

Environ Earth Sci (2016)75:1250
DOI 10.1007/s12665-016-6037-z



ERRATUM

Erratum to: Radiotoxicity risks of radium-226 (^{226}Ra) on groundwater-based drinking at Dawaki, Kuje, Giri and Sabon-Lugbe area of Abuja, North Central Nigeria

O. Maxwell^{1,2} · Husin Wagiran² · Embong Zaidi³ · E. S. Joel¹ · I. T. Tenebe⁴ · I. A. Oha⁵ · O. S. Onwuka⁵

© Springer-Verlag Berlin Heidelberg 2016

Erratum to: Environ Earth Sci (2016) 75:1084
DOI 10.1007/s12665-016-5884-y

Authors would like to correct the errors in Tables 1 and 2 of the original publication. The correct version of Tables 1 and 2 is given below:

The online version of the original article can be found under doi:[10.1007/s12665-016-5884-y](https://doi.org/10.1007/s12665-016-5884-y).

✉ O. Maxwell
maxwell.omeje@covenantuniversity.edu.ng

¹ Department of Physics, College of Science and Technology, Covenant University, KM 10, Idiroko Road, Canaan Land, Ota, Ogun State, Nigeria

² Department of Physics, Faculty of Science, Universiti Teknologi Malaysia (UTM), 81310 Skudai, Johor Bahru, Johor, Malaysia

³ Faculty of Science, Technology and Human Development, Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Batu Pahat, Johor, Malaysia

⁴ Department of Civil Engineering, College of Engineering, Covenant University, P.M.B 1023, Ota, Ogun State, Nigeria

⁵ Department of Geology, University of Nigeria, Nsukka, Enugu State, Nigeria

Table 1 Results of activity concentrations, annual effective dose, lifetime cancer mortality and morbidity risk, and the lifetime average daily dose (LADD) of ^{226}Ra in water samples from the study area, comparing with various countries and international standard

Location	Activity concentration ^{226}Ra ($\mu\text{Bq L}^{-1}$)	Annual effective dose (mSv year^{-1})	Cancer mortality risk	Cancer morbidity risk	LADD ($\mu\text{g kg}^{-1} \text{day}^{-1}$)	References
Dawaki	2698	8.9×10^{-5}	1.01×10^{-7}	1.55×10^{-7}	6×10^{-3}	Present study
Kuje	849	2.8×10^{-5}	3.19×10^{-8}	4.88×10^{-9}	2×10^{-3}	Present study
Giri	443	1.5×10^{-5}	1.67×10^{-8}	2.55×10^{-8}	1×10^{-3}	Present study
Sabon-Lugbe	2736	9.0×10^{-5}	1.03×10^{-7}	1.57×10^{-7}	6×10^{-3}	Present study
Water Board	1824	6.0×10^{-5}	6.85×10^{-8}	1.05×10^{-7}	4×10^{-3}	present study
Hand-dug well	2430	8.0×10^{-5}	9.12×10^{-8}	1.40×10^{-7}	5×10^{-3}	Present study
Slovenia	6333	–	–	–	–	Kobal et al. (1990)
Brazil	1013	–	–	–	–	Almeida et al. (2014)
Germany	14,567	–	–	–	–	Gans et al. (1978)
China	17,733	–	–	–	–	Zhuo et al. (2001)
Finland	20,267	–	–	–	–	Salonen et al. (2002)
USEPA, Council Directive 98/83/EY/	19,000	1.0×10^{-1}	–	–	–	USEPA (2000)
Odeda, Ogun state, Nigeria	–	–	2.54×10^{-4}	3.39×10^{-4}	–	Amakom and Jibril (2010)
RFD (reference dose)	–	–	–	–	6×10^{-1}	Ye-shin et al. (2004)

Table 2 Results of elemental concentrations of water analysis in Dei–Dei, Kubwa, Gosa, Lugbe boreholes, water board and hand-dug well, comparing with Pereira-Barbosa et al. (2013) and Gbadebo (2011)

Sample location	Carcinogenic toxic elements (mg L^{-1})			Non-carcinogenic toxic elements (mg L^{-1})				
	As	Cr	Cd	Pb	Ni	Zn	Mg	K
Dawaki borehole	0.003	0.004	0.0001	0.006	0.003	0.02	Nil	Nil
Kuje borehole	0.0002	0.004	0.00002	0.0002	0.002	0.04	2.11	1.41
Giri borehole	0.0006	0.0003	0.0005	0.003	0.001	0.032	1.334	1.339
Sabon-Lugbe	0.002	0.004	0.0001	0.014	0.021	0.277	0.037	0.0006
Water Board	0.001	0.01	0.0002	0.012	0.008	0.04	Nil	Nil
Hand-dug well	0.003	0.001	0.00006	0.002	0.005	0.03	Nil	Nil
Pereira-Barbosa et al. (2013)	0.05	0.1	0.005	0.010	0.07	0.07	0.05	–
Gbadebo (2011)	–	–	–	–	–	–	–	8.0