



Short communication

A database of radionuclide activity and metal concentrations for the Alligator Rivers Region uranium province

Che Doering^{a, *}, Andreas Bollhöfer^{a, b}^a Environmental Research Institute of the Supervising Scientist (ERISS), GPO Box 461, Darwin, NT 0801, Australia^b Federal Office for Radiation Protection (Bundesamt für Strahlenschutz, BfS), 79098, Freiburg, Germany

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ABSTRACT

This paper presents a database of radionuclide activity and metal concentrations for the Alligator Rivers Region (ARR) uranium province in the Australian wet-dry tropics. The database contains 5060 sample records and 57,473 concentration values. The data are for animal, plant, soil, sediment and water samples collected by the Environmental Research Institute of the Supervising Scientist (ERISS) as part of its statutory role to undertake research and monitoring into the impacts of uranium mining on the environment of the ARR. Concentration values are provided in the database for 11 radionuclides (^{227}Ac , ^{40}K , ^{210}Pb , ^{210}Po , ^{226}Ra , ^{228}Ra , ^{228}Th , ^{230}Th , ^{232}Th , ^{234}U , ^{238}U) and 26 metals (Al, As, Ba, Ca, Cd, Co, Cr, Cu, Fe, Hg, K, Mg, Mn, Na, Ni, P, Pb, Rb, S, Sb, Se, Sr, Th, U, V, Zn). Potential uses of the database are discussed.

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1. Introduction

Environmental assessments of uranium mining sites can be data intensive because of the potentially large number of contaminant-pathway combinations that need to be characterised in order to evaluate exposure risks to people and the environment. This is the case for Ranger uranium mine in the Alligator Rivers Region (ARR) of northern Australia where, for more than three decades, the Environmental Research Institute of the Supervising Scientist (ERISS) has been undertaking research to generate data and independently assess the environmental impacts of uranium mining in the region (Van Dam et al., 2002). Data generated by ERISS on radionuclide activity and metal concentrations in various environmental compartments have recently been compiled into a database to facilitate their storage and analysis. This paper describes the development of the database and discusses some of its potential uses.

2. Regional context

The ARR is located in the wet-dry tropics of northern Australia

(Fig. 1). It is an area rich in Aboriginal culture, biological diversity and uranium mineral deposits. Most of the ARR is Aboriginal owned land and around two thirds of it is World Heritage listed as Kakadu National Park. Ranger uranium mine is located in the ARR. It is Australia's largest uranium producer and one of the top uranium-producing mines worldwide. The mine is surrounded by Kakadu National Park but is technically not part of it. Mining at Ranger began in 1980 and is scheduled to cease by 2021. The site is to be remediated by 2026 such that it could be incorporated into Kakadu National Park (Commonwealth of Australia (1999)).

The statutory position of Supervising Scientist and an associated research institute (i.e. ERISS) were established in 1978 following an Australian Government inquiry into the environmental concerns surrounding uranium mining in the ARR (Fox et al., 1977). The Supervising Scientist is responsible for the environmental oversight of uranium mining in the ARR, and ERISS undertakes research into its environmental impacts. An important part of the research by ERISS has been to collect Aboriginal bush foods¹ from the environment and analyse them for radionuclides and metals. The initial reason for this has been to assess potential exposures to Aboriginal people from dietary intakes of radionuclides and metals, and

* Corresponding author.

E-mail address: che.doering@environment.gov.au (C. Doering).¹ Bush foods are the edible tissues of wild plants and animals which are traditionally hunted and gathered by Aboriginal people for sustenance.

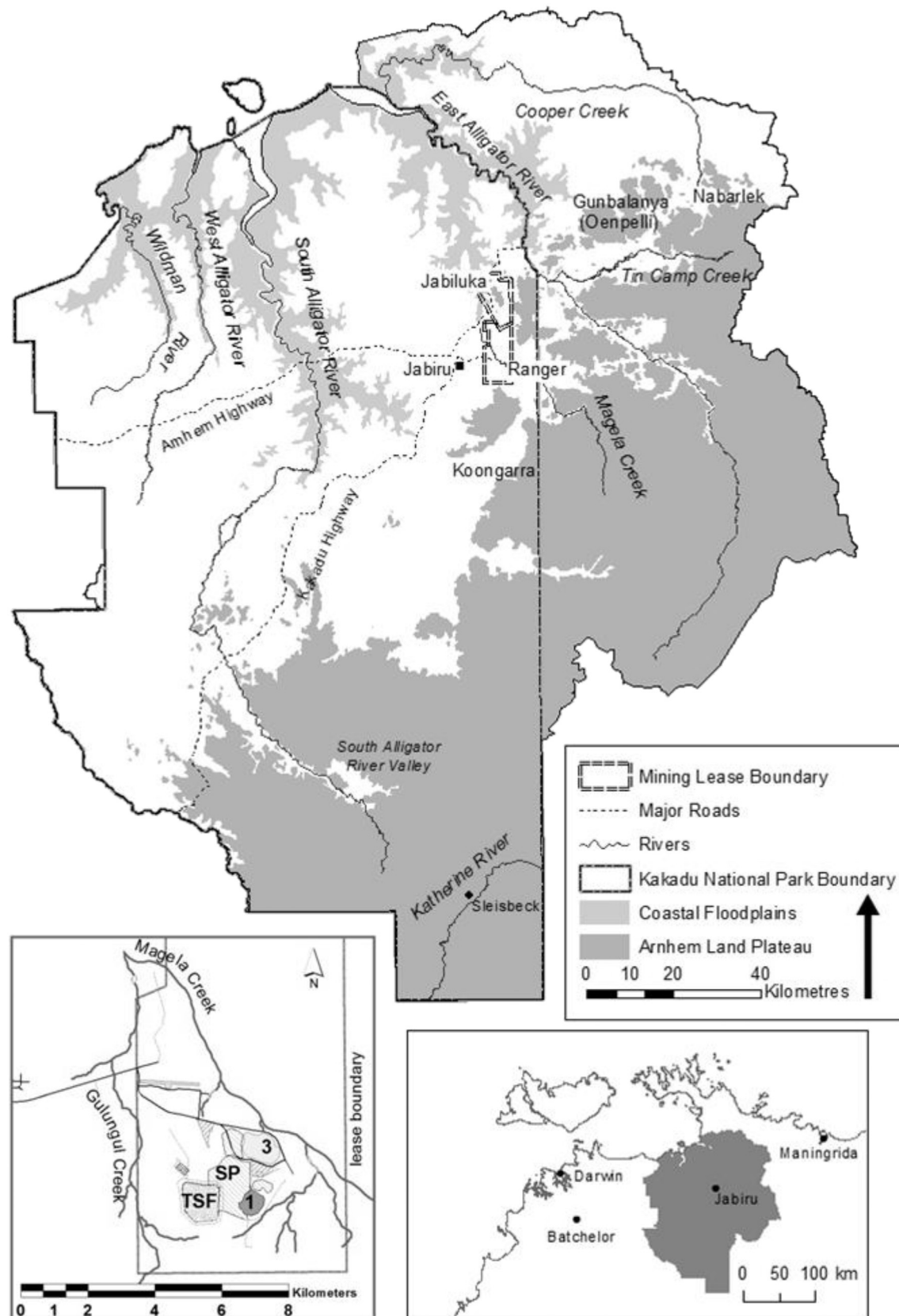


Fig. 1. Alligator Rivers Region map showing Kakadu National Park and the location of Ranger uranium mine. The inset at the bottom left shows an expanded view of the mine and surrounding creeks (TSF = tailings storage facility, SP = stockpiles, 1 = pit 1, 3 = pit 3). The inset at the bottom right shows the location of the Alligator Rivers Region in the broader geographical context of Australia's 'Top End'.

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