Dear Metals Interest Group Members,

We thought that after 20 years of the Metals Interest Group (formerly Metals Advisory Group), it was time to publish a newsletter! So welcome to the first ever Metals Interest Group newsletter - One short Metals newsletter, one giant leap for our Interest Group...

The aim of this newsletter is to give you a flavour of what was presented and discussed in the previous MIG meeting at either SETAC Europe or SETAC North America; as well as some other metals-related news, reports or papers that you might find of interest; and of course something for the newbies (early career scientists) at the end.

All comments and suggestions are welcome. If you have some work or are aware of a report, paper or the like, that you think may be newsletter worthy, please let us know!

Cheers,

Chris, Bill and Kevin.

PS. A massive thank you to Anne Cremazy for the MIG logo design – if funding dries up, I think you have a career in graphic design...

What’s in this issue?

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Kevin Brix managed to dig out a couple of papers for you to peruse.

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Don’t miss out on SETAC meetings!

Page 6. Something interesting for early career scientists! *
Here you can find the current holder of the Chris Lee award and the SETAC job listings.
* For future editions, we welcome submissions from early career scientists (the definition is quite flexible here, PhDs – to early career Associate Prof’s, so don’t be shy) – feel free to give a short account of your research interests, work to be published, or a recently published article.
News from around the world and project updates

Regulatory activities from around the world:

Canadian Regulatory Activities Update: Water Quality Guidelines and Ecological Screening Assessments for Inorganics

Mike Beking, Doug Spry, and Yamini Gopalapillai

The Chemicals Management Plan (CMP) is a Government of Canada initiative aimed at reducing the risks posed by chemicals to Canadians and their environment. The CMP builds on previous initiatives by assessing chemicals used in Canada and by taking action on chemicals found to be harmful to human health and/or the environment. The third phase of the CMP was launched in 2016, and will address the remaining 1550 priority chemicals out of the original 4300 chemicals identified as priorities during categorization. This includes about 380 inorganic substances that are being assessed, such as: Ag, Al, Cyanides, Cu, Sb, Tl, and Zn. The draft screening assessments for Cu and Zn, for instance, were published in the summer of 2019 and were each followed by a public comment period. The final screening assessments for Cu and Zn are to be published in 2020, along with the final screening assessment for Sb. Draft screening assessments for Ag and Tl will be published in 2020, followed by Mn and Al draft screening assessments in 2020-2021. The complete list of substances addressed under the third phase of CMP and their publication timelines can be found here: https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/cmp-third-phase-update.html#toc1

Recently, draft federal environmental quality guidelines (FEQGs) were developed for Sr, Pb, and Fe. They have completed their respective public comment periods and are now in the approvals process for being published as final FEQGs. The draft FEQGs for Cu and Al are being integrated into their respective CMP risk assessments. The draft FEQG for Al is slated to be published in 2020-2021. The Canadian Water Quality Guidelines for the Protection of Aquatic Life for Mn was developed by the Canadian Council of Ministers of the Environment and was published in 2019.

For more information, please visit:

CMP: https://www.canada.ca/en/health-canada/services/chemical-substances.html


Current status of metal research in Australia and surrounding regions

Aleicia Holland

The revised methodology for the Australian and New Zealand guidelines was released in August 2018 and can be found here https://www.waterquality.gov.au/anz-guidelines. Several metal guideline values (GVs) are being revised and are currently under review including Fe (freshwater and marine), Cr (freshwater), Cu (marine) and Zn (marine). Work is also currently underway on harmonising the approach to GV derivation and we are exploring the development of species sensitivity distribution (SSD) tools using the Shinyapp software. Bioavailability based GVs are currently being developed for Ni in freshwater and marine environments with funding support from NiPERA. In 2019, a new project was started looking at developing Zn multiple linear regression (MLR) models using local taxa and these will be compared with existing models (MLR and BLM). This work is funded by the International Zinc Association. Research into the effect of natural Australian DOC from different freshwaters on toxicity and bioavailability of Cu, Ni and Zn is also underway.

The group at the Environmental Research institute of the Supervising Scientist (ERISS) have been working on developing toxic unit-SSDs produced for mine site waters which incorporate the influence of metal mixtures and validating the use of single metal site-specific GVs. They have also developed a new chronic 14-d growth bioassay for juvenile freshwater mussels (Velesunio angasi).

In Southeast Asia and Melanesia research has recently been conducted developing a tropical risk assessment of Ni, with exposure and effects data generated for tropical organisms. In New Caledonia molecular-based techniques were used to examine changes in benthic community composition along a Ni gradient to identify protective thresholds for benthic biota. Guidelines for Ni, Co and Cr in freshwaters are also being developed for New Caledonia using bioavailability approaches. This work is partially funded by NiPERA.

For more information, please contact Aleicia Holland, A.Holland2@latrobe.edu.au

European Water Framework Directive update

Chris Cooper

The European Water Framework Directive (WFD) is undergoing a review process to determine if it is still fit for purpose. The aim of the WFD, which was initiated in 2000, was to ensure all water bodies across Europe were in good ecological and chemical status by 2015. This did not happen. As a result, a WFD review process began in 2017 that involved general public and stakeholder questionnaires being used to ascertain its ‘Effectiveness, Efficiency, Coherence with other Directives and Relevance’.

Some of the common issues that arose during the WFD review was the ‘one out all out’ principle obscuring any improvements in waterbodies and the non-deterioration principle, which has been seen to hamper industry when new permits are applied for or existing ones renewed. At the time of the MIG meeting, the WFD was still under review. However, it
became clear for the non-ferrous metals industry that regardless of the outcome of the WFD review, correct implementation of Environmental Quality Standard (EQS) methodology is key for ensuring state-of-the-science assessments. Related to this, a new Technical Guidance Document (TGD) for implementing metal EQSs has been finalised, but still awaiting final checks from the EU Commission. The aim is to promote the use of the TGD across Europe.

*For more information, please contact Chris Cooper, ccooper@zinc.org*

Metals-related projects, updates:

**Development of a Database to Facilitate Derivation of Bioavailability-based Metals EQS for European Freshwaters**

Iain Wilson, Adam Peters, Graham Merrington, Adam Ryan, David DeForest, Aaron Edgington.

A large water quality database intended to be used for metal bioavailability corrections for European freshwaters has been developed. The database was developed using a step-wise process to systematically obtain, screen, and assess the quality of all available data. Data were obtained from EU member states via various sources including centrally hosted data archives, data compiled by the European Environment Agency, and contacts at environment agencies throughout Europe.

Initial data searches focused on obtaining as much information as possible; the targeted information was separated into categories. Essential data were pH, dissolved organic carbon and Ca; desirable data were Mg, Na, K, Cl, SO$_4^{2-}$, total and dissolved Cu, Ni, Pb, and Zn, and added value data were conductivity, hardness, Fe, Al and other trace elements.

After compilation, an initial screening was performed to retain data with relevant sample/site information and the specific ‘essential data’. Following the initial screen, a quality assessment was implemented, which was based on the European Chemicals Agency guidance on use of measured data.

Preliminary results demonstrate that although large amounts of data are generated on water quality throughout Europe, the public availability of these data, the water quality constituents assessed, the format in which data are provided, and the quality of the data are extremely variable. Where high quality data are available, they can be used for performing bioavailability assessments, which can then identify geographic locations or areas that may be specifically sensitive to metals. Furthermore, by collating all available data, and by retaining datasets with data gaps, it is possible to identify areas where data limitations hinder adequate bioavailability assessments.

*For additional information: Adam Ryan (acryan@zinc.org) or Iain Wilson (Iain.Wilson@wca-consulting.com).*
Publication Highlights

A large number of high-quality papers on metals in the environment have been published recently. We can’t possibly cover them all, but here are a few that caught our attention.

A series of 5 papers were published in the January issue of *Environmental Toxicology and Chemistry* on the use of metal bioavailability models in aquatic systems. These papers are the result of a workshop held in Pensacola, Florida in December 2017 and describe the state-of-the-science on metal bioavailability models and provide new ideas on how best to evaluate and compare the performance of different models. ([https://setac.onlinelibrary.wiley.com/toc/15528618/2020/39/1](https://setac.onlinelibrary.wiley.com/toc/15528618/2020/39/1))

Speaking of bioavailability models, Jie Ji and colleagues have developed a bioavailability modelling framework for predicting the influence of anions (phosphate, carbonate, sulfate, and hydroxide) on the bioavailability and toxicity of arsenate, selenite and vanadate to wheat (*Triticum aestivum*). Their work was published in the February 18 issue of *Environmental Science and Technology*. ([https://pubs.acs.org/doi/pdf/10.1021/acs.est.9b06837](https://pubs.acs.org/doi/pdf/10.1021/acs.est.9b06837))

Finally, Chris Mebane and colleagues just published an experimental stream study evaluating the effects of Cd, Cu, Ni, and Zn individually and in mixtures on macroinvertebrates. They found metal concentrations in both water and periphyton could be used to predict toxicity and that mixture toxicity was either additive or less than additive. Mayflies were the most sensitive taxonomic group, often in the top 10\textsuperscript{th} percentile of species sensitivity distributions for individual metals. ([https://setac.onlinelibrary.wiley.com/doi/epdf/10.1002/etc.4663](https://setac.onlinelibrary.wiley.com/doi/epdf/10.1002/etc.4663))

Important dates for your diary

Please check regularly for cancellations and postponements...

- May 3\textsuperscript{rd} to 7\textsuperscript{th}: SETAC Europe in Dublin, Ireland.
  - Metals Interest Group meeting on Tuesday the 5\textsuperscript{th} of May, 1700-1830, Liffey Hall 1.
  - Late abstract submission (poster only) has been (re)opened until 22\textsuperscript{nd} of April, 23:59 CET.
  - The scientific programme is now announced at [https://dublin.setac.org/programme/scientific-programme/scope-tracks/](https://dublin.setac.org/programme/scientific-programme/scope-tracks/)
- September 6\textsuperscript{th} to 10\textsuperscript{th}: SETAC World Congress in Singapore.
  - Abstract submission deadline is March 25\textsuperscript{th}.
- November 15\textsuperscript{th} to 19\textsuperscript{th}: SETAC North America in Fort Worth, Texas.
  - Abstract submission from 1\textsuperscript{st} of April to June 3\textsuperscript{rd}.
  - Also, it will be the Interest Group’s 20\textsuperscript{th} birthday, next year it’ll be able to legally buy a drink in the US.
Something interesting for early career scientists

Chris Lee Award

Congratulations to Francesca Gissi (University of Wollongong) for receiving the ICA/SETAC Chris Lee Award for 2019! This award is jointly sponsored by the International Copper Association and SETAC for outstanding research on metals by an early career scientist. The award provides up to $5,000 to a graduate student or recent graduate whose ongoing research focuses on fate and effects of metals in the environment. Nominations for the 2020 Chris Lee Award are due March 17th 2020. The nomination form can be found here: https://awards.setac.org/chris-lee-award/.

SETAC jobs listing

Freaking out about what to do next, then visit the SETAC careers page: https://www.setac.org/page/ProfDevelopment.

Well done, you made it to the end of the newsletter! Your reward is a bad joke....

Q: Did you hear oxygen went on a date with potassium?
A: It went OK... Oh dear.