. The next four days will be dominated by discussion and presentations concerning sediment management. Scientists and policy makers from all over the world have gathered to inform each other of the latest developments. This will be a good opportunity for the USAR partners to bring the project to the attention of the conference attendees.

During the conference we will present the pilots and work packages to the gathered delegates who come from government institutions, universities and non-government organisations from across central and southern America. Then we will discuss with the various people present about our progress. We will also promote our digital catalogue during the congress which now contains more than 2000 scientific articles on the use of dredged sediment as raw material. We will invite the attendees to test the catalogue and make recommendations for how it may be improved.

Opening speeches from local dignitaries and scientific committee

In addition to the promotion of our own project, the USAR partners here were able to attend several presentations today. There is a major problem with erosion in Mexico in which much sediment is released uncontrollably. This erosion can be attributed to, among other things, non-regulated mining activities (including the extraction of uranium) and missing infrastructure for the collection and purification of waste water in the mountainous areas. This results in large flows of waste water, especially during the rainy season (June to September) that also carries large amounts litter including plastic waste. This congress must make an important contribution to raising awareness and raising funds to tackle the problems.

Hans presenting on the Flanders USAR pilot

DAY TWO - Thursday 21 June

View of San Cristobal de las Casas from Guadalupe Church

Today is the second day of the International Symposium of Sediment Management in the magical city of San Cristobal de las Casas. This Mexican city, at more than 2000 meters altitude, is very special because of its ethnic diversity and colonial tradition. The symposium takes place in the middle of this beautiful city. A total of 60 presentations and 29 poster sessions will be held during the event.

The aim of the congress is to gather researchers, business people and engineers around the international challenges related to sediment management. The symposium is structured in sessions on various topics: characterization and remediation of sediment, sediment-water interactions, environmental legislation, reuse and management of sewage sludge, perspectives from the private industry, management of oil contaminated sediments and developments in sediment management.

For colleagues who are interested in (one of) the above subjects, all abstracts and papers are available! Are you interested? Let me know!

From the USAR project we are present at the congress with three presentations and an information stand. In the presentations we presented the objectives of the USAR project, the work packages and the planned pilots. HHSK has been brought under the spotlight as an organization and its task for ensuring dry feet and clean water.

It was incomprehensible for many here that we live and work in an area that is so far below sea level and is still subsiding. The length of waterways and magnitude of the dredging task (quantities and costs) was a surprise to many.

Following our presentations, we held various discussions about the USAR project and the developments. There is interest in how we prepare our innovative pilots. By considering dredged sediment as a raw material, we go into unexplored territory, such as obtaining permits. National and

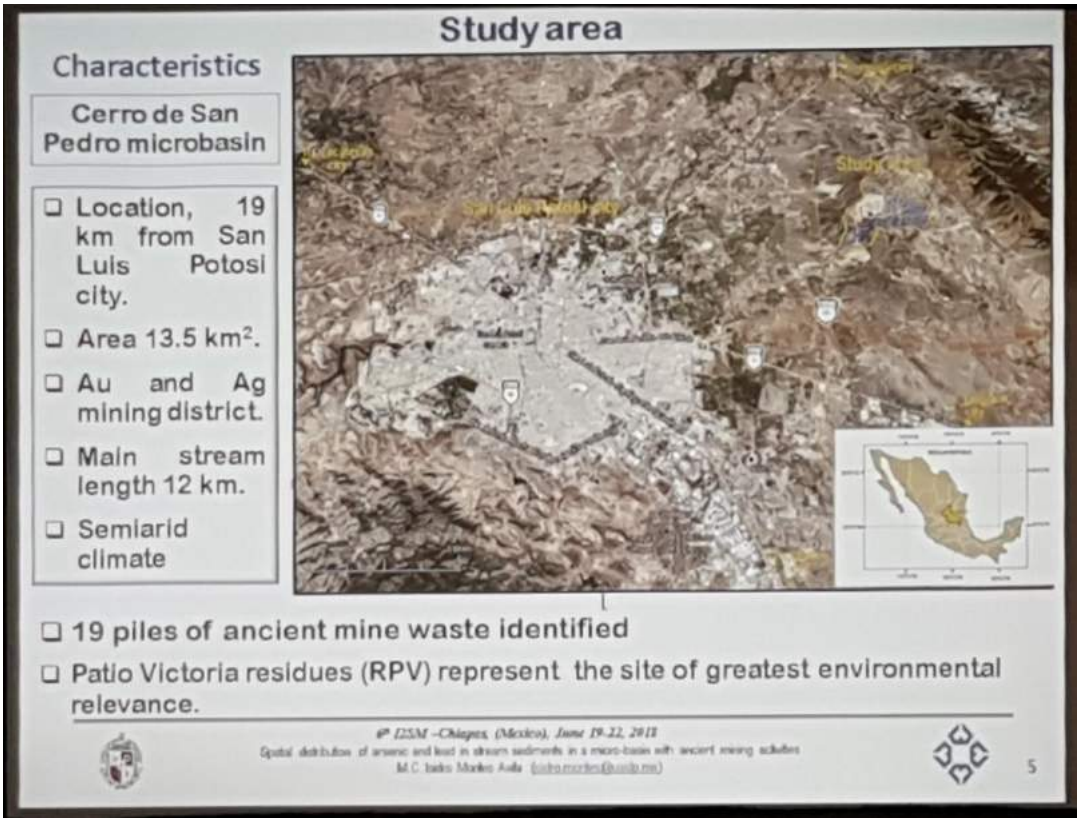
international policy and legislation is still designed for traditional waste management. More political attention and new legislation is needed to facilitate introducing recovered sediment into the circular economy.

In addition to publicising the USAR project, we also attend the other presentations to keep abreast of new developments as well as perspectives from another part of the world. One of the presentations was a French version of Topsurf. A PhD student presented the results of his research into the mixing of green waste and compost with sediment to provide growth media. He has made various mixtures and compared them quantitatively and qualitatively with existing compost. His first results show that the tested sediment can be used to produce potting compost that meets the European requirements (Ecolabel) for commercial compost.

Another presentation concerned research in California (Mexico). Absorption of harmful substances from sediment is released into the surface water and accumulates via the food chain in the fish that are subsequently caught by the population – toxic substances can be transferred to humans through consumption. By using activated carbon (Norit®) they will attempt to isolate the harmful substances in the sediment, which should improve the water quality and hence reduce toxicity in fish. The big challenge here is how you can keep the activated carbon in the right location. In addition, you do not take away the contamination, but it remains on location, albeit isolated.

In the afternoon session there were two presentations regarding a French-Mexican project [VAL-USES project]. Working in the Usamacinta River basin that is shared between Mexico and Guatemala, the project intends to study many aspects of sediment management – including the historic uses of sediment by the indigenous population (sand fishermen, making bricks and ceramics) and also the social, cultural and legal implications of sediment management practices. The river forms part of the border between Mexico and Guatemala and for a 300 km stretch there are no bridges, meaning that naturally occurring sediment bars form important crossing points for local residents. This is an aspect of sediment management that we do not really see in the Interreg2Seas area!

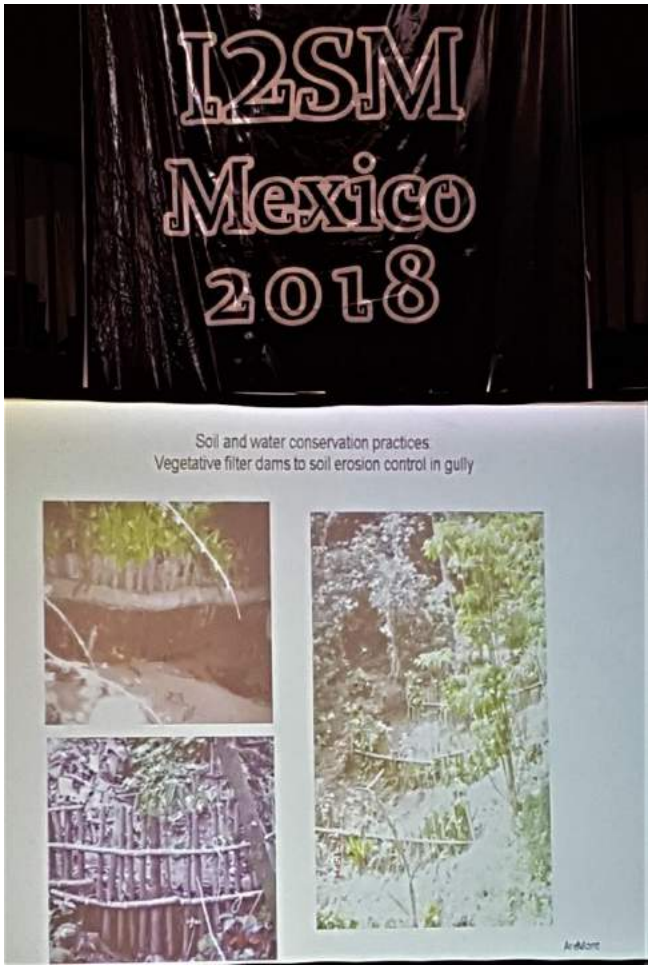
Mexico – like Cornwall in the UK – has a rich history of mining (indeed miners from Cornwall were in high demand in Mexico as the technological leaders of the 1800s). Much of this mining activity has now ceased and both regions are left with a toxic legacy in the form of sediment and soil that is contaminated with heavy metals. As part of the USAR project Westcountry Rivers Trust are working with scientists at the University of Plymouth to trial novel techniques for remediating old mining sites. It was interesting to hear how our Mexican counterparts are tackling essentially the same issue – albeit their problems seem to be exacerbated due to the fact that the mining activities in Mexico largely occurred in semi-arid mountainous regions with high seasonal rainfall. This presents particular challenges for stabilising and remediating the remaining contaminated material – but perhaps lessons can be learned on both sides of the ocean from sharing information on these novel approaches.



A recurring theme throughout the morning session, which included presenters from Mexico, Ecuador and Brazil was the struggle to ensure that environmental protection – and that of human health and wellbeing – was given due priority over the desire from big corporations to maximise their exploitation of natural resources. In some areas we heard that things had improved – with the appointment of a new independent environmental 'watchdog' in Brazil – although it was acknowledged that these processes remained incredibly slow. It is clear that this is not something to be taken for granted and serves as a timely reminder for the UK USAR partners as they continue along the path of leaving the European Union and the robust environmental protections that it enshrines into European law.

DAY THREE – Friday 22 June

The third day of the International Symposium of Sediment Management 2018 (I2SM) began with a key note speech from Dr José Luis Arellano-Monterrosas, from CONAGUA – The Mexican National Water Commission. The fascinating presentation covered changes to the Mexican landscape over recent decades, which coupled with an increase in the occurrence of heavy rains has meant that disastrous soil loss is an issue of the utmost importance. The loss of soil during heavy rain fills reservoirs with sediment, threatens mountain roads with landslides and leads to some areas being left unusable for agriculture. In order to tackle this issue, they are beginning to focus on the areas upstream of where the worst erosion is seen. By slowing water down at the beginning of mountain streams – using low cost, low technology vegetative filter dams they can hold back water and soil and start to heal the landscape. It is important to reward those that are maintaining forested areas as removal of trees is a key problem.



Slide from Dr José Luis-Arellano Monterosas' presentation showing the vegetative filter dams used to arrest soil erosion in steep mountain streams and gullies

There followed a series of talks on a range of topics – including the Valle de Bravo reservoir that supplies Mexico City with drinking water and how phosphorus releases from bottom sediments – caused when the water becomes anoxic – are exacerbating eutrophic conditions. Where it is difficult to control external inputs of phosphorus, the issue can be alleviated by pumping liquid oxygen into the base of the reservoir. There were also interesting presentations on investigations into the use of GGBS (Ground Granulated Blast-furnace slag) a waste product from the iron and steel industry for solidification of contaminated port sediments, and an examination of various techniques for reducing acid mine drainage from reclaimed mine sites.

After lunch attention switched to the location of the planned field visit for Saturday – the Lagunas de Montebello National Park. This session was open to the public as the condition of the lake complex is an issue of importance to many local stakeholders including farmers, fishermen and those dependent on tourism. We heard short presentations from a panel of experts that are working hard to manage the lakes and assess the primary causes of their decline. There were then a series of questions from the audience which the assembled panel were able to answer. The Lagunas de Montebello lake complex is home to over 750 species of fish, birds, reptiles and mammals – many of which are facing the threat of extinction due to the degradation of the habitat. The causes of this are primarily increasingly intensive agriculture in the surrounding catchment – what was forest in the 1950s is now used for growing tomatoes and there is much unregulated development in the area – many small settlements with no provision for wastewater treatment. The growing of maize has more recently given way to tomatoes - a crop that requires high inputs of nutrients and can yield three harvests each year. The result is that the lakes are filling more rapidly with sediment than ever before, nutrient rich waters are leading to eutrophic conditions, with resultant fish-kills, algal blooms, murky waters and bad smells where there were none before. Much research has been conducted in this area to fully understand the issue – agriculture is important to the economy of the area and so those seeking to protect the lakes need to work in tandem with local farmers and other stakeholders to find the best solution for everyone.

With the end of the panel discussion and questions from the public the formal proceedings of the 6th International Symposium of Sediment Management 2018 were brought to a close. Thanks and tokens of recognition were given to key organisers of the symposium and it was announced that the next symposium – in 2020, will be held in Lille, France.

DAY 4 – Saturday 24 June

The final day of the symposium was reserved for a field trip to the Lagunas de Montebello National Park. The Montebello lakes system is a group of lakes within a karst landscape fed by underground waterways within the Rio Grande de Comitan watershed. Since the signing of the North American Free Trade Agreement (NAFTA) in 1994 the area upstream of the lake system has been used for increasingly intensive agriculture. Much of it was originally mature forest but it was turned over to first maize and then more recently tomatoes. Over this same period the population of the region has grown and this has resulted in increased wastewater discharges. The result of these changes is a dramatic deterioration in the condition of the lakes, which are famous for their clear water and striking turquoise colour. Increased inputs of sediment and nutrients are leading to some of them showing signs of eutrophication – there have been algal blooms and episodic fish kills due to low dissolved oxygen levels and reports of pollution from agrochemicals (pesticides and herbicides) from the farmland.


Dr Roberto Bonifaz explaining the issues facing the Lagunas de Montebello National Park

The attendees travelled by minibus down to the lakes that lie on the border with Guatemala, stopping off for a late breakfast in Comitan where we were able to watch the second half of Mexico vs South Korea in the World Cup. Following the match we received the first of our 'scientific briefings' from Dr Roberto Bonifaz from the National Autonomous University of Mexico (UNAM).

ON arrival at the lakes we were able to walk down to the shores of the Cinco Lagos lakes before travelling on to Lake Pojoj where we were able to paddle on rafts across to an island in the lake. The last stop was at Lake Tzicao which straddles the border with Guatemala. There was time for the field trip attendees to cross the causeway into Guatemala and visit local shops before returning to San Cristobal.

It was a fascinating field trip with lots of time to explore the beautiful lakes that sit in one of the most biodiverse habitats in Mexico. The drive to and from the lakes also provided amazing views of the Mexican countryside and an insight into the farming practices and living conditions of the local people.

Preparing for the raft trip across to the island in lake Pojoj