

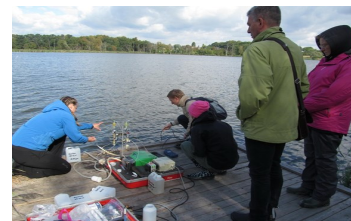


COMET

COordination and iMplementation
of a pan European instrument for Radioecology

Issue 3
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The COMET Education Program



The ultimate aim of the education and training programme within COMET is to ensure a sustainable workforce in radioecology. To achieve this aim we are dependent upon interactions with the wider radioecology community, through outreach to students, teachers, employers, employees and to other stakeholders. It is essential that COMET further develops the Training and Education (T&E) Platform in radioecology which was set up by the EC funded [STAR project](#) and also utilizes the platform which is to be developed within [CONCERT](#).

As radioecology is a multidisciplinary science, students working on MSc or PhD projects in radioecology have a wide range of

future career opportunities.

One of our goals is to put students in contact with potential employers, as well as to ensure that training and education in radioecology meets the needs of those employers. Of particular concern to stakeholders (e.g. EU Commission, National authorities, industry and other professionals) is the requirement for post graduates to have good skills in radiochemistry, radioecology, environmental modelling and radiation protection; including both radiobiology and dosimetry.

The [MSc](#) and [PhD](#) education program is given to provide these stakeholders with candidates for their future workforce that are internationally competitive.

Further essential ingredients of the COMET training and education programme are the provision of refresher courses (e.g. [on updates to the ERICA tool](#)) which are often arranged at workshops and conferences and at field-courses arranged in contaminated areas (see below).

All the courses are given in English and they are usually run intensively to make it easier for working students to attend.

More information on previous and upcoming COMET courses can be found on the [T&E platform](#) and information is also posted on the latest news blog on www.radioecology-exchange.org.



www.comet-radioecology.org & www.radioecology-exchange.org

COMET co-ordinator: Hildegard Vandenove



COMET Training Course: Naturally occurring radioactive material (NORM) in the environment

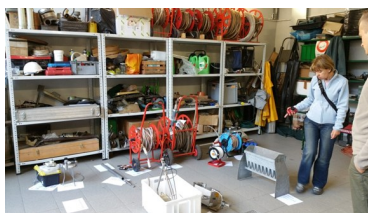
This training course was held at the Silesian Centre for Environmental Radioactivity in Katowice, Poland in September 2015 and focused on environmental radiation impact and risks associated with enhanced natural radioactivity released from different NORM industries. Special attention was paid to a freshwater ecosystem contaminated by radium released with brines due to the activity of a coal mine.



The first day was devoted for extensive lectures dealing with general NORM aspects and key processes controlling the behavior of naturally occurring radionuclides in different ecosystems in the light of recent radioecology research, including basic concepts, variables and parameters needed for modeling purposes. The distinctive features of NORM as a source of contamination that differ significantly from artificial sources were outlined and discussed in the light of appropriate methods application for assessing the exposure to radiation, environmental burden and risk.

As no research is finished without a final conclusion, at the end of the day the current legal aspects related to NORM were presented in order to create a regulatory baseline. An example of the already enforced solution in Norway was discussed.

The next morning the team of trainees, full of freshly gathered



knowledge, was ready to rise to the challenges ahead. After they had quickly become familiar with wide variety of sampling tools they were packed into a bus and sent to a 32 hectare natural lake where radium rich brines from a coal mine had been discharged from the early 1980s until 2002.

This has resulted in a large amount of radium isotopes accumulating in bottom



sediments. Currently the lake is filled with fresh water but in the bottom sediments a complex suite of natural radionuclides are present due to the decay of radium isotopes.

Stirred by a chilling breeze the trainees actively practiced their recently gained abilities.

The exercises carried out at this site were focused on contamination inventory, radionuclide migration in abiotic environment and biota and discussions regarding risk assessment.

Bottom sediments, soil from banks, different fractions of water and some species of biota were collected.



All efforts and a hard day of inconveniences were made up for when all together, instructors and trainees met in the evening at an inn serving traditional Silesian dishes.



The third day started with some time travel.... The unique features of Upper Silesia mining area allowed the trainees to see what the lake sampled the day before would look like in the future. They were taken to another lake which had been contaminated in a similar way but was now dry and had subsequently undergone the process of technical land reclamation.

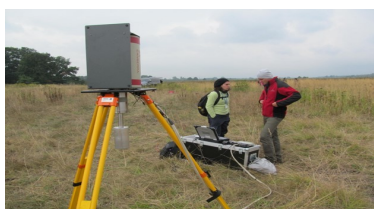
The exercises carried out at this site were focused on land reclamation effectiveness assessment and were based on *in-situ* gamma spectrometry,





COMET Training Course: Naturally occurring radioactive material (NORM) in the environment (continued)

dose rate measurement and mapping, radon in soil and radon exhalation measurement, radium and radium progeny migration to biota.



Coming back to Katowice the students visited an old miner's settlement built at the end of XIX century. Objects found in their original state provided evidence that miner's life in the past was not so bad.

The last day was again in the laboratory but boring lectures were replaced by laboratory exercises that were much more



closer to reality. Trainees had opportunity to measure collected samples (that were 'by magic' already prepared...) using of state-of-the-art measurement techniques in different Silesian Centre for Environmental radioactivity labs using high resolution gamma spectrometry, LSC, TLD and radiochemistry techniques.

Finally there was an excellent lecture and demonstration of the Environmental Risk Assessment model – the [ERICA Tool](#).



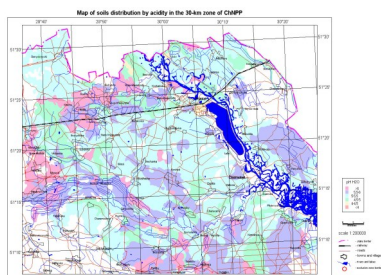
The lectures and exercises covered the whole impact assessment process starting with sampling strategies and protocol preparation, sampling campaign, sample pre-treatment and preparation, the use state-of-the-art measurement techniques and ending with a lecture on the use of environmental risk assessment models.

According to the opinion of the trainees all objectives had been achieved. The only fly in the ointment was the chill breeze during field exercises and, according to some comments, lunches were too opulent and made some of trainees too sleepy.

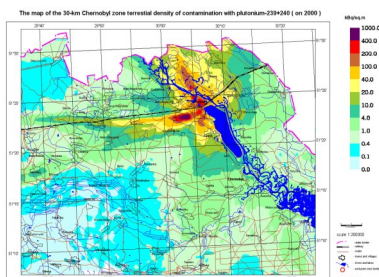
The [agenda](#), [course information](#), [presentations](#), [course report](#) and [feedback](#) are all available on the Radioecology Exchange website.

Report and pictures by:
Boguslaw Michalik

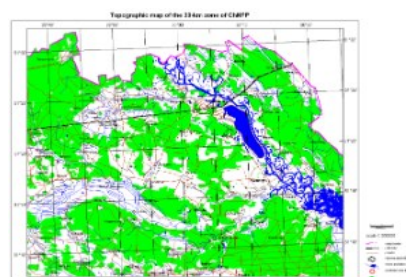
Spatial datasets for the Chernobyl Exclusion Zone (CEZ)



pH



Deposition map for Pu-239/240



Forest cover

COMET partner NuBIP have provided some [Spatial datasets](#) for the zone. Maps are available showing the deposition of many radionuclides, soil properties and land cover.

For more information on COMET contact: [Hildegard Vandenhove](#)





Fukushima Research & Training Cruise

Four years after the accident at the Fukushima Dai-ichi Nuclear Power Plant, activity concentrations of ^{137}Cs and ^{134}Cs still remain elevated in some bottom sediments, benthic invertebrates and benthic fish. The long ecological half-life of Cs isotopes in these organisms is thought to be partly due to delayed accumulation through the benthic food web, but the exact mechanisms are not fully understood.

Scientists from Stockholm University (SU) recently had the opportunity to join a research and training cruise on RV Oshoro Maru, organized by Hokkaido and Tokyo Universities. They took samples of benthic fish, benthic invertebrates and sediment. They also extracted meiofauna from the sediment; these are little-studied benthic organisms between 0.04 and 1mm in size which are a vital food source for benthic invertebrates and fish.

The scientists will use a combination of fish stomach content analyses, stable C and N isotopes analyses and next-generation DNA sequencing to build a detailed picture of benthic food web structure. This data will then be linked to Cs isotope measurements from the same samples in order to better understand food web Cs transfer.

By: Clare Bradshaw, Francisco Nascimento and Filip Svensson, SU. Pictures: Clare Bradshaw



COMET events and workshop in Japan

Three events were held in Japan in July 2015. These were:

(i) a special session at the 13th International Conference on the Biogeochemistry of Trace Elements (ICOBTE) held at the Fukuoka International Congress Centre. The Symposium was on “Understanding and mitigating the environmental behavior of

radiocaesium after the Fukushima accident”.

(ii) an excursion to the region affected by the Fukushima accident.

(iii) A COMET Workshop held at Iizaka, Fukushima. This workshop was organised by the Institute for Environmental Radioactivity at Fukushima

University, and had 42 participants from 6 countries. The speakers covered a wide range of topics and summarised current key findings and issues.

A [report](#) describes each of the three activities, summarises their content and considers the main messages for both Japan and the wider international community.





Results from the Chernobyl Exclusion Zone

In 2014 samples of different biota were collected from a site close to the Red Forest in the Chernobyl Exclusion Zone in collaboration with the [TREE project](#). Sampling focused on species falling within the definitions of the ICRP

Reference Animals and Plants using a protocol similar to [Barnett et al. \(2014\)](#).

Under COMET funding Chernobyl Center have now completed analyses of most samples to determine ^{137}Cs and

^{90}Sr , with actinides being determined in a sub-set of samples. Samples will now be sent to the UK for further analyses. Results will be used to establish alternative transfer models (see [Beresford et al. \(2016\)](#)).



NordicNORM Workshop, Helsinki, Finland (Sept 2015)

The Nordic Countries have always co-operated intensively and successfully in finding common approaches to deal with natural radiation. The initiative for this workshop came from the Nordic Radiation Protection Authorities and the work plan of CONCERT, the European Joint Programme for the Integration of Radiation Protection Research includes a Task (2.7) entitled Research and innovation supporting the implementation of the revised European Basic Safety Standards. Consequently, the NordicNORM workshop was organised in September 2015

hosted by Radiation and Nuclear Safety Authority (STUK), in cooperation with fellow Radiation Protection Authorities in other Nordic countries.

The workshop primarily targeted regulators, industry and research organisations from Nordic countries, but there was wider participation, including representatives from Estonia, Czech Republic and Hungary, as well as from the European Commission.

The workshop content included:

- Identification of NORM practices in the Nordic Countries

- Discussion on potential ways to co-operate in the implementation of the ICRP recommendations and the EU BSS Directive regarding NORM

- Presentations of Nordic studies on NORM

- Discussion on needs to update the "[Nordic Flag Book](#)" on NORM and whether to extend it to cover practices such as mining and milling industry involving NORM.

See the workshop [website](#) for more information and to access the [presentations](#) and book of [abstracts](#).





Forthcoming events for 2016

- ◆ The EJP CONCERT is expected to launch the first Transnational call for proposals in early January with anticipated submission deadline of early April. See the [preliminary announcement](#). The final call is expected to be published in January on the CONCERT [website](#).
- ◆ An [Information Day](#) on the 1st CONCERT open RTD call will be held in Munich on January 27th.
- ◆ A short session on updates to the ERICA Tool will be given on Thursday at the [IRPA congress](#), which is taking place in Cape Town, 9 -13 May.
- ◆ COMET workshop on Radiological Modelling. This will be held in Seville during 15 -17 June. Details will be available on the [Radioecology Exchange](#) soon.
- ◆ The last of the COMET sponsored [workshops](#) 'Thirty years after the Chernobyl accident what do we know about the effects of radiation on the environmental' will be held Slavutych, Ukraine during 29-31 August.
- ◆ A COMET fieldcourse on Chernobyl fallout in the environment will be held in Kiev, Ukraine during 5-8 September. More details will be available on the Radioecology Exchange website soon.
- ◆ [Radiation Protection Week](#) will be held in Oxford, UK on the 19-23 Sept. This will bring together complementary strands of radiation protection research, with the established European platforms [MELODI](#), [EURADOS](#), [NERIS](#) and [ALLIANCE](#), along with other relevant stakeholders. Further information and registration details will be available soon.
- ◆ The [NORM VIII](#) symposium will be held in Rio de Janeiro, Brazil from the 19-21 October.
- ◆ The [EAN-NORM workshop](#) will be held in Stockholm, Sweden from the 5-7 December.

Announcement of the 2nd International Conference on Radioecological Concentration Processes



In April, 1966 the first international radioecology conference was held in Stockholm as a consequence of radioecological studies following the nuclear tests in late 1950's and early 1960's.

Participants came mainly from the Nordic countries, USA and the former USSR and over 100 papers were presented and the proceedings contained 1016 pages. This conference was very successful and it played an

important role in radioecological research in the following decades. **We now feel that it is time to hold a second conference, on radioecological concentration processes, 50 years later, in Seville, Spain from the 6-9th November 2016.**

There has of course been several other conferences involving radioecology since 1966! This conference will however focus on radiological concentration processes in air, the marine and fresh water environment as well as the terrestrial environment. We expect that the conference will provide the scientific community with the most recent radionuclide processes in the environment and concentration factors, distribution factors and transfer factors.

IAEA publications are available containing extensive tables devoted to concentration factors, transfer factors, etc. for the marine and terrestrial environments. These tables are of great value for modelling purposes but they include no scientific explanation of the concentration processes involved. This aim of this conference is therefore, in addition to revise data, to also provide such understanding.

We also think that it will be an excellent opportunity for COMET to highlight some of its research. The organisers are especially encouraging younger scientists to give presentations.

Information about deadlines, abstract submission, registration etc, can be found on the conference [web page](#).

For more information on COMET contact: Hildegard Vandenbove

