



SPERA- IUR Regional Forum Report

Place (City, Country):	Melbourne, Australia
Date:	Friday, 6 th September 2024
Organisers:	International Union of Radioecology (IUR), Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)
Purpose:	The purpose of the regional forum is to provide an opportunity for international and regional stakeholders to meet, identify key programs of work in the field of environmental radioactivity and radioecology that are already underway or planned, identify corresponding areas for collaborations and identify key research priorities, avoiding gaps and duplications.
Expected Output(s):	The sharing of knowledge and experiences will promote efficient use of existing infrastructures, support harmonised and coherent regulatory developments, and the development of well-informed, balanced, and adapted consensus, whilst meeting the specificities of problem-oriented or regional objectives.
Participants:	Ilonka Bokor Joanne Brown Shane Clough Dr Megan Cook Dr Michaela Froehlich Liesel Green Candice Guavis Dr David Kolkoma Dr Stephen Long Dr Amy MacIntosh Peter Medley Blake Orr Dominique Scott Michelle Thomas A/Prof Stephen Tims Madison Williams-Hoffman Dr Gillian Hirth (AO)

Julia Carpenter
Emmanuel Blessing
Dr Jojo Panakal John

The SPERA-IUR Regional Forum brought together participants from across the South-Pacific region to discuss advancements in radioecology, environmental monitoring and international collaboration.

The IUR was generous to provide funding to support the travel and attendance of three representatives from the Pacific Islands:

- **Dr. David Kolkoma (Papua New Guinea)**

Dr. Kolkoma is a Senior Lecturer and the Head of the Applied Physics Department at the Papua New Guinea University of Technology.

- **Emmanuel Blessing (Vanuatu)**

Mr. Blessing currently holds the position of Senior Desk Officer at the Treaties and Conventions Division of the Ministry of Foreign Affairs, International Cooperation, and External Trade. He is also responsible for the Arms Trade Treaty and currently serves as Vanuatu's National Liaison Officer to the International Atomic Energy Agency.

- **Prof. Panakal Jon JOJO (Papua New Guinea)**

Prof. Panakal is a Professor at the Applied Physics Department at the Papua New Guinea University of Technology.

Agenda of the Forum

Participants were offered to present from their organisation and/or network on:

- Overview of organisation/network
- Ongoing activities of relevance
- Perspectives and directions for the future

This was followed by an open roundtable discussion on the development of a regional network, knowledge sharing and cooperative activities:

- Review original terms of reference to establish a regional network that focused on development of environmental radioactivity in the Asia-Pacific environment.
- Developing regional priorities for research and expertise in environmental radioactivity and radioecology.
- Application of resources to support efficient regional coordination of research and expertise, and development of a strategy for future cooperative activities.

Outline of the report

This report outlines the following:

- Key highlights from the workshop
- Brief summaries of the presenters
- Main results of the roundtable survey

- Deliverables for the future

The forum began with a **Welcome to Country** by **ARPANSA CEO Dr. Gillian Hirth (AO)**, followed by a brief overview of the mission of the IUR (International Union of Radioecology) and SPERA (South Pacific Environmental Radioactivity Association). The focus was on fostering collaboration, revitalizing networks, and facilitating joint frameworks among organizations within the region, especially after setbacks caused by the pandemic. The forum sought to re-establish momentum and rebuild connections that had slowed since 2020.

Dr. Amy MacIntosh (ARPANSA) provided an insightful overview of radioecology, explaining its critical role in understanding the movement and effects of radionuclides in the environment. She highlighted how radioecology complements environmental radiochemistry, with radioecology focusing on the transfer of radionuclides through ecosystems, including plants, animals, and soils, and the subsequent effects on living organisms. Amy emphasized the importance of integrating radioecological knowledge with radiochemistry for a comprehensive approach to environmental monitoring and dose assessments. This synergy is vital for developing effective radiological protection frameworks and ensuring the sustainability of ecosystems affected by radiological activities.

Key takeaways from presentations

Joanne (Jo) Brown (IAEA) presented on the IAEA's efforts in data collection for radionuclide transfer in the environment. Key points included:

- Challenges in data collation and the need for more dose assessment data from the Asia-Pacific region.
- Updates on environmental behaviour of radionuclides (e.g., Cs-137 and uranium) and the ongoing development of a digital database to integrate IAEA data, such as DIRATA, with external systems like MARIS.
- Issues with arid environments, where data scarcity limits statistical analysis.
- The need to enhance experimental work on soil-plant transfer, particularly for site-specific data that supports regional radiological risk assessments.

Dr. Megan Cook (ARPANSA) shared ARPANSA's perspective on international engagement, focusing on:

- Prioritising radioecology and environmental monitoring through partnerships, such as the RCA (Regional Cooperative Agreement).
- ARPANSA's work on raising awareness and building human capability through training programs and international collaboration.
- ARPANSA's efforts to align with global priorities while emphasizing communication and outreach.

Dr. Michaela Froehlich and Associate Professor Stephen Timms (Australian National University) presented their research efforts at the ANU focusing on the use of actinides and radioecological studies to further our understanding of marine environments:

- Actinides as environmental tracers: Their research involves using actinides to map ocean currents, helping to trace the movement of radionuclides and understand broader environmental patterns in marine systems.
- They expressed a strong interest in marine radioecology, particularly in the bioaccumulation of radionuclides in marine ecosystems. A comparison of seagrass vs. seaweed as bioindicators of radiological contamination was highlighted as an ongoing area of study.
- The establishment of a new Australian Research Council (ARC) training centre focused on radiation innovation was announced. This centre will provide educational opportunities at the Masters and PhD levels, fostering the next generation of scientists in the field.
- A major aspect of the program is training in science communication, ensuring that students and researchers are equipped to effectively convey their findings to both the scientific community and the public.
- They also emphasized the extension of radionuclide studies into Environmental Impact Assessments (EIA), with the aim of integrating radioecological data into standard environmental monitoring and protection frameworks.
- Discussed their efforts in building a robust network of researchers and organizing workshops to promote collaboration and share knowledge across institutions, both in Australia and internationally.

Madison Williams-Hoffman (Maddy) - Edith Cowan University, Environmental Radiochemistry Lab

Madison presented ongoing and future research at **the Environmental Radiochemistry Lab** at Edith Cowan University, highlighting several key projects:

- Pb-210 dating for blue carbon research, which focuses on tracing carbon sequestration in coastal ecosystems.
- Investigation of anthropogenic radionuclides using gamma spectroscopy to study human impact on environmental radionuclide levels.
- Addressing biosecurity concerns through research involving the import of international materials such as soil and water.
- The Lowedall investigation and resampling efforts at the Montebello Islands, with plans to review marine sampling methods and expand crater activity mapping.
- A focus on biota dose assessment, particularly looking at abandoned shipwrecks and hot particles, and their implications for dose and transport mechanisms.
- Building a sediment library to store environmental samples for future research.
- Future work will concentrate on using the Montebello Islands as a case study to examine anthropogenic radionuclides in a tropical coastal ecosystem.

Emmanuel Blessing (Vanuatu Government) shared the interest and broad initiatives Vanuatu are partaking in:

- Vanuatu is in the process of establishing a formal institution to regulate radiation and control the use of ionizing radiation. Currently, there is only one vague regulation under the Pollution Act.

- Plans for a baseline study and assessment of radiation sources are underway, with the assistance of two medical physicists.
- The IAEA is drafting a proposal for a workshop in Nadi in September to help guide the development of regulations and an environmental monitoring program tailored to Vanuatu's needs.
- The need for comprehensive environmental monitoring infrastructure and labs that are specific to Vanuatu, rather than duplicated from elsewhere.
- A focus on zoonotic diseases and environmental impacts, with Vanuatu being a founding signatory of the South Pacific Nuclear-Free Treaty.
- There is a lack of awareness of the peaceful uses of nuclear science among students and the public, creating a need for workshops, seminars, and training with the help of the IAEA.

Julia Carpenter (ARPANSA) provided an overview of ARPANSA's environmental programs and governance frameworks:

- Environmental assessments and monitoring are a core part of ARPANSA's work, which includes ocean modelling and providing advice to national guidance.
- Collaboration with higher education institutions and involvement in international programs like MAERIA.
- Training courses are being developed in Australian time zones to accommodate regional participants.
- ARPANSA is involved in establishing a national environmental radiation monitoring network and supporting data collation efforts.
- An ongoing project includes ²¹⁰Po monitoring in drinking water, with plans to consolidate efforts into a regional database for environmental radiation data.

Peter Medley (Queensland Health) highlighted the activities and future directions of the Radiation Sciences team in Queensland:

- The lab, although large and under-utilized, is involved in both commercial and research work, such as ²¹⁰-Po microprecipitation for environmental monitoring.
- Key research projects include:
- Drinking water quality assessments and small-scale projects on bush food diet studies and environmental dose.
- Investigating radionuclide impurities and conducting a baseline assessment prior to the Olympics.
- Exploring the use of surface hand-held contamination monitors for monitoring and analysis.
- Future work will address uncertainties in waste management, the impact of seafood diets in Torres Strait Islanders, and passive radon monitoring.
- The lab is a member of RadInnovate ITTC and fosters collaborative work with other institutions, including offering training courses and examining ¹³¹-I dose for medical staff.

Dr. Amy MacIntosh presented on behalf of Dr. Tom Cresswell (Principal Research Scientist at ANSTO) discussing offshore decommissioning projects:

- NORM and mercury contamination are identified as the top research priorities for decommissioning.
- Research in the aquatic ecology lab at ANSTO includes understanding the biokinetics of mercury compounds (MeHg, HgCl₂, HgS) and the biomagnification of mercury in Australian marine taxa, using radiotracing to study how mercury is taken up and retained by organisms.
- Future research will focus on understanding mercury's oxidation and solubility under different Australian environmental conditions, such as light and temperature, as well as its methylation in sediment.
- NORM studies include dosimetry (radiation dose estimation) and bioaccumulation in marine organisms. Dosimetry studies indicate that NORM dose rates can exceed screening levels even when accounting for solubility.
- Current experiments expose Australian marine algae to gamma radiation to assess growth rates.
- Ongoing mesocosm studies examine the behaviour and toxicity of NORM in the marine environment, partnering with Australian agencies to better understand NORM risks.
- The research aims to develop a contaminant assessment framework for offshore environments, offering advice to industry and regulators.
- Further dose-response assays for radiation exposure are planned, and collaboration with the IAEA is needed to advance regulatory understanding and risk assessments of NORM and mercury.

Results from roundtable survey and discussion

A SurveyMonkey survey was distributed to all the participants to fill out key questions surrounding radioecology in the South-Pacific region.

The questions asked were:

What is a project you are working on and where does radioecology fit in? If you don't work directly in the area of radioecology, what fascinates you about the field?

What was your main purpose of attending the SPERA-IUR Forum?

What were the most valuable takeaways from this workshop for you?

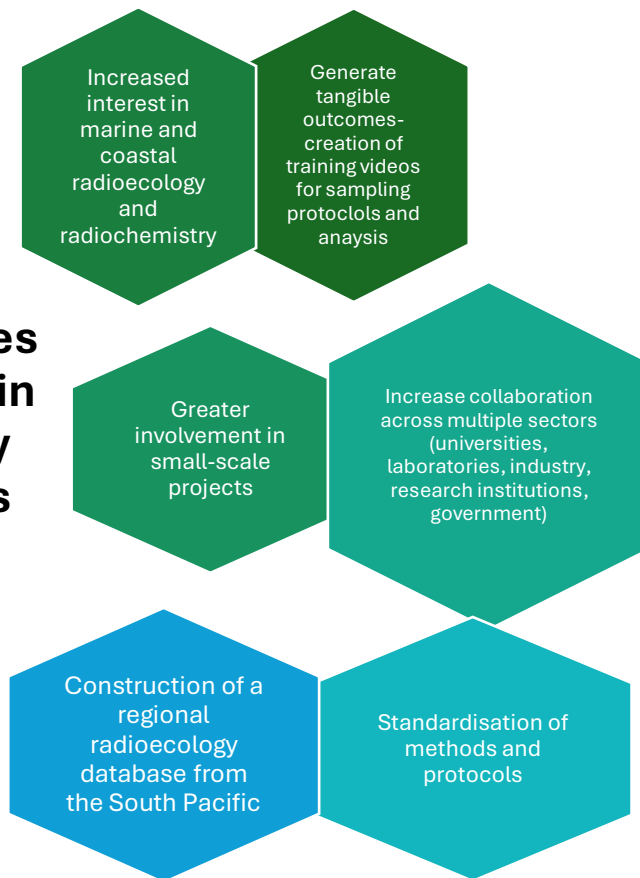
What new initiatives or research topics should IUR consider initiating or supporting based on the discussions held in the workshop?

In what ways do you think IUR can better support radioecology research and initiatives in the Pacific region?

How can IUR facilitate better collaboration and communication among researchers and stakeholders in the region?

A collective discussion was held to explore network perspectives and future collaboration strategies

Main themes expressed in the survey responses



Actions

After the roundtable discussion, a series of key actions were identified and implemented to begin the revitalisation of the IUR Asia-Pacific Working Group in conjunction with SPERA:



Follow-up meeting Q1
2025



Establishment of a web-
based collaboration
platform for regional
cooperation



Development of a
communication plan to
ensure all members of the
regional forum have
access to all available
information to strengthen
their radioecological
activities



A pilot project analysing
soil samples in the Pacific
utilising regional
laboratory networks



Creation of a database for
Asia-Pacific regional data,
importantly a profile of key
sampling & measurement
data & metadata for high
data quality

Additional points for discussion

- Targeted regional capability/capacity building activities
- The possibility of developing projects or working groups based on regional reference organisms
- Sharing of standard laboratory methods for common radioanalytical measurements