SKUPOVI I DOGAĐAJI

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Interreg Danube Hazard m3c project; Final Meeting and Workshops at the 25th International River Symposium

The Faculty of Chemical Engineering and Technology (FCET) of the University of Zagreb is a project partner on the international project *Tackling hazardous substances pollution in the Danube River Basin by Measuring, Modelling-based Management and Capacity building* (Danube Hazard m^{3}c), which is implemented as part of the Interreg Danube Transnational Program. The project started on July 1st, 2020, and will last until March 31st, 2023. The project coordinator is the Technische Universität Wien, TU Wien. The project is co-financed by the European Union, and the total value of the project is EUR 2,475,349.98. Many European institutions participate in the project, 11 as project partners, and 13 as strategic partners.

The majority of the project results were presented at the 25th International River Symposium, which was held on November 27–30 in Vienna, Austria, in person. Right after that, on December 1st, the final project meeting and several workshops were organised in the International Vienna Centre, in the UN building. Project partner attendees from FCET that attended in person were Assoc. Prof. Dajana Kučić Grgić, PhD, and Josipa Papac Zjačić, mag. ing. oecoing., while other associates were attending online.

The project is tackling Hazardous substances (HS) pollution in the Danube River Basin (DRB) by Measuring, Modelling-based Management, and capacity building (m^{3}c). DH m^{3}c database is a compilation of several data sources such as groundwaters, surface waters (rivers), wastewater treatment plants, stormwater outlets, atmospheric deposition, and soil. Data was collected in the time period 2008–2020, while 14 DRB countries were involved with 734 substances, seven compartments, and seven types of data sources (national/regional, international, project or research institutions database, scientific publications). It is interesting to notice that amongst 11 million measurements, 40 % of values are below LOQ (*limit of quantification*). Continuity of the measurements and data quality is an important factor for the good content of the Inventory database. An example of invalid data, for example, is measurements of industrial chemicals in rivers (such as PFOS, PFAS, nonylphenol, and octylphenol) where data are fragmented and scarce. The DH m^{3}c inventory database provides an overview of data availability and sufficiency of the measurements, missing pathways, lack of harmonization of methods (chemical analysis), and data collection. The database will serve as a valuable basis for supporting inventory in terms of the identification of trends and generation of consistent datasets for basin-wide modelling, status assessments, and finding relevant substances. Further actions will continue to upgrade it with new data to assure legislation and provide unlimited access to the data repository.

One of the biggest project activities was the development of the model MoRE which is concentrated on the quantification of pathways in the pilot region. On the other hand, the existing model DHMS is basin-wide, concentrated on emission inventories and it is linked to sources. The project team recommended using them simultaneously while using the best of both aspects. Optimisation

Fig. 1 – Professor Adrienne Clement from the Budapest University of Technology and Economics with other professors gave a project overview

of the model for certain regions is currently in progress and it is expected to be finished at the beginning of 2023.

Currently available legislation was discussed through the three-step approach (with corresponding documents): Interim policy recommendations, Critical review of national policies, and Policy guidance. Knowledge-based identification and prioritization of measures are needed for consistent emission inventories. Especially highlighted is the need for well-designed and targeted monitoring efforts in the long run while focusing on a limited number of indicator substances. Hierarchy of the pollution control is expressed as the inverted triangle where most efforts go to the prevention at the source, then controlling and minimizing mobilization, and at last, retaining of the fluxes. Sampling and laboratory testing should be done according to adequate standards and should allow comparison of results. Transnational harmonized monitoring is very challenging but was worth the effort. Harmonization is very important but needs adaptation to local conditions. Additionally, areas for policy improvement are in establishing national regulations for monitoring of chemicals and emission standards as well as individual permits for wastewater discharges granted by national authorities, including fees for discharge into sewer networks and water bodies.

Capacity building was conducted through different activities such as eight national/regional workshops on monitoring and emission inventorying, three transnational workshops on inventorying and modelling, and preparation of the technical guidance manual. It is interesting to highlight the fact that the pharmaceutical diclofenac is HS that has been detected and quantified in almost every analysed sample. There is already enough data regarding the diclofenac occurrence in the aquatic environment for the defining maximum limit, now it is just a matter of time before it will be taken into account.

All detailed information related to the description and implementation of the project can be found on the official website: http://www.interreg-danube.eu/approved-projects/danube-hazard-m3c.

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