Record 301 of 474

Author(s): Nikolic, JL (Nikolic, Jugoslav L.); Veselinovic, NC (Veselinovic, Nenad C.); Tollefsen, TB (Tollefsen, Tore B.); Celikovic, IT (Celikovic, Igor T.); Kisic, DM (Kisic, Dragica M.); Cuknic, OR (Cuknic, Olivera R.); Zunic, ZS (Zunic, Zora S.)

Title: SOIL GAS MAPPING IN THE VICINITY OF NIKOLA TESLA THERMO POWER PLANT DISPOSAL FIELD

Source: NUCLEAR TECHNOLOGY & RADIATION PROTECTION, 25 (1): 37-40 APR 2010

Abstract: This paper presents the results of identification of natural ionizing irradiation in the vicinity of Nikola Tesla B power plant ash disposal field. The investigations have comprised the determination of natural gas (radon and thoron) activities with a passive discriminative nuclear track detector (CR 39) in the air column of the depth of 80 cm in the soil. The determination of gamma dose rate has been given as well, including the corresponding GPS coordinates of 28 measuring points.

ISSN: 1451-3994

DOI: 10.2298/NTRP1001037N

Record 302 of 474

Author(s): Gillmore, GK (Gillmore, G. K.); Jabarivasal, N (Jabarivasal, N.)

Title: A reconnaissance study of radon concentrations in Hamadan city, Iran

Source: NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, 10 (4): 857-863 2010

Abstract: This paper presents results of a reconnaissance study that used CR-39 alpha track-etch detectors to measure radon concentrations in dwellings in Hamadan, western Iran, significantly, built on permeable alluvial fan deposits. The indoor radon levels recorded varied from 4 (i.e. below the lower limit of detection for the method) to 364 Bq/m(3) with a mean value of 108 Bq/m(3) which is 2.5 times the average global population-weighted indoor radon concentration - these data augment the very few published studies on indoor radon levels in Iran. The maximum radon concentration in Hamadan occurs during the winter period (January to March) with lower concentrations during the autumn. The effective dose equivalent to the population in Hamadan is estimated from this study to be in the region of 2.7 mSv/y, which is above the guidelines for dose to a member of the public of 1 mSv/y suggested by the International Commission on Radiological Protection (ICRP) in 1993. This study supports other work in a number of countries that indicates such permeable 'surficial' deposits as being of intermediate to high radon potential. In western Iran, the presence of hammered clay floors, the widespread presence of excavated qanats, the textural properties of surficial deposits and human behaviour intended to cope with winds are likely to be important factors influencing radon concentrations in older buildings.

ISSN: 1561-8633

Record 303 of 474

Author(s): Vaupotic, J (Vaupotic, J.); Gregoric, A (Gregoric, A.); Kobal, I (Kobal, I.); Zvab, P (Zvab, P.); Kozak, K (Kozak, K.); Mazur, J (Mazur, J.); Kochowska, E (Kochowska, E.); Grzadziel, D (Grzadziel, D.)

Title: Radon concentration in soil gas and radon exhalation rate at the Ravne Fault in NW Slovenia

Source: NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, 10 (4): 895-899 2010

Abstract: The Ravne tectonic fault in north-west (NW) Slovenia is one of the faults in this region, responsible for the elevated seismic activity at the Italian-Slovene border. Five measurement profiles were fixed in the vicinity of the Ravne fault, four of them were perpendicular and one parallel to the fault. At 18 points along these profiles the following measurements have been carried out: radon activity concentration in soil gas, radon exhalation rate from ground, soil permeability and gamma dose rate. The radon measurements were carried out using the AlphaGuard equipment, and GammaTracer was applied for gamma dose rate measurements. The ranges of the obtained results are as follows: 0.9-32.9 kBq m(-3) for radon concentration (C-Rn), 1.1-41.9 mBq m(-2) s(-1) for radon exhalation rate (E-Rn), 0.5-7.4x10(-13) m(2) for soil permeability, and 86-138 nSv h(-1) for gamma dose rate. The concentrations of Rn-222 in soil gas were found to be lower than the average for Slovenia. Because the deformation zones differ not only in the direction perpendicular to the fault but also along it, the behaviour of either C-Rn or E-Rn at different profiles differ markedly. The study is planned to be continued with measurements being carried out at a number of additional points.

ISSN: 1561-8633

Record 304 of 474

Author(s): Rushton, L (Rushton, L.); Bagga, S (Bagga, S.); Bevan, R (Bevan, R.); Brown, TP (Brown, T. P.); Cherrie, JW (Cherrie, J. W.); Holmes, P (Holmes, P.); Fortunato, L (Fortunato, L.); Slack, R (Slack, R.); Van Tongeren, M (Van Tongeren, M.); Young, C (Young, C.); Hutchings, SJ (Hutchings, S. J.)

Title: Occupation and cancer in Britain

Source: BRITISH JOURNAL OF CANCER, 102 (9): 1428-1437 APR 27 2010

Abstract: BACKGROUND: Prioritising control measures for occupationally related cancers should be evidence based. We estimated the current burden of cancer in Britain attributable to past occupational exposures for International Agency for Research on Cancer (IARC) group 1 (established) and 2A (probable) carcinogens.
METHODS: We calculated attributable fractions and numbers for cancer mortality and incidence using risk estimates from the literature and national data sources to estimate proportions exposed.
RESULTS: 5.3% (8019) cancer deaths were attributable to occupation in 2005 (men, 8.2% (6362); women, 2.3% (1657)). Attributable incidence estimates are 13 679 (4.0%) cancer registrations (men, 10 063 (5.7%); women, 3616 (2.2%)). Occupational attributable fractions are over 2% for mesothelioma, sinonasal, lung, nasopharynx, breast, non-melanoma skin cancer, bladder, oesophagus, soft tissue sarcoma, larynx and stomach cancers. Asbestos, shift work, mineral oils, solar radiation, silica, diesel engine exhaust, coal tars and pitches, occupation as a painter or welder, dioxins, environmental tobacco smoke, radon, tetrachloroethylene, arsenic and strong inorganic mists each contribute 100 or more registrations. Industries and occupations with high cancer registrations include construction, metal working, personal and household services, mining, land transport, printing/publishing, retail/hotels/restaurants, public administration/defence, farming and several manufacturing sectors. 56% of cancer registrations in men are attributable to work in the construction industry (mainly mesotheliomas, lung, stomach, bladder and non-melanoma skin cancers) and 54% of cancer registrations in women are attributable to shift work (breast cancer).
CONCLUSION: This project is the first to quantify in detail the burden of cancer and mortality due to occupation specifically for Britain. It highlights the impact of occupational exposures, together with the occupational circumstances and industrial areas where exposures to carcinogenic agents occurred in the past, on population cancer morbidity and mortality; this can be compared with the impact of other causes of cancer. Risk reduction strategies should focus on those workplaces where such exposures are still occurring. British Journal of Cancer (2010) 102, 1428-1437. doi:10.1038/sj.bjc.6605637
www.bjcancer.com (C) 2010 Cancer Research UK

ISSN: 0007-0920

DOI: 10.1038/sj.bjc.6605637

Record 306 of 474

Author(s): [Anon]

Title: A radon detector for earthquake prediction

Source: PHYSICS WORLD, 23 (4): 5-5 APR 2010

ISSN: 0953-8585

Record 307 of 474

Author(s): Xhafa, B (Xhafa, Besim); Bekteshi, S (Bekteshi, Sadik); Ahmetaj, S (Ahmetaj, Skender); Kabashi, S (Kabashi, Skender); Jonuzaj, A (Jonuzaj, Albert)

Title: Indoor radon concentrations in Vushtrri, Kosovo

Source: NUOVO CIMENTO DELLA SOCIETA ITALIANA DI FISICA B-BASIC TOPICS IN PHYSICS, 124 (9): 1003-1007 SEP 2009

Abstract: Indoor air radon concentration was measured by exposing track-etch detectors in the two elementary schools, one high school, a kindergarten and the hospital in the city of Vushtrri. Measurements were performed with the radon monitor PRM-145, which uses alpha scintillation cells and serves to determine the current concentration of radon. The results we obtained are in the range between the average values of radon for the interior spaces, and values that poses potential risk for lung cancer. Measuring the concentration of radon was done in total of 34 rooms and came up with values which are between 28 Bqm(-3) and 398Bqm(-3). In order to reduce the concentration of radon, we have built a ventilation pump, then we performed repeated measurements and finally came with results between 130-145 Bqm(-3).

ISSN: 1594-9982

DOI: 10.1393/ncb/i2010-10823-5

Record 308 of 474

Author(s): Kiliari, T (Kiliari, Tasoula); Tsiaili, A (Tsiaili, Anastasia); Pashalidis, I (Pashalidis, Ioannis)

Title: Lithological and seasonal variations in radon concentrations in Cypriot groundwaters

Source: JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY, 284 (3): 553-556 JUN 2010

Abstract: The paper presents and discusses radon activity concentrations in Cypriot groundwater systems as a function of the background lithology and seasonal/meteorological conditions using an airborne radon monitoring system (ARM) after separation of radon by out-gassing. Radiometric analysis of groundwater samples obtained from non-contaminated systems showed that radon concentration in groundwaters varies strongly (0.1-10 Bq L-1) depending mainly on the hosting geological matrix but also to lesser degree on atmospheric/meteorological conditions. The associated excess annual dose has been estimated to range between 10(-6) and 10(-4) mSv y(-1), which is an insignificant contribution to the radiation exposure of the Cypriot population caused by airborne radon (0.5 +/- A 0.4 mSv y(-1)).

ISSN: 0236-5731

DOI: 10.1007/s10967-010-0518-4

Record 309 of 474

Author(s): Allen, JG (Allen, Joseph G.); Minegishi, T (Minegishi, Taeko); Myatt, TA (Myatt, Theodore A.); Stewart, JH (Stewart, James H.); Mccarthy, JF (Mccarthy, John F.); Macintosh, DL (Macintosh, David L.)

Title: Assessing exposure to granite countertops-part 2: Radon

Source: JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY, 20 (3): 263-272 MAY 2010

Abstract: Radon gas (Rn-222) is a natural constituent of the environment and a risk factor for lung cancer that we are exposed to as a result of radioactive decay of radium (Ra-226) in stone and soil. Granite countertops, in particular, have received recent media attention regarding their potential to emit radon. Radon flux was measured on 39 full slabs of granite from 27 different varieties to evaluate the potential for exposure and examine determinants of radon flux. Flux was measured at up to six pre-selected locations on each slab and also at areas identified as potentially enriched after a full-slab scan using a Geiger-Muller detector. Predicted indoor radon concentrations were estimated from the measured radon flux using the CONTAM indoor air quality model. Whole-slab average emissions ranged from less than limit of detection to 79.4 Bq/m(2)/h (median 3.9 Bq/m(2)/h), similar to the range reported in the literature for convenience samples of small granite pieces. Modeled indoor radon concentrations were less than the average outdoor radon concentration (14.8 Bq/m(3); 0.4 pCi/l) and average indoor radon concentrations (48 Bq/m(3); 1.3 pCi/l) found in the United States. Significant within-slab variability was observed for stones on the higher end of whole slab radon emissions, underscoring the limitations of drawing conclusions from discrete samples. Journal of Exposure Science and Environmental Epidemiology (2010) 20, 263-272; doi:10.1038/jes.2009.43; published online 26 August 2009

ISSN: 1559-0631

DOI: 10.1038/jes.2009.43

Record 310 of 474

Author(s): Myatt, TA (Myatt, Theodore A.); Allen, JG (Allen, Joseph G.); Minegishi, T (Minegishi, Taeko); Mccarthy, WB (Mccarthy, William B.); Stewart, JH (Stewart, James H.); Macintosh, DL (Macintosh, David L.); Mccarthy, JF (Mccarthy, John F.)

Title: Assessing exposure to granite countertops-part 1: Radiation

Source: JOURNAL OF EXPOSURE SCIENCE AND ENVIRONMENTAL EPIDEMIOLOGY, 20 (3): 273-280 MAY 2010

Abstract: Humans are continuously exposed to low levels of ionizing radiation. Known sources include radon, soil, cosmic rays, medical treatment, food, and building products such as gypsum board and concrete. Little information exists about radiation emissions and associated doses from natural stone finish materials such as granite countertops in homes. To address this knowledge gap, gross radioactivity, g ray activity, and dose rate were determined for slabs of granite marketed for use as countertops. Annual effective radiation doses were estimated from measured dose rates and human activity patterns while accounting for the geometry of granite countertops in a model kitchen. Gross radioactivity, g activity, and dose rate varied significantly among and within slabs of granite with ranges

for median levels at the slab surface of ND to 3000 cpm, ND to 98,000 cpm, and ND to 1.5E-4 mSv/h, respectively. The maximum activity concentrations of the K-40, Th-232, and Ra-226 series were 271, 231, and 450 Bq/kg, respectively. The estimated annual radiation dose from spending 4 h/day in a hypothetical kitchen ranged from 0.005 to 0.18 mSv/a depending on the type of granite. In summary, our results show that the types of granite characterized in this study contain varying levels of radioactive isotopes and that their observed emissions are consistent with those reported in the scientific literature. We also conclude from our analyses that these emissions are likely to be a minor source of external radiation dose when used as countertop material within the home and present a negligible risk to human health. Journal of Exposure Science and Environmental Epidemiology (2010) 20, 273-280; doi:10.1038/jes.2009.44; published online 26 August 2009

ISSN: 1559-0631

DOI: 10.1038/jes.2009.44

Record 311 of 474

Author(s): Rahman, SU (Rahman, S. U.); Matiullah (Matiullah); Anwar, J (Anwar, J.); Jabbar, A (Jabbar, A.); Rafique, M (Rafique, M.)

Title: Indoor Radon Survey in 120 Schools Situated in Four Districts of the Punjab Province - Pakistan

Source: INDOOR AND BUILT ENVIRONMENT, 19 (2): 214-220 APR 2010

Abstract: An indoor radon survey has been carried in 120 schools situated in four districts of the Punjab province, namely Attock, Chakwal, Jhelum, and Rawalpindi. In each season, a total of 360 CR-39-based radon detectors were installed in the selected schools. After exposure the detectors were etched in 6M NaOH at 80 degrees C solution for 16 h and tracks densities, which are related to the radon concentration, were measured. Indoor radon concentration varied from 18 +/- 7 to 168 +/- 5 Bq.m(-3) with an average value of 52 +/- 9 Bq.m(-3). High indoor radon concentration values were found in the summer season, whereas lower values were recorded in autumn season. The mean annual radon effective dose equivalent was estimated to be 0.49 mSv per year. Present indoor radon concentration values are higher than that of the world average value of 40 Bq.m(-3), but lower than the action level recommended by the ICRP.

ISSN: 1420-326X

DOI: 10.1177/1420326X09347132

Record 312 of 474

Author(s): Aronowitz, JN (Aronowitz, Jesse N.); Robison, RF (Robison, Roger F.)

Title: Howard Kelly establishes gynecologic brachytherapy in the United States

Source: BRACHYTHERAPY, 9 (2): 178-184 APR-JUN 2010

Abstract: PURPOSE: Exploration of Howard Atwood Kelly's contributions to gynecologic brachytherapy. METHODS AND MATERIALS: Review of contemporary journals, texts, newspaper accounts, and the memoirs of Kelly's associates. Information from unpublished material, including Kelly's handwritten notes and diaries, was culled from the Alan Mason Chesney Archives of the Johns Hopkins Medical Institutions. RESULTS: Despite European reports of radium's efficacy, gynecologists on both sides of the Atlantic resisted its adoption. The endorsement of radium therapy by America's foremost gynecologist, Howard Kelly, was instrumental in its acceptance. His consummate skill as clinician, investigator, publicist, and entrepreneur established brachytherapy as the primary treatment modality for carcinoma of the cervix and vagina. The technique he pioneered in the second decade of the 20th century, a combination of brachytherapy and megavoltage-equivalent teletherapy, presaged modern practice. CONCLUSION: Principles for the management of female genital neoplasia, outlined by Howard Kelly nine decades ago, remain relevant today.

ISSN: 1538-4721

DOI: 10.1016/j.brachy.2009.10.001

Record 313 of 474

Author(s): Gruson, M (Gruson, M.); Murith, C (Murith, C.); Rumo, S (Rumo, S.)

Title: Survey: Knowledge level of the population about radon in Switzerland.

Source: RADIOPROTECTION, 45 (1): 11-30 JAN-MAR 2010

Abstract: In 1995, a survey was conducted in order to investigate levels of knowledge about radon among the Swiss population. In 2008, a second survey, using a similar methodology, was carried out by the FOPH. The new study showed that about 40% of the Swiss population has heard of radon, which represents an increase of 8% over the 1995 survey. Most of the respondents knew that radon causes lung cancer, but believed that the gas also produces other health effects in particular, migraine and skin conditions. In addition, older people, those with a high level of education and property owners tended to be more familiar with the radon issue than the public at large. The inhabitants of high-risk regions achieved markedly better results, which demonstrate that information campaigns in these regions have been successful. At the same time, additional communication efforts are required in low- and medium-risk municipalities, where the majority of the population lives.

ISSN: 0033-8451

DOI: 10.1051/radiopro/2009027

Record 314 of 474

Author(s): Kreuzer, M (Kreuzer, Michaela); Grosche, B (Grosche, B.); Schnelzer, M (Schnelzer, M.); Tschense, A (Tschense, A.); Dufey, F (Dufey, F.); Walsh, L (Walsh, L.)

Title: Radon and risk of death from cancer and cardiovascular diseases in the German uranium miners cohort study: follow-up 1946-2003

Source: RADIATION AND ENVIRONMENTAL BIOPHYSICS, 49 (2): 177-185 MAY 2010

Abstract: Data from the German uranium miners cohort study were analyzed to investigate the radon-related risk of mortality from cancer and cardiovascular diseases. The Wismut cohort includes 58,987 men who were employed for at least 6 months from 1946 to 1989 at the former Wismut uranium mining company in Eastern Germany. By the end of 2003, a total of 3,016 lung cancer deaths, 3,355 deaths from extrapulmonary cancers, 5,141 deaths from heart diseases and 1,742 deaths from cerebrovascular diseases were observed. Although a number of studies have already been published on various endpoints in the Wismut cohort, the aim of the present analyses is to provide a direct comparison of the magnitude of radon-related risk for different cancer sites and cardiovascular diseases using the same data set, the same follow-up period and the same statistical methods. A specific focus on a group of cancers of the extrathoracic airways is also made here, due to the assumed high organ doses from absorbed radon progeny. Internal Poisson regression was used to estimate the excess relative risk (ERR) per unit of cumulative exposure to radon in working level months (WLM) and its 95% confidence limits (CI). There was a statistically significant increase in the risk of lung cancer with increasing radon exposure (ERR/WLM = 0.19%; 95% CI: 0.17%; 0.22%). A smaller, but also statistically significant excess was found for cancers of the extrathoracic airways and trachea (ERR/WLM = 0.062%; 95% CI: 0.002%; 0.121%). Most of the remaining nonrespiratory cancer sites showed a positive relationship with increasing radon exposure, which, however, did not reach statistical significance. No increase in risk was noted for coronary heart diseases (ERR/WLM = 0.0003%) and cerebrovascular diseases (ERR/WLM = 0.001%). The present data provide clear evidence of an increased radon-related risk of death from lung cancer, some evidence for an increased radon-related risk of death from cancers of the extrathoracic airways and some other extrapulmonary cancers, and no evidence for mortality from cardiovascular diseases. These findings are consistent with the results of other miner studies and dosimetric calculations for radon-related organ doses.

ISSN: 0301-634X

DOI: 10.1007/s00411-009-0249-5

Record 315 of 474

Author(s): Tempfer, H (Tempfer, H.); Hofmann, W (Hofmann, W.); Schober, A (Schober, A.); Lettner, H (Lettner, H.); Dinu, AL (Dinu, A. L.)

Title: Deposition of radon progeny on skin surfaces and resulting radiation doses in radon therapy

Source: RADIATION AND ENVIRONMENTAL BIOPHYSICS, 49 (2): 249-259 MAY 2010

Abstract: In the Gastein valley, Austria, radon-rich thermal water and air have been used for decades for the treatment of various diseases. To explore the exposure pathway of radon progeny adsorbed to the skin, progeny activities on the skin of patients exposed to thermal water (in a bathtub) and hot vapour (in a vapour chamber) were measured by alpha spectrometry. Average total alpha activities on the patients' skin varied from 1.2 to 4.1 Bq/cm(2) in the bathtub, and from 1.1 to 2.6 Bq/cm(2) in the vapour bath. Water pH-value and ion concentration did affect radon progeny adsorption on the skin, whereas skin greasiness and blood circulation did not. Measurements of the penetration of deposited radon progeny into the skin revealed a roughly exponential activity distribution in the upper layers of the skin. Based on

the radon progeny surface activity concentrations and their depth distributions, equivalent doses to different layers of the skin, in particular to the Langerhans cells located in the epidermis, ranged from 0.12 mSv in the thermal bath to 0.33 mSv in the vapour bath, exceeding equivalent doses to the inner organs (kidneys) by inhaled radon and progeny by about a factor 3, except for the lung, which receives the highest doses via inhalation. These results suggest that radon progeny attachment on skin surfaces may play a major role in the dosimetry for both thermal water and hot vapour treatment schemes.

ISSN: 0301-634X

DOI: 10.1007/s00411-010-0274-4

Record 317 of 474

Author(s): Perrier, F (Perrier, Frederic); Richon, P (Richon, Patrick)

Title: Spatiotemporal variation of radon and carbon dioxide concentrations in an underground quarry: coupled processes of natural ventilation, barometric pumping and internal mixing

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (4): 279-296 APR 2010

Abstract: Radon-222 and carbon dioxide concentrations have been measured during several years at several points in the atmosphere of an underground limestone quarry located at a depth of 18 m in Vincennes, near Paris, France. Both concentrations showed a seasonal cycle. Radon concentration varied from 1200 to 2000 Bq m(-3) in summer to about 800-1400 Bq m(-3) in winter, indicating winter ventilation rates varying from 0.6 to 2.5 x 10(-6) s(-1). Carbon dioxide concentration varied from 0.9 to 1.0% in summer, to about 0.1-0.3% in winter. Radon concentration can be corrected for natural ventilation using temperature measurements. The obtained model also accounts for the measured seasonal variation of carbon dioxide. After correction, radon concentrations still exhibit significant temporal variation, mostly associated with the variation of atmospheric pressure, with coupling coefficients varying from -7 to -26 Bq m(-3) hPa(-1). This variation can be accounted for using a barometric pumping model, coupled with natural ventilation in winter, and including internal mixing as well. After correction, radon concentrations exhibit residual temporal variation, poorly correlated between different points, with standard deviations varying from 3 to 6%. This study shows that temporal variation of radon concentrations in underground cavities can be understood to a satisfactory level of detail using non-linear and time-dependent modelling. It is important to understand the temporal variation of radon concentrations and the limitations in their modelling to monitor the properties of natural or artificial underground settings, and to be able to assess the existence of new processes, for example associated with the preparatory phases of volcanic eruptions or earthquakes. (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2009.12.003

Record 318 of 474

Author(s): Yoon, S (Yoon, Seokwon); Chang, BU (Chang, Byung-Uck); Kim, Y (Kim, Yongjae); Byun, JI (Byun, Jong-In); Yun, JY (Yun, Ju-Yong)

Title: Indoor radon distribution of subway stations in a Korean major city

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (4): 304-308 APR 2010

Abstract: The overall survey on indoor radon concentration was conducted at all subway stations in a major city, Daejeon in the central part of Korea. It was quarterly performed from September 2007 to August 2008. The annual arithmetic mean of indoor radon concentration of all the stations was 34.1 +/- 14.7 Bq m(-3), and the range of values was from 9.4 to 98.2 Bq m(-3). The radon concentrations in groundwater (average 31.0 +/- 0.8 Bq m(-3)) were not significantly high in most stations, but the concentration (177.9 +/- 2.3 Bq L-1) of one station was over the level of 148 Bq L-1 in drinking water proposed by U.S. EPA. Based on indoor survey results, the approximate average of the annual effective dose by radon inhalation to the employees and passengers were 0.24 mSv y(-1), and 0.02 mSv y(-1), respectively. Although the effective dose based on the UNSCEAR report was potentially estimated, for more accurate assessment, the additional survey on the influence by indoor radon will be necessary. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2010.01.002

Record 319 of 474

Author(s): Chen, J (Chen, Jing); Rahman, NM (Rahman, Naureen M.); Abu Atiya, I (Abu Atiya, Ibrahim)

Title: Radon exhalation from building materials for decorative use

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (4): 317-322 APR 2010

Abstract: Long-term exposure to radon increases the risk of developing lung cancer. There is considerable public concern about radon exhalation from building materials and the contribution to indoor radon levels. To address this concern, radon exhalation rates were determined for 53 different samples of drywall, tile and granite available on the Canadian market for interior home decoration. The radon exhalation rates ranged from non-detectable to 312 Bq m(-2) d(-1). Slate tiles and granite slabs had relatively higher radon exhalation rates than other decorative materials, such as ceramic or porcelain tiles. The average radon exhalation rates were 30 Bq m(-2) d(-1) for slate tiles and 42 Bq m(-2) d(-1) for granite slabs of various types and origins. Analysis showed that even if an entire floor was covered with a material having a radon exhalation rate of 300 Bq m(-2) d(-1), it would contribute only 18 Bq m(-3) to a tightly sealed house with an air exchange rate of 0.3 per hour. Generally speaking, building materials used in home decoration make no significant contribution to indoor radon for a house with adequate air exchange.

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2010.01.005

Record 320 of 474

Author(s): Di Claudio, ED (Di Claudio, Elio D.); Jacovitti, G (Jacovitti, Giovanni); Laurenti, A (Laurenti, Alberto)

Title: Maximum Likelihood Orientation Estimation of 1-D Patterns in Laguerre-Gauss Subspaces

Source: IEEE TRANSACTIONS ON IMAGE PROCESSING, 19 (5): 1113-1125 MAY 2010

Abstract: A method for measuring the orientation of linear (1-D) patterns, based on a local expansion with Laguerre-Gauss circular harmonic (LG-CH) functions, is presented. It lies on the property that the polar separable LG-CH functions span the same space as the 2-D Cartesian separable Hermite-Gauss (2-D HG) functions. Exploiting the simple steerability of the LG-CH functions and the peculiar block-linear relationship among the two expansion coefficients sets, Maximum Likelihood (ML) estimates of orientation and cross section parameters of 1-D patterns are obtained projecting them in a proper subspace of the 2-D HG family. It is shown in this paper that the conditional ML solution, derived by elimination of the cross section parameters, surprisingly yields the same asymptotic accuracy as the ML solution for known cross section parameters. The accuracy of the conditional ML estimator is compared to the one of state of art solutions on a theoretical basis and via simulation trials. A thorough proof of the key relationship between the LG-CH and the 2-D HG expansions is also provided.

ISSN: 1057-7149

DOI: 10.1109/TIP.2010.2041395

Record 322 of 474

Author(s): Mireles, F (Mireles, F.); Davila, JI (Davila, J. I.); Garcia, ML (Garcia, M. L.); Pinedo, JL (Pinedo, J. L.); Lopez, H (Lopez, H.)

Title: Evaluation of Efficiency Calibration Parameters of the LR-115 Radon Detector

Source: HEALTH PHYSICS, 98 (5): S63-S68 Suppl. S MAY 2010

Abstract: Measurement of Rn-222 is an important research concern because of the high-energy alpha emission of its Po-218 and Po-214 progeny. The LR-115 passive detector is the basis of a solid-state nuclear track detector (SSNTD) whose use for radon measurements has been well established. The usage of the SSNTD technique requires calibration by comparison. The aim or this work is to evaluate the efficiency calibration parameters for the radon measurement system that three steps: (1) irradiation conditions, (2) etching conditions, and (3) track counting. The following parameters were evaluated: breakdown and counting voltages for the spark counter, detector thickness, etching time, temperature and NaOH concentration as etching conditions for the LR-115 detector. Calibrating factors of 0.035 and 0.028 tracks cm(-2) Bq(-1) m(3) d(-1) for the open- and closed-chamber radon monitors, respectively, were determined considering the best efficiency calibration parameter values. Health Phi's. 98 (Supplement 2):S63-S68; 2010

ISSN: 0017-9078

Record 323 of 474

Author(s): Fessenden, JE (Fessenden, J. E.); Clegg, SM (Clegg, S. M.); Rahn, TA (Rahn, T. A.); Humphries, SD (Humphries, S. D.); Baldridge, WS (Baldridge, W. S.)

Title: Novel MVA tools to track CO2 seepage, tested at the ZERT controlled release site in Bozeman, MT

Source: ENVIRONMENTAL EARTH SCIENCES, 60 (2): 325-334 MAR 2010

Abstract: Over the past 4 years, controlled field experiments have taken place in Bozeman, MT, USA where pure CO2 has been released at known rates and depths to quantify the detection limits of various monitoring tools and techniques for the use of CO2 seepage detection. As part of this study, new tools engineered at Los Alamos National Laboratory were deployed to determine the sensitivity of these technologies to detect and measure CO2 seepage. These technologies were engineered for above-ground CO2 detection and include laser-based closed path delta(CO2)-C-13 measurement systems, an O-2/CO2 concentration ratio measurement system, and a chamber-based radon detection system. The sensitivity of these technologies to detect CO2 were measured through spatial transects taken perpendicular to the CO2 source and through temporal changes measured diurnally over the course of a 30 day experiment. Results show that the radon system is most sensitive to CO2 detection at the start of the experiment in locations adjacent to the CO2 source. The closed path or in situ delta(CO2)-C-13 system detected CO2 seepage as far as 2 m away from the source during non-windy periods. The O-2/CO2 system detected the CO2 seepage as far as 2 m above-ground and 1 m away from the source. Descriptions of these technologies and an overview of these results are presented.

ISSN: 1866-6280

DOI: 10.1007/s12665-010-0489-3

Record 324 of 474

Author(s): Chiu, YL (Chiu, Yuk-Lan); Wang, XR (Wang, Xiao-Rong); Qiu, H (Qiu, Hong); Yu, ITS (Yu, Ignatius Tak-Sun)

Title: Risk factors for lung cancer: a case-control study in Hong Kong women

Source: CANCER CAUSES & CONTROL, 21 (5): 777-785 MAY 2010

Abstract: To identify etiological connections of lung cancer in Chinese women in Hong Kong, who are among the highest in lung cancer incidence and mortality, we conducted a case-control study, in which 279 female lung cancer cases and 322 controls were selected and frequency matched. A variety of information, including dietary habits, occupational history, smoking, domestic environmental exposures, and family history of cancer was collected, and their associations with lung cancer were analyzed with logistic analysis approach. In addition to positive associations with exposures to cooking emissions and to radon at home, smoking and family cancer history, we observed that increasing consumption of meat was linked to a higher risk, whereas consumptions of vegetables had a strong protective effect against lung cancer. Moderate consumption of coffee appeared to be beneficial against the disease. Those never employed and domestic helpers were at a higher risk. The results indicated that environmental exposures, risky personal behaviors, or lifestyle, as well as family cancer aggregation are among important contributors to the high incidence of lung cancer in Hong Kong females.

ISSN: 0957-5243

DOI: 10.1007/s10552-010-9506-9

Record 325 of 474

Author(s): Singh, RP (Singh, Ramesh P.); Kumar, JS (Kumar, J. Senthil); Zlotnicki, J (Zlotnicki, Jacques); Kafatos, M (Kafatos, Menas)

Title: Satellite detection of carbon monoxide emission prior to the Gujarat earthquake of 26 January 2001

Source: APPLIED GEOCHEMISTRY, 25 (4): 580-585 Sp. Iss. SI APR 2010

Abstract: NOAA AVHRR images have clearly shown anomalous changes in land surface temperature associated with earthquakes in the past two decades. Soon after the Gujarat earthquake of January 26, 2001, an anomalous increase in land surface temperature was inferred from MODIS satellite data a few days prior to the main earthquake event. The cause of such an anomalous change in surface temperature prior to the earthquake is attributed to many probable phenomena, but no definite cause has been identified. In the present study, changes of a complementary nature were found of land surface temperature associated with the emission of CO from the epicentral region. The observed changes on land and atmosphere associated with the Gujarat earthquake of 26 January, 2001, show the existence of

strong coupling between land, atmosphere and ionosphere. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0883-2927

DOI: 10.1016/j.apgeochem.2010.01.014

Record 326 of 474

Author(s): Walia, V (Walia, Vivek); Lin, SJ (Lin, Shih Jung); Fu, CC (Fu, Ching Chou); Yang, TF (Yang, Tsanyao Frank); Hong, WL (Hong, Wei-Li); Wen, KL (Wen, Kuo-Liang); Chen, CH (Chen, Cheng-Hong)

Title: Soil-gas monitoring: A tool for fault delineation studies along Hsinhua Fault (Tainan), Southern Taiwan

Source: APPLIED GEOCHEMISTRY, 25 (4): 602-607 Sp. Iss. SI APR 2010

Abstract: Many studies have shown the soil gas method to be one of the most reliable investigation tools in the research of earthquake precursory signals and fault delineation. The present research is aimed finding the relationship between soil gas distribution and tectonic systems in the vicinity of the Hsinhua Fault zone in the Tainan area of Southern Taiwan. More than 110 samples were collected along 13 traverses to find the spatial distribution of Rn, He, CO2 and N-2. The spatial congruence of all the gases shows that N-2 is the most probable carrier gas of He, whereas CO2 seems to be a good carrier gas of Rn in this area. From the spatial distribution of Rn, He, CO2 and N-2 the trace of Hsinhua Fault and neotectonic features can be identified. The spatial distribution of studied gases shows a clear anomalous trend ENE-SWS along the Hsinhua Fault. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0883-2927

DOI: 10.1016/j.apgeochem.2010.01.017

Record 327 of 474

Author(s): Bastide, K (Bastide, Kristell); Ugolin, N (Ugolin, Nicolas); Levalois, C (Levalois, Celine); Bernaudin, JF (Bernaudin, Jean-Francois); Chevillard, S (Chevillard, Sylvie)

Title: Are adenosquamous lung carcinomas a simple mix of adenocarcinomas and squamous cell carcinomas, or more complex at the molecular level?

Source: LUNG CANCER, 68 (1): 1-9 APR 2010

Abstract: Adenocarcinomas (AC), squamous cell carcinomas (SCC) and adenosquamous carcinomas (ASC) are three histological subtypes of non-small-cell lung carcinomas (NSCLC). ASC are morphologically mixed tumours that contain the two cell components AC and SCC. To understand if they are a "simple" mix of AC and SCC or if they present molecular specificities, as compared with the molecular characterization of both components, we performed a comparative transcriptome analysis on a series of nine ASC, five AC and five SCC induced in rats by radon exposure. We found that 72, 40 and 39 genes were differentially expressed when comparing AC_SCC, ASC_SCC and AC_ASC, respectively. Moreover, when classifying the three histological subtypes, using genes that discriminated AC and SCC, we observed that all ASC were classified as intermediate between the AC and SCC, some being closer to AC, others to SCC. These results indicated that, regarding gene expression, ASC could be considered as a mix of AC and SCC, both in various proportions. However, they also exhibit molecular specificities since we found specific genes discriminating ASC_SCC and AC_ASC. In conclusion, the ASC mixed lung tumours are more complex than simple mixes of AC and SCC components. Neuroendocrine differentiation and ERK proliferation pathways seemed preferentially deregulated in ASC compared to AC and SCC respectively, pathways that are worthy of being explored because they could partially explain the high clinical aggressiveness of ASC. (C) 2009 Elsevier Ireland Ltd. All rights reserved.

ISSN: 0169-5002

DOI: 10.1016/j.lungcan.2009.11.001

Record 328 of 474

Author(s): Harrison, RG (Harrison, R. G.); Aplin, KL (Aplin, K. L.); Rycroft, MJ (Rycroft, M. J.)

Title: Atmospheric electricity coupling between earthquake regions and the ionosphere

Source: JOURNAL OF ATMOSPHERIC AND SOLAR-TERRESTRIAL PHYSICS, 72 (5-6): 376-381 APR 2010

Abstract: We propose a mechanism to explain suggested links between seismic activity and ionospheric changes detected overhead. Specifically, we explain changes in the natural extremely low-frequency (ELF) radio noise recently observed in the topside ionosphere aboard the DEMETER satellite at night,

before major earthquakes. Our mechanism utilises increased electrical conductivity of surface layer air before a major earthquake, which reduces the surface-ionosphere electrical resistance. This increases the vertical fair weather current, and (to maintain continuity of electron flow) lowers the ionosphere. Magnitudes of crucial parameters are estimated and found to be consistent with observations. Natural variability in ionospheric and atmospheric electrical properties is evaluated, and may be overcome using a hybrid detection approach. Suggested experiments to investigate the mechanism involve measuring the cut-off frequency of ELF "tweeks", the amplitude and phase of very low frequency radio waves in the Earth-ionosphere waveguide, or medium frequency radar, incoherent scatter or rocket studies of the lower ionospheric electron density.

ISSN: 1364-6826

DOI: 10.1016/j.jastp.2009.12.004

Record 329 of 474

Author(s): Spivak, AA (Spivak, A. A.)

Title: The specific features of geophysical fields in the fault zones

Source: IZVESTIYA-PHYSICS OF THE SOLID EARTH, 46 (4): 327-338 APR 2010

Abstract: Instrumental measurements of geophysical fields in several regions of the Earth's crust with a complex structure and tectonics are analyzed. The observed geophysical fields include the electric field in the boundary layer of the atmosphere and in the subsurface crust, the ground magnetic field, and the fields formed by microseismic vibrations and natural radon emanation. It is shown that the fault zones are characterized by noticeably higher (compared to the middle segments of crustal blocks) variations in the geophysical fields, a stronger response to the faint external impacts in the form of lunisolar tides, and baric variations in the atmosphere, as well as by higher intensity relaxation processes. Energy transformations between the geophysical fields of different origins are observed predominantly in the fault regions.

ISSN: 1069-3513

DOI: 10.1134/S1069351310040051

Record 330 of 474

Author(s): Rao, NS (Rao, N. Sulekha); Sengupta, D (Sengupta, D.)

Title: Seasonal levels of radon and thoron in the dwellings along southern coastal Orissa, Eastern India

Source: APPLIED RADIATION AND ISOTOPES, 68 (1): 28-32 JAN 2010

Abstract: Inhalation of radon (Rn-222) and thoron (Rn-220) are a major source of natural radiation exposure. Indoor radon-thoron study has been carried out in some dwellings of Ganjam district, southern coastal Orissa, India using LR-115 type II plastic track detectors. Seasonal variation of indoor radon and thoron shows high values in winter and low values in both summer and rainy. The inhalation dose lies in the range of 0-0.06 mu Sv h(-1) and is not high from those found elsewhere in India.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.026

Record 331 of 474

Author(s): Salonen, L (Salonen, Laina)

Title: Calibration of the direct LSC method for radon in drinking water: Interference from Pb-210 and its progenies accumulated in Ra-226 standard solution

Source: APPLIED RADIATION AND ISOTOPES, 68 (1): 131-138 JAN 2010

Abstract: The standard ASTM method is the most commonly applied method far determining Rn-222 in drinking water. The method is calibrated with a Ra-226 standard solution that usually contains variable amounts of (210)pb. Bi-210 and Po-210 if the standard has not recently been purified. Until now it has not been experimentally confirmed that these progenies do not interfere when the method is calibrated. In this study, interference was examined using three different organic cocktails and alpha/beta liquid scintillation spectrometry to separately assess the effect of three radionuclides. The interference from Po-210 was 4% for one of the cocktails if the Ra-226 standard had been purified 5 years earlier. The interferences from Pb-210 and Bi-210 were negligible compared to that of Po-210.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.08.006

Record 332 of 474

Author(s): Paschalides, JS (Paschalides, J. S.); Marinakis, GS (Marinakis, G. S.); Petropoulos, NP (Petropoulos, N. P.)

Title: Passive, integrated measurement of radon using 5A synthetic zeolite and blue silica gel

Source: APPLIED RADIATION AND ISOTOPES, 68 (1): 155-163 JAN 2010

Abstract: Synthetic zeolite of 0.5 nm pore size (5A) and blue silica gel were tested to determine their capability to be used as radon collectors. Tests conducted in a radon chamber under controlled conditions of temperature and relative humidity indicate that simple, inexpensive and maintenance-free passive devices containing about 250g of synthetic zeolite or about 270g of blue silica gel in open face metal canisters that can measure radon conveniently and adequately, the latter though being suitable only for dry-medium dry atmosphere with quite high radon concentrations. Both materials can be recycled for reuse, in a way similar to the recycle and reuse of active carbon. The amount of radon adsorbed in such collectors is determined by counting the gamma rays from the radon decay products. The lower limit of detection (LLD) is estimated to similar to 45 Bqm(-3) for the synthetic zeolite and to similar to 350 Bqm(-3) for the blue silica gel, for an exposure of 48 h at a relative humidity of about 50%. In comparison, the corresponding LLD for active carbon is estimated to 10 Bqm(-3). At relative humidity in the range between 10% and 50%, radon chamber experiments indicate that the measured radon in the canisters is proportional to the mean concentration of radon during the period of exposure. It is estimated that calibration uncertainty lies within +/- 20% for both materials, thus suggesting that at least detectors based on the 5A synthetic zeolite presenting a reasonably low LLD, are a feasible and of similar cost alternative to activated carbon for indoors radon concentration measurements in practical situations.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.08.017

Record 333 of 474

Author(s): El-Taher, A (El-Taher, A.); Makhluf, S (Makhluf, S.); Nossair, A (Nossair, A.); Halim, ASA (Halim, A. S. Abdel)

Title: Assessment of natural radioactivity levels and radiation hazards due to cement industry

Source: APPLIED RADIATION AND ISOTOPES, 68 (1): 169-174 JAN 2010

Abstract: The cement industry is considered as one of the basic industries that plays an important role in the national economy of developing countries. Activity concentrations of Ra-226, Th-232 and K-40 in Assiut cement and other local cement types from different Egyptian factories has been measured by using gamma-ray spectrometry. From the measured gamma-ray spectra, specific activities were determined. The measured activity concentrations for these natural radionuclides were compared with the reported data for other countries. The average values obtained for Ra-226, Th-232 and K-40 activity concentration in different types of cement are lower than the corresponding global values reported in UNSCEAR publications. The obtained results show that the averages of radiation hazard parameters for Assiut cement factory are lower than the acceptable level of 370 Bq kg(-1) for radium equivalent Ra-eq, 1 for level index 1 gamma r, the external hazard index Hex <= 1 and 59 (nGy h(-1)) for absorbed dose rate. The manufacturing operation reduces the radiation hazard parameters. Cement does not pose a significant radiological hazard when used for construction of buildings.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.001

Record 334 of 474

Author(s): Ujic, P (Ujic, Predrag); Celikovic, I (Celikovic, Igor); Kandic, A (Kandic, Aleksandar); Vukanac, I (Vukanac, Ivana); Durasevic, M (Durasevic, Mirjana); Dragosavac, D (Dragosavac, Dusan); Zunic, ZS (Zunic, Zora S.)

Title: Internal exposure from building materials exhaling Rn-222 and Rn-220 as compared to external exposure due to their natural radioactivity content

Source: APPLIED RADIATION AND ISOTOPES, 68 (1): 201-206 JAN 2010

Abstract: The main scope of this paper is to point out the importance of introducing radon and thoron

exhalation measurements from building materials in the regulating frame. Currently (2009), such a regulation of this kind of exposure is not explicitly included in the Serbian regulating network. To this end, this work reports concentration measurements of Ra-226, Th-232 and K-40 and radon and thoron exhalation rates from building materials used in Serbia. Following detailed analysis, it was noticed that both internal exposures to radon and/or thoron exhaling from building materials may exceed external exposures to their precursors contained therein. (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.10.003

Record 335 of 474

Author(s): Yum, EHW (Yum, E. H. W.); Li, VWT (Li, V. W. T.); Choi, VWY (Choi, V. W. Y.); Cheng, SH (Cheng, S. H.); Yu, KN (Yu, K. N.)

Title: Effects of alpha particles on zebrafish embryos

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 714-717 APR-MAY 2010

Abstract: Dechorionated zebrafish embryos were irradiated at 1.5 h post fertilization (hpf) to low-doses of alpha particles, viz., 1.4, 2.8, 5.6, 11.2 mGy (determined using Monte Carlo simulations). At 24 hpf, these embryos were then examined for apoptotic cells through acridine orange staining. The mean number of apoptotic cells was found to decrease significantly from controls to 1.4-mGy irradiation, and then to increase almost linearly to 2.8, 5.6 and 11.2-mGy irradiation. This trend is a typical characteristic of a hormetic effect. (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.035

Record 336 of 474

Author(s): Zhukovsky, M (Zhukovsky, Michael); Onischenko, A (Onischenko, Alexandra); Bastrikov, V (Bastrikov, Vladislav)

Title: Radon measurements-discussion of error estimates for selected methods

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 816-820 APR-MAY 2010

Abstract: The main sources of uncertainties for grab sampling, short-term (charcoal canisters) and long term (track detectors) measurements are: systematic bias of reference equipment: random Poisson and non-Poisson errors during calibration: random Poisson and non-Poisson errors during measurements. The origins of non-Poisson random errors during calibration are different for different kinds of instrumental measurements.
The main sources of uncertainties for retrospective measurements conducted by surface traps techniques can be divided in two groups: errors of surface (210)pb (Po-210) activity measurements and uncertainties of transfer from Pb-210 surface activity in glass objects to average radon concentration during this object exposure. It's shown that total measurement error of surface trap retrospective technique can be decreased to 35%. (c) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.049

Record 337 of 474

Author(s): Onishchenko, A (Onishchenko, Aleksandra); Zhukovsky, M (Zhukovsky, Michael); Veselinovic, N (Veselinovic, Nenad); Zunic, ZS (Zunic, Zora S.)

Title: Radium-226 concentration in spring water sampled in high radon regions

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 825-827 APR-MAY 2010

Abstract: Water Ra-226 concentration in springs was measured in regions with high indoor radon: Ural, North Caucasus (Russia), Niska Banja (Serbia), Piestany (Slovakia), and Issyk-Kul (Kyrgyzstan). This paper presents the results for Ra-226 concentration above 0.03 Bq l(-1). Radium in water could indicate indoor radon problem in the region and water investigation is useful at the initial stage of radon survey. Even low Ra-226 concentration in water (0.1-0.6 Bq l(-1)) caused high Ra-226 activity in travertine (up to 1500 Bq kg(-1)), which resulted in indoor radon concentration above 2000 Bq m(-3) (Niska Banja). (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.050

Record 338 of 474

Author(s): Trnkova, L (Trnkova, Lenka); Trojek, T (Trojek, Tomas); Thinova, L (Thinova, Lenka)

Title: Gamma spectrometric measurements of depth-related radionuclide distribution in walls

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 832-835 APR-MAY 2010

Abstract: The method for depth-related radionuclide distribution was evolved for approximate determination of the spatial lay-out of radionuclides in materials. The method is based on different attenuation coefficients for various energies of gamma radiation. For each material, the attenuation coefficient decreases with rising energy of radiation. It is therefore possible to assess the location of radionuclides in a material owing to attenuation on the track which a photon has to pass through the material. In this case, gamma lines with energies 609 and 1764 key produced by nuclide Bi-214 were used for depth-related radionuclide distribution. This application should be suitable for locating radionuclides in the walls of buildings where high dose rates from gamma radiation occur. These doses are caused by natural radionuclides, mainly radium daughters. The presence of radionuclides in houses poses a high risk associated with inhalation of radon and its decay products. For suitable remediation, it is necessary to know the radionuclide depth distribution.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.061

Record 339 of 474

Author(s): Walencik, A (Walencik, A.); Kozlowska, B (Kozlowska, B.); Dorda, J (Dorda, J.); Zipper, W (Zipper, W.)

Title: Natural radioactivity in underground water from the Outer Carpathians in Poland with the use of nuclear spectrometry techniques

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 839-843 APR-MAY 2010

Abstract: The investigations of natural radioactivity in underground mineral water and spring water in health resorts in the Outer Carpathians were performed. Samples from 40 water springs were collected 3-4 times over a period of 10 years (1997-2007). In order to obtain necessary data, two different nuclear spectrometry techniques were applied: WinSpectral alpha/beta 1414 liquid scintillation counter from Wallac and alpha-spectrometer 7401 VR from Canberra-Packard, USA with the silicon surface barrier detector. The activity concentrations of Rn-222 in the investigated samples varied from below 1 to 50 Bq/l. For radium isotopes the concentrations were in a range from below 10 to 490 mBq/l for Ra-226 and from 29 to 397 mBq/l for Ra-228. The highest concentrations for both radium isotopes were obtained for medicinal water Zuber III from Krynica spa. The activity concentrations for uranium isotopes varied from below 0.5 to 16 mBq/l for U-238 and from below 0.5 to 162 mBq/l for U-234 with the highest values obtained for water Zuber IV. The highest annual effective dose arising from mainly radium isotopes was obtained for Zuber III water and was equal to 75 mu Sv/yr. Additionally, the annual effective doses due to Rn-222 consumed with water were also estimated. The isotopic ratios between isotopes originating from the same decay chain (U-234/U-238, Ra-226,U-238) and from different radioactive decay chains (Ra-226/Ra-228) were determined. The correlations between different isotopes were presented.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.056

Record 340 of 474

Author(s): Thinova, L (Thinova, Lenka); Matolin, M (Matolin, Milan); Ploc, O (Ploc, Ondrej); Cechak, T (Cechak, Tomas)

Title: Radiation sources in the environment near NPP Temelin

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 848-853 APR-MAY 2010

Abstract: A widely discussed question is how much a nuclear power plant really contributes to irradiation of the people living in its vicinity. A number of laboratory and in situ measurements were performed in the area surrounding NPP Temelin, on the basis of which we can specify the irradiation of this area from various sources. The evaluation includes the contributions from natural sources, such as radon, terrestrial radiation and cosmic radiation, together with the contribution from inhalation and ingestion of radionuclides. Medical irradiation and nuclear fallout are also included.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.09.057

Record 341 of 474

Author(s): Kozlowska, B (Kozlowska, B.); Walencik, A (Walencik, A.); Dorda, J (Dorda, J.); Zipper, W (Zipper, W.)

Title: Radon in groundwater and dose estimation for inhabitants in Spas of the Sudety Mountain area, Poland

Source: APPLIED RADIATION AND ISOTOPES, 68 (4-5): 854-857 APR-MAY 2010

Abstract: Studies of radon isotope Rn-222 activity concentration in underground water in the Sudety region were performed with the use of the liquid scintillation technique. Waters chosen for investigations were collected in 24 health resorts and towns of the Sudety area from 115 springs, wells and intakes. The Rn-222 activity concentration varied within the range from 4.2 +/- 0.4 to 1703 +/- 55 Bq/l. The annual effective doses due to the consumption of 222Rn with water were calculated for 50 sources of underground spring water or tap water used for consumption. The results were within the range from 0.003 to 1.1 mSv/yr, assuming 0.51 of tap water per day from which radon is not removed or 0.51 of mineral spring water consumed daily. The contribution to the effective dose from the inhalation of radon during the daily usage of domestic water substantially increases its effective dose. (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.12.016

Record 342 of 474

Author(s): Sakoda, A (Sakoda, Akihiro); Hanamoto, K (Hanamoto, Katsumi); Ishimori, Y (Ishimori, Yuu); Kataoka, T (Kataoka, Takahiro); Kawabe, A (Kawabe, Atsushi); Yamaoka, K (Yamaoka, Kiyonori)

Title: First model of the effect of grain size on radon emanation

Source: APPLIED RADIATION AND ISOTOPES, 68 (6): 1169-1172 JUN 2010

Abstract: The present model represents an improvement on previous models of radon emanation from soil by incorporating soil grain size in addition to moisture. Monte Carlo simulation was employed in the calculation since it was difficult to mathematically express the radon emanation fraction for the present soil model. Grain size is one of the most important factors in describing the properties of soil. Grain size was demonstrated to affect the radon emanation fraction, depending on moisture content. Although the emanation fraction is generally considered to be proportional to grain size, the result of the model calculation suggested that the effect of grain size is not so simple. This study should serve as an initial step toward improving the modeling of this radon emanation. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.11.070

Record 343 of 474

Author(s): Sakoda, A (Sakoda, Akihiro); Nishiyama, Y (Nishiyama, Yuichi); Hanamoto, K (Hanamoto, Katsumi); Ishimori, Y (Ishimori, Yuu); Yamamoto, Y (Yamamoto, Yuki); Kataoka, T (Kataoka, Takahiro); Kawabe, A (Kawabe, Atsushi); Yamaoka, K (Yamaoka, Kiyonori)

Title: Differences of natural radioactivity and radon emanation fraction among constituent minerals of rock or soil

Source: APPLIED RADIATION AND ISOTOPES, 68 (6): 1180-1184 JUN 2010

Abstract: We examined differences in the radioactive characteristics among the main minerals forming granite materials. Using a non-toxic high-density agent, minerals were separated from rock (granite-gneiss) and soil (weathered granite) samples. The natural radioactivity (U-238 and Ra-226) and radon emanation fraction of the minerals were then studied by gamma-ray spectrometry. The radon emanation fractions (27-43%) of the minerals from the soil were much higher than those (0.6-4.6%) of the rock minerals. Additionally, the emanation fractions differed greatly among the minerals separated from both the bulk rock and soil. These results were discussed in terms of the differences of surface area and radium distribution in the mineral grains. It was noticeable that a higher emanation fraction than expected for quartz was commonly observed in the rock and soil samples. We then estimated the contribution of each constituent mineral to the total radon exhalation from the bulk samples. The result depended not only on the radon emanation fraction, but also on the Ra-226 activity and the mineral content.

Furthermore, using the obtained data, we also discussed the effect of grain size on radon emanation and why this has been reported to vary markedly in previous studies. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0969-8043

DOI: 10.1016/j.apradiso.2009.12.036

Record 345 of 474

Author(s): Eichler, R (Eichler, R.); Aksenov, NV (Aksenov, N. V.); Albin, YV (Albin, Yu. V.); Belozerov, AV (Belozerov, A. V.); Bozhikov, GA (Bozhikov, G. A.); Chepigin, VI (Chepigin, V. I.); Dmitriev, SN (Dmitriev, S. N.); Dressler, R (Dressler, R.); Gaggeler, HW (Gaeggeler, H. W.); Gorshkov, VA (Gorshkov, V. A.); Henderson, RA (Henderson, R. A.); Johnsen, AM (Johnsen, A. M.); Kenneally, JM (Kenneally, J. M.); Lebedev, VY (Lebedev, V. Ya); Malyshev, ON (Malyshev, O. N.); Moody, KJ (Moody, K. J.); Oganessian, YT (Oganessian, Yu. Ts); Petrushkin, OV (Petrushkin, O. V.); Piguet, D (Piguet, D.); Popeko, AG (Popeko, A. G.); Rasmussen, P (Rasmussen, P.); Serov, A (Serov, A.); Shaughnessy, DA (Shaughnessy, D. A.); Shishkin, SV (Shishkin, S. V.); Shutov, AV (Shutov, A. V.); Stoyer, MA (Stoyer, M. A.); Stoyer, NJ (Stoyer, N. J.); Svirikhin, AI (Svirikhin, A. I.); Tereshatov, EE (Tereshatov, E. E.); Vostokin, GK (Vostokin, G. K.); Wegrzecki, M (Wegrzecki, M.); Wilk, PA (Wilk, P. A.); Wittwer, D (Wittwer, D.); Yeremin, AV (Yeremin, A. V.)

Title: Indication for a volatile element 114

Source: RADIOCHIMICA ACTA, 98 (3): 133-139 2010

Abstract: Recently, the chemical investigation of element 112 revealed a highly volatile, noble metallic behaviour, as expected for the last group 12 member of the periodic table. The observed volatility and chemical inertness were ascribed to the growing influence of relativistic effects on the chemical properties of the heaviest elements with increasing nuclear charge. Here, we report for the first time on gas phase chemical experiments aiming at a determination of element 114 properties. This element was investigated using its isotopes (287)114 and (288)114 produced in the nuclear fusion reactions of Ca-48 with (242)pn and Pu-244 respectively. Identification of three atoms of element 114 in thermochromatography experiments and their deposition pattern on a gold surface indicates that this element is at least as volatile as simultaneously investigated elements Hg, At, and element 112. This behaviour is rather unexpected for a typical metal of group 14.

ISSN: 0033-8230

DOI: 10.1524/ract.2010.1705

Record 346 of 474

Author(s): Crockett, RGM (Crockett, R. G. M.); Perrier, F (Perrier, F.); Richon, P (Richon, P.)

Title: Spectral-decomposition techniques for the identification of periodic and anomalous phenomena in radon time-series

Source: NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, 10 (3): 559-564 2010

Abstract: Two hourly-sampled time-series of soil-gas radon concentrations of durations of the order of a year have been investigated for periodic and anomalous phenomena. These time-series have been recorded in locations having little or no routine human behaviour and thus are effectively free of significant anthropogenic influences. One measurement site, Sur-Fretes, is located in the French Alps, with saturated soil conditions; the second site, Syabru-Bensi, is located in Nepal, in a river terrace with unsaturated soil conditions. In such conditions, periodic components with periods ranging from 8 h to 7 days are often weak and intermittent and therefore, even in the presence of stationary forcing, difficult to identify.

Two spectral decomposition techniques, Empirical Mode Decomposition (EMD) and Singular Spectrum Analysis (SSA), have been applied to these time series and yield similar results. For Sur-Fretes, weak diurnal and semi-diurnal components are observed with EMD, while SSA reveals only a diurnal component. In Syabru-Bensi, both EMD and SSA reveal a strong diurnal component and a weaker semi-diurnal component. Tidal components M1 and M2 are also suggested by EMD in Sur-Fretes, while these frequencies are not observed in Syabru-Bensi. The development of such analytical techniques can help in characterising the multiple physical processes contributing to the surface and subsurface dynamics of soil gases.

ISSN: 1561-8633

Record 347 of 474

Author(s): Groves-Kirkby, CJ (Groves-Kirkby, C. J.); Denman, AR (Denman, A. R.); Phillips, PS (Phillips, P. S.); Crockett, RGM (Crockett, R. G. M.); Sinclair, JM (Sinclair, J. M.)

Title: Comparison of seasonal variability in European domestic radon measurements

Source: NATURAL HAZARDS AND EARTH SYSTEM SCIENCES, 10 (3): 565-569 2010

Abstract: Analysis of published data characterising seasonal variability of domestic radon concentrations in Europe and elsewhere shows significant variability between different countries and between regions where regional data is available. Comparison is facilitated by application of the Gini Coefficient methodology to reported seasonal variation data. Overall, radon-rich sedimentary strata, particularly high-porosity limestones, exhibit high seasonal variation, while radon-rich igneous lithologies demonstrate relatively constant, but somewhat higher, radon concentrations. High-variability regions include the Pennines and South Downs in England, Languedoc and Brittany in France, and especially Switzerland. Low-variability high-radon regions include the granite-rich Cornwall/Devon peninsula in England, and Auvergne and Ardennes in France, all components of the Devonian-Carboniferous Hercynian belt.

ISSN: 1561-8633

Record 348 of 474

Author(s): Kuo, T (Kuo, T.); Lin, C (Lin, C.); Chang, G (Chang, G.); Fan, K (Fan, K.); Cheng, W (Cheng, W.); Lewis, C (Lewis, C.)

Title: Estimation of aseismic crustal-strain using radon precursors of the 2003 M 6.8, 2006 M 6.1, and 2008 M 5.0 earthquakes in eastern Taiwan

Source: NATURAL HAZARDS, 53 (2): 219-228 MAY 2010

Abstract: Aseismic crustal-strain signals prior to the 2003 Mw 6.8 Chengkung, 2006 Mw 6.1 Taitung, and 2008 Mw 5.0 Antung earthquakes with epicenters located 20, 55 and 11 km, respectively, from the Antung radon-monitoring station have been calculated using the radon anomalies recorded. Specifically, radon decreased from background levels of 791 +/- A 46, 762 +/- A 57, and 735 +/- A 48 pCi/L to minima of 326 +/- A 9, 371 +/- A 9, and 480 +/- A 43 pCi/L prior to the 2003, 2006, and 2008 earthquakes, respectively. The estimated aseismic crustal-strain maxima at the Antung hot spring during the rock dilation stage were 3.6, 2.7, and 1.3 ppm, respectively. The v-shaped radon pattern recognized in all three anomalies is valuable for detecting the aseismic strain precursory to disastrous earthquakes in the Antung hot spring which is situated in a brittle fractured aquifer of limited recharge surrounded by ductile mudstone.

ISSN: 0921-030X

DOI: 10.1007/s11069-009-9423-y

Record 349 of 474

Author(s): He, DL (He Deng-liang); Yin, GF (Yin Guang-fu); Dong, FQ (Dong Fa-qin); Liu, LB (Liu Lai-bao); Luo, YJ (Luo Ya-jun)

Title: Research on the additives to reduce radioactive pollutants in the building materials containing fly ash

Source: JOURNAL OF HAZARDOUS MATERIALS, 177 (1-3): 573-581 MAY 15 2010

Abstract: Several kinds of functional additives such as barite, zeolite, ferric oxide, gypsum, and high alumina cement were introduced to prepare a low-radiation cement-based composite to reduce radioactive pollutants contained in fly ash. The effect of content and granularity of the functional additives on the release of radioactive pollutants were investigated. Composites were characterized by X-ray diffraction, Scan electron microscopy. The results indicate that the radioactive pollutants contained in the fly ash can be reduced by adding a proper amount of zeolite, ferric oxide, gypsum, and high alumina cement. The release of radon from fly ash decreases with a decrease in the granularity of additives. Compared with traditional cement-based composite containing fly ash, the release of radon can be reduced 64.8% in these composites, and the release of gamma-ray is decreased 45%. Based on the microstructure and phase analysis, we think that by added functional additives, there are favorable to form self-absorption of radioactivity in the interior composites. This cement-based composite will conducive to fly ash are large-scale applied in the field of building materials. (C) 2009 Elsevier B.V. All rights reserved.

ISSN: 0304-3894

DOI: 10.1016/j.jhazmat.2009.12.071

Record 350 of 474

Author(s): Papastefanou, C (Papastefanou, Constantin)

Title: Escaping radioactivity from coal-fired power plants (CPPs) due to coal burning and the associated hazards: a review

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (3): 191-200 MAR 2010

Abstract: Coal, like most materials found in nature, contains trace quantities of the naturally occurring primordial radionuclides, i.e. of K-40 and of U-238, Th-232 and their decay products. Therefore, the combustion of coal results in the released into the environment of some natural radioactivity (1.48 TBq y(-1)), the major part of which (99 %) escapes as very fine particles, while the rest in fly ash. The activity concentrations of natural radionuclides measured in coals originated from coal mines in Greece varied from 117 to 435 Bq kg(-1) for U-238, from 44 to 255 Bq kg(-1) for Ra-226, from 59 to 205 Bq kg(-1) for Pb-210, from 9 to 41 Bq kg(-1) for Ra-228 (Th-232) and from 59 to 227 Bq kg(-1) for K-40. Fly ash escapes from the stacks of coal-fired power plants in a percentage of 3-1% of the total fly ash, in the better case. The natural radionuclide concentrations measured in fly ash produced and retained or escaped from coal-fired power plants in Greece varied from 263 to 950 Bq kg(-1) for U-238, from 142 to 605 Bq kg(-1) for Ra-226, from 133 to 428 Bq kg(-1) for Pb-210, from 27 to 68 Bq kg(-1) for Ra-228 (Th-232) and from 204 to 382 Bq kg(-1) for K-40. About 5% of the total ash produced in the coal-fired power plants is used as substitute of cement in concrete for the construction of dwellings, and may affect indoor radiation doses from external irradiation and the inhalation of radon decay products (internal irradiation) is the most significant. The resulting normalized collective effective doses were 6 and 0.5 man-Sv (GW a)(-1) for typical old and modern coal-fired power plants, respectively.

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2009.11.006

Record 351 of 474

Author(s): Llerena, JJ (Llerena, J. J.); Cortina, D (Cortina, D.); Duran, I (Duran, I.); Sorribas, R (Sorribas, R.)

Title: An approach to the subslab depressurization remedial action in a high Rn-222 concentration dwelling

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (3): 219-225 MAR 2010

Abstract: Galicia (NW Spain) is a radon-prone area in the Iberian Peninsula. Measurements were carried out at a rural dwelling, with an annual average of radon concentration over 4000 Bq m(-3) and a maximum of 9000 Bq m(-3), found during a radon screening campaign held in the Autonomous Community of Galicia. We performed a detailed study to identify the main contamination source and the behaviour of the radon concentration, in which a linear dependence with temperature was verified, once corrected for relative humidity. We used different passive methods (charcoal canisters and two types of etched track detectors) as well as a radon concentration monitor that provided continuous measurement. Subsequent to this characterization, and in order to reduce the high radon concentration, a remedial action was developed using different passive and forced ventilation methods. A modified subslab depressurization technique was found to be the most effective remedy, providing a radon concentration reduction of around 96%. This method also has the advantages of being inexpensive and reliable over time.

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2009.11.002

Record 352 of 474

Author(s): Wiwanitkit, V (Wiwanitkit, Viroj)

Title: Radon 222 flux during monsoon

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (3): 277-277 MAR 2010

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2009.10.007

Record 353 of 474

Author(s): Perrier, FE (Perrier, Frederic Edouard)

Title: Reply to the Letter titled "Radon 222 flux during monsoon"

Source: JOURNAL OF ENVIRONMENTAL RADIOACTIVITY, 101 (3): 278-278 MAR 2010

ISSN: 0265-931X

DOI: 10.1016/j.jenvrad.2009.10.008

Record 354 of 474

Author(s): Schmid, K (Schmid, Klaus); Kuwert, T (Kuwert, Torsten); Drexler, H (Drexler, Hans)

Title: Radon in Indoor Spaces An Underestimated Risk Factor for Lung Cancer in Environmental Medicine

Source: DEUTSCHES ARZTEBLATT INTERNATIONAL, 107 (11): 181-U9 MAR 19 2010

Abstract: Background: Occupational medicine has long recognized radon to be a cause of lung cancer, especially among miners working under ground. Until recently, however, little scientific evidence was available about the risk to the general population caused by indoor radon.
Methods: The authors analyzed literature that they found by a selective search in the light of the recently published S1 guideline of the German Society of Occupational and Environmental Medicine (Deutsche Gesellschaft fur Arbeitsmedizin und Umweltmedizin) and a recent publication of the German Commission on Radiological Protection (Strahlenschutzkommission).
Results: Exposure to indoor radon and its decay products is a major contributor to the radiation exposure of the general population. In Germany, the mean radiation exposure due to radon in living rooms and bedrooms is about 49 Bq/m(3). It is well documented in the scientific literature that indoor radon significantly increases the risk of lung cancer, probably in a linear dose-response relationship with no threshold. Every 100 Bq/m(3) increase in the radon concentration is estimated to increase the relative risk for lung cancer by 8% to 16%. After cigarette smoking, radon is the second main cause of lung cancer in the general population without occupational exposure.
Conclusions: From the point of view of preventive environmental medicine, it is important to identify buildings with high radon concentrations, initiate appropriate measures, and minimize radon exposure, particularly in new buildings.

ISSN: 1866-0452

DOI: 10.3238/arztebl.2010.0181

Record 355 of 474

Author(s): Plana-Fattori, A (Plana-Fattori, Artemio); Protat, A (Protat, Alain); Delanoe, J (Delanoe, Julien)

Title: Observing ice clouds with a Doppler cloud radar

Source: COMPTES RENDUS PHYSIQUE, 11 (1): 96-103 JAN-FEB 2010

Abstract: Cloud systems containing ice particles ("ice clouds") must be realistically represented in numerical models devoted to weather forecasting and climate projection. Nevertheless, such clouds have not been fully characterized. The RadOn method (after Radar Only) has been developed for estimating microphysical properties of ice clouds from Doppler cloud radar observations. This method is here updated and applied to observations conducted in 2003-2004 with the Doppler cloud radar RASTA at the SIRTA observatory (Palaiseau, near Paris). (C) 2009 Published by Elsevier Masson SAS on behalf of Academie des sciences.

ISSN: 1631-0705

DOI: 10.1016/j.crhy.2009.11.004

Record 356 of 474

Author(s): Werzi, R (Werzi, R.)

Title: Improving the sensitivity of radionuclide particulate monitoring stations

Source: APPLIED RADIATION AND ISOTOPES, 68 (2): 340-344 FEB 2010

Abstract: A worldwide radionuclide network of 80 stations, part of the International Monitoring System, is being setup to monitor compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The radioactivity sampled at these stations is primarily Rn-220 progenies. Using the knowledge of the diurnal change of the Rn-220 progeny Pb-212 the sampled activity at the end of the sampling process can be minimised by choosing the right collection start time. It is shown that improvements of several percents in the minimum detectible concentration (MDC) for CTBT relevant nuclides can be achieved. (C) 2009

ISSN: 0969-8043
DOI: 10.1016/j.apradiso.2009.10.032

Record 357 of 474

Author(s): Pawar, SD (Pawar, S. D.); Meena, GS (Meena, G. S.); Jadhav, DB (Jadhav, D. B.)

Title: Diurnal and Seasonal Air Ion Variability at Rural Station Ramanandnagar (17 degrees 2 ' N, 74 degrees E), India

Source: AEROSOL AND AIR QUALITY RESEARCH, 10 (2): 154-166 APR 2010

Abstract: High-energy radiations, such as alpha and beta particles or gamma radiation, ionize air molecules into pairs of positive ions and free electrons. The diurnal and seasonal variations of these air ions were measured for the first time at a rural monitoring station in Ramanandnagar (17 degrees 2'N, 74 degrees E), India, and the urban tropical station in Pune (18 degrees 31'N, 73 degrees 55'E) from June 2007 to May 2008. Air ion concentrations, measured using a Gerdien condenser at Pune station, increased from nighttime and reached maximum in the early morning. Compared to Pune, air ion concentration and positive-to-negative air ion ratios at Ramanandnagar increased from morning and reach maximum in the afternoon (12:00-14:00). Plant transpiration and waves in the flooded Krishna River during July-September 2007 were determined as additional sources of atmospheric ion production at Ramanandnagar. Intensive temperature inversion during winter lead to the accumulation of radon and radioactive aerosols near the Earth's surface, and hence increased the rate of ionization. Annual peaks of positive/negative ion maxima and positive-to-negative small ion ratios were observed in January 2008. It was also observed that as human activities increased, more aerosol particles were introduced into the atmosphere between 12: 00 14: 00 hours, during which time the average positive-to-negative air ion ratio reached peak values. During summer, radioactive gases moved upward, carrying radon and radioactive aerosols, and thereby reducing ionization. Results show a decrease in average positive and negative small ion maxima from February 2008 to May 2008.

ISSN: 1680-8584
DOI: 10.4209/aaqr.2009.10.0066

Record 358 of 474

Author(s): Zelensky, VF (Zelensky, V. F.); Gamov, VO (Gamov, V. O.); Golchenko, VP (Golchenko, V. P.); Boev, SG (Boev, S. G.); Rizhov, VP (Rizhov, V. P.)

Title: INCREASE OF RADON CONCENTRATION AND ITS DECAY PRODUCTS IN THE ZONE OF ELECTRIC DISCHARGE IN DIFFERENT MEDIA - THE SOURCE OF FALSE EFFECTS OF INDUCED RADIOACTIVITY

Source: PROBLEMS OF ATOMIC SCIENCE AND TECHNOLOGY, (1): 161-164 2010

Abstract: It is shown that in some cases when working with electrical discharges in different environments the appearance of radioactivity and helium traces may be a result of increase concentration of Rn-222 natural radon and its decay products in the discharge area.

ISSN: 1562-6016

Record 360 of 474

Author(s): Mishra, R (Mishra, Rosaline); Prajith, R (Prajith, R.); Sapra, BK (Sapra, B. K.); Mayya, YS (Mayya, Y. S.)

Title: Response of direct thoron progeny sensors (DTPS) to various aerosol concentrations and ventilation rates

Source: NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION B-BEAM INTERACTIONS WITH MATERIALS AND ATOMS, 268 (6): 671-675 MAR 15 2010

Abstract: Direct thoron/radon progeny sensors (DTPS/DRPS) are absorber mounted LR115 type track detectors for measuring the time-averaged progeny concentrations. Through a large number of experiments, the sensitivity factor of these sensors in natural indoor environment was found to be nearly constant at a value of 0.94 Tr cm(-2) d(-1)/EETC (Bq m(-3)) for DTPS and 0.09 Tr cm(-2) d(-1)/EERC (Bq m(-3)) for DRPS. The constancy of the sensitivity factor in the natural environments is attributed primarily to the presence of large aerosol concentrations and relatively low ventilation rates in time-averaged

measurements. However, detailed model calculations suggest that in extreme scenario i.e. at high ventilation rate and low aerosol concentrations, the sensitivity factor can be quite different. Such situations are likely to occur in occupational plant areas. Therefore systematic chamber experiments were carried out to using DTPS, to estimate the variability of the sensitivity factor in these extreme conditions. In the first set, the sensitivity factor of DIPS was measured in 6 different aerosol concentrations at zero ventilation rates. The sensitivity factor showed a steep decrease as the aerosol concentration increased to about 8554 particle cm(-3), after which it remained almost constant with increase in aerosol concentration. The second set of experiments was conducted at 5000 particles cm(-3) at three different ventilation rates. The sensitivity factor was found to increase with increase in ventilation rate. The results are further discussed.

ISSN: 0168-583X

DOI: 10.1016/j.nimb.2009.12.012

Record 362 of 474

Author(s): Baias, PF (Baias, Paul F.); Hofmann, W (Hofmann, Werner); Winkler-Heil, R (Winkler-Heil, Renate); Cosma, C (Cosma, Constantin); Duliu, OG (Duliu, Octavian G.)

Title: LUNG DOSIMETRY FOR INHALED RADON PROGENY IN SMOKERS

Source: RADIATION PROTECTION DOSIMETRY, 138 (2): 111-118 FEB 2010

Abstract: Cigarette smoking may, change the morphological and physiological parameters of file lung. Thus file primary objective of the present study was to investigate to what extent these smoke-induced changes can modify, deposition, clearance and resulting doses of inhaled radon progeny, relative to healthy non-smokers (NSs). Doses to sensitive bronchial target cells were computed for four categories of smokers: (1) Light, short-term (LST) smokers, (2) light, long-term (LLT) smokers, (3) heavy, short-term (HST) smokers and (4) heavy, long-term (HLT) smokers. Because of only small changes of morphological and physiological parameters, doses for the LST smokers hardly differed from those for NSs. For LLT and HST smokers, even a protective effect could be observed, caused by. a thicker mucus layer and increased mucus velocities. Only, in the case of HLT smokers were doses higher by about a factor of 2 than those for NSs, caused primarily by impaired mucociliary clearance, higher breathing frequency, reduced lung volume and airway, obstructions. These higher doses suggest that the contribution or inhaled radon progeny to the risk of lung cancer in smokers, May be higher than currently, assumed on the basis of NS doses.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp183

Record 363 of 474

Author(s): Rafique, M (Rafique, Muhammad); Rahman, S (Rahman, Said); Rahman, SU (Rahman, S. U.); Jabeen, S (Jabeen, Shahida); Shahzad, MI (Shahzad, M. Ikram); Rathore, MH (Rathore, Mumtaz H.); Matiullah (Matiullah)

Title: INDOOR RADON CONCENTRATION MEASUREMENT IN THE DWELLINGS OF DISTRICT POONCH (AZAD KASHMIR), PAKISTAN

Source: RADIATION PROTECTION DOSIMETRY, 138 (2): 158-165 FEB 2010

Abstract: The present study deals with measurement of indoor radon concentrations in dwellings of the district Poonch of file state of Azad Jammu and Kashmir, Pakistan. In this context, CR-39-based box-type radon defectors were installed in drawing rooms and bedrooms of 80 selected houses and were exposed to indoor radon for 3 months. After exposure; the CR-39 detectors were etched for 9 h in 6 mol NaOH at 70 degrees C and the observed track densities were related to radon concentrations. Measured indoor radon concentrations in the studied area ranged from 27 +/- 6 to 169 +/- 4, 29 +/- 6 to 196 +/- 4 and 31 +/- 5 to 142 +/- 2 Bq m(-3) in the drawing rooms and 74 +/- 5 to 172 +/- 3, 32 +/- 6 to 191 +/- 4 and 27 +/- 5 to 155 +/- 2 Bq m(-3) in bedrooms of the Abbaspur, Hajira and Rawalakot regions of the district Poonch, respectively; whereas weighted average radon concentration ranged from 93 +/- 6 to 159 +/- 4, 33 +/- 5 to 118 +/- 3 and 31 +/- 6 to 155 +/- 5 Bq m(-3) in the dwellings of Abbaspur, Hajira and Rawalakot, respectively. Estimated doses due to the indoor radon ranged from 2.35 +/- 0.15 to 4.00 +/- 0.10, 0.83 +/- 0.08 to 2.98 +/- 0.08 and 0.78 +/- 0.15 to 3.91 +/- 0.13 mSv y(-1) for Abbaspur, Rawalakot and Hajira, respectively. Comparing the current indoor radon results with those of the Health Protection Agency UK and US EPA (i.e. 200 and 148 Bq m(-3)) limits majority of the houses surveyed in the present study are within the safe limits.

ISSN: 0144-8420
DOI: 10.1093/rpd/ncp203

Record 364 of 474

Author(s): Khan, F (Khan, F.); Ali, N (Ali, N.); Khan, EU (Khan, E. U.); Khattak, NU (Khattak, N. U.); Khan, K (Khan, K.)

Title: RADON MONITORING IN WATER SOURCES OF BALAKOT AND MANSEHRA CITIES LYING ON A GEOLOGICAL FAULT LINE

Source: RADIATION PROTECTION DOSIMETRY, 138 (2): 174-179 FEB 2010

Abstract: This paper relates to a series of systematic studies regarding measurement of radon concentration in the earthquake-affected areas of northern Pakistan. Radon is a radioactive alpha-particle-emitting gas originating from the decay series of uranium and thorium and is found anywhere in soil, air and water. The nature of water does not matter with regard to the presence of radon, however, the level of radon concentration varies in different types of water. The present survey is carried out in water samples from the fault zone of Balakot and Mansehra regions, North West Frontier Province, Pakistan, which is important for geological consideration and protection from radiation hazards. The measurements were made on a Pylon system that is based on the radon gas measurement with a Lucas cell. In 72 water samples in the equilibrium state between radon and its progeny, the concentration level of radon is measured. The results show that the radon concentrations are in the range of 4.99-24.52 kBq/m(3), with an average value of 15.52 kBq/m(3) for all types of water taken in this survey.

ISSN: 0144-8420
DOI: 10.1093/rpd/ncp214

Record 365 of 474

Author(s): Milic, G (Milic, Gordana); Jakupi, B (Jakupi, Bajram); Tokonami, S (Tokonami, Shinji); Trajkovic, R (Trajkovic, Radmila); Ishikawa, T (Ishikawa, Tetsuo); Celikovic, I (Celikovic, Igor); Ujic, P (Ujic, Predrag); Cuknic, O (Cuknic, Olivera); Yarmoshenko, I (Yarmoshenko, Ilia); Kosanovic, K (Kosanovic, Katica); Adrovic, F (Adrovic, Feriz); Sahoo, SK (Sahoo, Sarat K.); Veselinovic, N (Veselinovic, Nenad); Zunic, ZS (Zunic, Zora S.)

Title: The concentrations and exposure doses of radon and thoron in residences of the rural areas of Kosovo and Metohija

Source: RADIATION MEASUREMENTS, 45 (1): 118-121 JAN 2010

Abstract: This paper deals with the results of indoor radon and thoron concentrations and exposure doses obtained for 63 dwellings out of the 14 rural communities of Central Kosovo, North Kosovo and Prizren region. These research activities are part of overall radiological research that has systematically been carried out since 1986, particularly in Kosovo and Metohija regions. Passive radon/thoron discriminative detectors, exposed for three months, were used. The arithmetic mean concentrations of indoor radon and thoron are C-Rn = 429 Bq m(-3) C-Tn = 85 Bq m(-3).

ISSN: 1350-4487
DOI: 10.1016/j.radmeas.2009.10.052

Record 366 of 474

Author(s): Legarda, F (Legarda, F.); Idoeta, R (Idoeta, R.); Alegria, N (Alegria, N.); Herranz, M (Herranz, M.)

Title: An active radon sampling device for high humidity places

Source: RADIATION MEASUREMENTS, 45 (1): 122-128 JAN 2010

Abstract: An active radon measurement device has been developed to be used in workplaces with a relative humidity of 100% for spot measurements of radon concentration. A mathematical model based on the convective-diffusive transport equation is used in the design of this system, which has been used to measure the radon concentration in the Pozalagua cave (Biscay, at Northern of Spain). From the obtained radon values the public and workers doses have been obtained.

ISSN: 1350-4487
DOI: 10.1016/j.radmeas.2010.01.003

Record 367 of 474

Author(s): Tsunomori, F (Tsunomori, F.); Kuo, T (Kuo, T.)

Title: A mechanism for radon decline prior to the 1978 Izu-Oshima-Kinkai earthquake in Japan

Source: RADIATION MEASUREMENTS, 45 (1): 139-142 JAN 2010

Abstract: Precursory changes in the radon concentration of groundwater were observed by Wakita et al. (1980) prior to the 1978 Izu-Oshima-Kinkai earthquake of magnitude 7.0. Mechanisms for interpreting the anomalous radon decrease are examined in this paper. The SKE-1 well is situated in a volcanic-rock fractured aquifer of limited recharge. Given these geological conditions, the dilation of brittle rock mass occurred at a rate faster than the recharge of groundwater and gas saturation developed in newly created cracks preceding the earthquake. Radon volatilization into the gas phase can explain the anomalous decrease of radon precursory to the 1978 earthquake. To support the hypothesis, vapor-liquid two-phase radon-partitioning experiments were conducted at formation temperature (14 degrees C) using formation water from the SKE-1 well. Experimental data indicated that the decrease in radon concentration from 483 3 count/min to 439 +/- 7 count/min required a gas saturation of 2.35% developed in rock cracks through the dilatancy process.

ISSN: 1350-4487

DOI: 10.1016/j.radmeas.2009.08.003

Record 368 of 474

Author(s): Chaudhuri, H (Chaudhuri, Hirok); Das, NK (Das, Nisith K.); Bhandari, RK (Bhandari, Rakesh K.); Sen, P (Sen, Prasanta); Sinha, B (Sinha, Bikash)

Title: Radon activity measurements around Bakreswar thermal springs

Source: RADIATION MEASUREMENTS, 45 (1): 143-146 JAN 2010

Abstract: Rn-222 concentrations were measured in the bubble gases, spring waters, soil gases and in ambient air around the thermal springs at Bakreswar in West Bengal, India. This group of springs lies within a geothermal zone having exceptionally high heat flow about 230 mW/m(2), resembling young oceanic ridges. The spring gas has a high radon activity (similar to 885 kBq/m(3)) and is rich in helium (similar to 1.4 vol.%) with appreciably large flow rate. The measured radon exhalation rates in the soils of the spring area show extensive variations from 831 to 4550/mBqm(2) h while Rn-222 concentrations in the different spring waters vary from 3.18 to 46.9 kBq/m(3). Surface air at a radius of 40 m around the springs, within which is situated the Bakreswar temple complex and a group of dwellings, has radon concentration between 450 and 500 Bq/m(3). In the present paper we assess the radon activity background in and around the spring area due to the different contributing sources and its possible effect on visiting pilgrims and the people who reside close to the springs.

ISSN: 1350-4487

DOI: 10.1016/j.radmeas.2009.11.039

Record 369 of 474

Author(s): Provoost, J (Provoost, Jeroen); Bosman, A (Bosman, Annelies); Reijnders, L (Reijnders, Lucas); Bronders, J (Bronders, Jan); Touchant, K (Touchant, Kaatje); Swartjes, F (Swartjes, Frank)

Title: Vapour intrusion from the vadose zone-seven algorithms compared

Source: JOURNAL OF SOILS AND SEDIMENTS, 10 (3): 473-483 APR 2010

Abstract: Vapours of volatile organic compounds (VOCs) emanating from contaminated soils may move through the unsaturated zone to the subsurface. VOC in the subsurface can be transported to the indoor air by convective air movement through openings in the foundation and basement. Once they have entered the building, they may cause adverse human health effects. Screening-level algorithms have been developed, which predict indoor air concentrations as a result of soil (vadose zone) contamination. The present study evaluates seven currently used screening-level algorithms, predicting vapour intrusion into buildings as a result of vadose zone contamination, regarding the accuracy of their predictions and their usefulness for screening purpose. Screening aims at identifying contaminated soils that should be further investigated as to the need of remediation and/or the presence of an intolerable human health risk. To be useful in this respect, screening-level algorithms should be sufficiently conservative so that they produce very few false-negative predictions but they should not be overly conservative because they might have insufficient discriminatory power.

For this purpose, a comparison is made between observed and predicted soil air and indoor air concentrations from seven reasonably well-documented sites, where the vadose zone was contaminated with aromatic or chlorinated VOCs. The seven screening-level algorithms considered were: Vlier-Humaan (Be), Johnson and Ettinger model (USA), VolaSoil (NL), CSoil (NL), Risc (UK) and the dilution factor models from Norway and Sweden. Calculations are presented in two scatter plots (soil air and indoor air), each containing the predictions versus the observations. Differences between predicted and observed VOCs concentrations were evaluated on the basis of three statistical criteria to establish their accurateness and the usefulness for screening purposes. Results from the applied criteria are presented in a table and figures.
It was found that the screening-level algorithms investigated tended to overestimate soil air concentrations more than indoor air concentrations. Differences between predictions and observations were up to three orders of magnitude. The algorithms with the highest accuracy for predicting the soil air concentration are in ascending order the Johnson and Ettinger model (JEM), Vlier-Humaan and VolaSoil algorithms. For the indoor air, it is concluded that all algorithms have a tendency to overestimate the predicted indoor air concentrations, except for the JEM and Vlier-Humaan algorithms, which produced frequent underestimations.
Several earlier studies have investigated the accuracy of some of the screening-level algorithms for vapour intrusion and the results presented in the present study agree with the findings. However, the present study presents the accuracy of vapour intrusion algorithms via three statistical criteria that allow their ranking. The present study also determines the suitability of screening-level algorithms as screening tool. It is found that algorithms may rank differently as to accuracy and suitability as a screening tool. The algorithms with the highest accuracy for predicting the indoor air concentration are the JEM and Vlier-Humaan algorithms. The most suitable algorithms to serve for screening purposes are CSoil, VolaSoil and Risc, since they are sufficiently conservative, have fewer false-negative predictions and still have sufficient discriminatory power.
Given the over-predictions and under-predictions of the algorithms considered, a combination of modelling and measurements will often be required to produce multiple lines of evidence for the presence of an intolerable human health risk or the need for remedial actions at a site. Integrated programmes of modelling and field observations can reduce the uncertainty of predicted soil air and indoor air concentrations, and a tiered approach is presented in this study.

ISSN: 1439-0108

DOI: 10.1007/s11368-009-0127-4

Record 370 of 474

Author(s): Men, W (Men, Wu); Liu, GS (Liu, Guang Shan); Huang, YP (Huang, Yi Pu)

Title: Measurement of Ra-228 in the Yellow Sea and East China Sea using the radon emanation method

Source: JOURNAL OF RADIOANALYTICAL AND NUCLEAR CHEMISTRY, 284 (1): 65-72 APR 2010

Abstract: Ra-228 levels in the Yellow Sea and East China Sea were determined using the emanation method. The seawater radium was concentrated using an Mn-fiber and the Ra-224 ingrowth was measured after about half a year when the initial Ra-224 in the sample would have decayed. The Ra-224 activity in the sample was evaluated using the decay dynamics relationship between parent Ra-228 and daughter Th-228. The concentration and distribution feature of Ra-228 in the Yellow Sea and East China Sea were studied and the Ra-228 concentrations in the surface seawater of the Yellow Sea and the East China Sea were in the range 0.09-15.0 Bq/m(3) with an average of 6.84 Bq/m(3) during the summer cruise, and in the range 0.09-16.9 Bq/m(3) with an average of 6.37 Bq/m(3) during the winter cruise. The Ra-228 distribution in the northern Yellow Sea was different from the southern Yellow Sea and East China Sea. The highest Ra-228 activity of surface water was located in the middle of the northern Yellow Sea, but for the southern Yellow Sea and East China Sea, it decreased with increasing distance from China continent.

ISSN: 0236-5731

DOI: 10.1007/s10967-009-0432-9

Record 371 of 474

Author(s): Schubert, G (Schubert, Gerhard); Alletsgruber, I (Alletsgruber, Irene); Finger, F (Finger, Friedrich); Gasser, V (Gasser, Veronika); Hobiger, G (Hobiger, Gerhard); Lettner, H (Lettner, Herbert)

Title: Radon in the groundwater of Muhlviertel (Upper Austria)

Source: GRUNDWASSER, 15 (1): 33-42 MAR 2010

Abstract: In the occurrence areas of selected crystalline rocks-mainly granites-the Radon-222 content of

groundwater has been investigated. The results show a significant correlation with the Uranium concentrations in the rocks. The Uranium concentrations were between 1 and 15 ppm, while the Radon-222 concentrations were between 0.2 and 719.5 Bq/l.
To identify Radon-decreasing effects like degasification and admixture of surface water, CO2 partial pressures and Oxygen-18 in water samples were determined and the local hydrological situation has been taken under consideration. Samples which showed clear evidence of Radon-decreasing effects were excluded from further evaluation because they would not represent the full empiric potential of Radon emanation in the aquifer.
In combination with geological maps, petrologic information and airborne radiometry, Radon-222 analyses in groundwater can provide important data for Radon potential mapping. The significance of the groundwater Radon analyses can be improved by supplementary hydrochemical and hydrological isotope investigations.

ISSN: 1430-483X

DOI: 10.1007/s00767-009-0127-8

Record 372 of 474

Author(s): Singh, J (Singh, Joga); Singh, H (Singh, Harmanjit); Singh, S (Singh, Surinder); Bajwa, BS (Bajwa, B. S.)

Title: Measurement of soil gas radon and its correlation with indoor radon around some areas of Upper Siwaliks, India

Source: JOURNAL OF RADIOLOGICAL PROTECTION, 30 (1): 63-71 MAR 2010

Abstract: Radon is a radioactive gas which makes the primary contribution to the natural radiation to which people are exposed. For that reason, great importance is attributed to the determination of radon concentration levels in water, indoor air and soil gas and outdoors. In this paper, measurements of radon concentration in soil gas have been carried out around some areas of the Upper Siwaliks of the Kala Amb, Nahan and Morni Hills, India, using a portable AlphaGUARD PQ 2000 device into which the soil gas is drawn using active pumping. The soil gas radon concentration around the Upper Siwaliks was found to vary from 11.5 +/- 0.9 to 78.47 +/- 3.1 kBq m(-3). The annual average indoor radon concentration in the study area was measured in the range from 71.7 +/- 21.0 to 421.7 +/- 33.6 Bq m(-3) using LR-115 type II cellulose nitrate films in the bare mode. The values of soil gas radon concentration in the study area were compared with those from the adjoining low-radioactive areas of Punjab. Since the soil or bedrock beneath a building is one of the sources of radon gas in the indoor air, an effort has been made to find a possible correlation between soil gas radon with the indoor radon. A satisfactory positive correlation has been observed between soil gas radon and indoor radon in the study area.

ISSN: 0952-4746

DOI: 10.1088/0952-4746/30/1/005

Record 373 of 474

Author(s): Karunakara, N (Karunakara, N.); Al-Azmi, D (Al-Azmi, Darwish)

Title: A STUDY ON RADON ABSORPTION EFFICIENCIES OF EDIBLE OILS PRODUCED IN INDIA

Source: HEALTH PHYSICS, 98 (4): 621-627 APR 2010

Abstract: A study on absorption of radon by different edible oils of plant origins produced and used in India was conducted in order to identify efficient radon-absorbing oils. A comparative study of radon absorption by edible oils of India with that of olive oil, which is known as a good absorber of radon, was also carried out. The study was performed by bubbling known concentrations of radon through the oil contained in a bottle and then evaluating the bubbled oil by gamma-ray spectrometry using an HPGe detector. The results show that oils such as coconut oil, gingelly oil (till oil), ground nut oil, mustard oil, sunflower oil, and saffola kardi oil are also good absorbers for radon, and among them coconut oil and gingelly oils are better absorbers than olive oil. The Henry's equilibrium constant (or the concentration factor), an indicator for the solubility of gas in liquids, was also measured for different types of oil by saturating a known volume of the oil with radon. The Henry's equilibrium constant varied in the range 7.32-8.22 for the Indian vegetable oils, and for olive oil it was found to be 7.88. The details of the experimental technique employed and results obtained are presented and discussed in this paper. Health Phys. 98(4):621-627; 2010

ISSN: 0017-9078

DOI: 10.1097/HP.0b013e3181c9f7be

Record 374 of 474

Author(s): Tuccimei, P (Tuccimei, P.); Mollo, S (Mollo, S.); Vinciguerra, S (Vinciguerra, S.); Castelluccio, M (Castelluccio, M.); Soligo, M (Soligo, M.)

Title: Radon and thoron emission from lithophysae-rich tuff under increasing deformation: An experimental study

Source: GEOPHYSICAL RESEARCH LETTERS, 37: Art. No. L05305 MAR 12 2010

Abstract: Radon and thoron emissions from lithophysae-rich tuff under increasing deformation are measured to determine how mechanical damage affects gas emission levels in tuffs. Mechanical properties of rocks under stresses should be carefully considered to properly interpret data from geochemical field monitoring. Two samples are uniaxially loaded up to failure, while two others are unloaded at the end of the elastic phase, in order to achieve the highest compaction of existing pores. Changes in the porosity of deformed samples are evidenced by helium pycnometer and microscopy analyses. Radon and thoron exhalation rates are measured on groups of two samples by alpha spectrometer technique. Results show that tuff samples are characterised by a dual porosity consisting of a macroporosity, given by isolated large pores with sizes from mm- up to cm-scale and a microporosity ranging between microns to hundreds of microns. At the end of the elastic phase pervasive pore collapse is observed, due to the closure of the cm-scale macropores. This is mirrored by a significant decrease of radon and thoron release. After failure, a further reduction of porosity in the rock adjacent to the fault planes is observed due to extensive closure of both macropores and micropores. At this stage radon and thoron emissions increase. The formation of new exhaling surfaces is the main carrier of the bulk increase of radon and thoron exhalations, strongly prevailing over the densification carried out from the compaction mechanisms. In terms of volcanic hazard, negative anomalies in radon emissions should be considered as indicators of forthcoming ruptures. Key words: radon and thoron exhalation, tuff deformation, seismic precursor. Citation: Tuccimei, P., S. Mollo, S. Vinciguerra, M. Castelluccio, and M. Soligo (2010), Radon and thoron emission from lithophysae-rich tuff under increasing deformation: An experimental study, Geophys. Res. Lett., 37, L05305, doi: 10.1029/2009GL042134.

ISSN: 0094-8276

Article Number: L05305

DOI: 10.1029/2009GL042134

Record 375 of 474

Author(s): Mwashote, BM (Mwashote, B. M.); Burnett, WC (Burnett, W. C.); Chanton, J (Chanton, J.); Santos, IR (Santos, I. R.); Dimova, N (Dimova, N.); Swarzenski, PW (Swarzenski, P. W.)

Title: Calibration and use of continuous heat-type automated seepage meters for submarine groundwater discharge measurements

Source: ESTUARINE COASTAL AND SHELF SCIENCE, 87 (1): 1-10 MAR 20 2010

Abstract: Submarine groundwater discharge (SGD) assessments were conducted both in the laboratory and at a field site in the northeastern Gulf of Mexico, using a continuous heat-type automated seepage meter (seepmeter). The functioning of the seepmeter is based on measurements of a temperature gradient in the water between downstream and upstream positions in its flow pipe. The device has the potential of providing long-term, high-resolution measurements of SGD. Using a simple inexpensive laboratory setup, we have shown that connecting an extension cable to the seepmeter has a negligible effect on its measuring capability. Similarly, the observed influence of very low temperature (<= 3 degrees C) on seepmeter measurements can be accounted for by conducting calibrations at such temperatures prior to field deployments. Compared to manual volumetric measurements, calibration experiments showed that at higher water flow rates (>28 cm day(-1) or cm(3) cm(-2) day(-1)) an analog flowmeter overestimated flow rates by >= 7%. This was apparently due to flow resistance, turbulence and formation of air bubbles in the seepmeter water flow tubes. Salinity had no significant effect oil the performance of the seepmeter. Calibration results from fresh water and sea water showed close agreement at a 95% confidence level significance between the data sets from the two media (R-2 = 0.98). Comparatively, the seepmeter SGD measurements provided data that are comparable to manually-operated seepage meters, the radon geochemical tracer approach, and an electromagnetic (EM) seepage meter. (C) 2009 Elsevier Ltd. All rights reserved.

ISSN: 0272-7714

DOI: 10.1016/j.ecss.2009.12.001

Record 376 of 474

Author(s): Trevisi, R (Trevisi, Rosabianca); Caricato, A (Caricato, Annapaola); D'Alessandro, M (D'Alessandro, Marco); Fernandez, M (Fernandez, Manuel); Leonardi, F (Leonardi, Federica); Luches, A (Luches, Armando); Tonnarini, S (Tonnarini, Sabrina); Veschetti, M (Veschetti, Miriam)

Title: A pilot study on natural radioactivity in schools of south-east Italy

Source: ENVIRONMENT INTERNATIONAL, 36 (3): 276-280 APR 2010

Abstract: In the period 2005-2006 a survey on natural radioactivity in about 500 schools located in south-east Italy (the Salento peninsula, province of Lecce) was carried out. In particular average radon concentration and average absorbed dose rate in air due to gamma radiation have been assessed by using solid state nuclear track detectors (SSNTD) and electret ionization chambers (EIC), as well as thermoluminescence dosimeters (TLD), respectively. SSNTD dosimeters were placed in every school, while electrets and TLD have been employed in a pilot study performed in a selected sample of 56 schools in order to achieve preliminary information.
Moreover the study foresaw a quality control on electret dosimeters' perfomances in terms of homogeneity and reliability. The results of this check have been taken into account in the data analysis. In this paper final results concerning the pilot study are reported.
The indoor radon levels measured in the schools ranged from 65 Bq/m(3) to 1808 Bq/m(3), and only six schools (corresponding to 13% of the sample) showed radon annual average above 500 Bq/m(3), Italian action level for workplaces. For the average absorbed dose rate in air due to gamma radiation, the recorded values ranged between 47 and 83 nGy/h with an average value of 61 nGy/h. (C) 2010 Elsevier Ltd. All rights reserved.

ISSN: 0160-4120

DOI: 10.1016/j.envint.2009.12.008

Record 377 of 474

Author(s): Le Druillennec, T (Le Druillennec, T.); Lelsch, G (Lelsch, G.); Bour, O (Bour, O.); Tarits, C (Tarits, C.); Tymen, G (Tymen, G.); Alcalde, G (Alcalde, G.); Aquilina, L (Aquilina, L.)

Title: Hydrogeological and geochemical control of the variations of Rn-222 concentrations in a hard rock aquifer: Insights into the possible role of fracture-matrix exchanges

Source: APPLIED GEOCHEMISTRY, 25 (3): 345-356 MAR 2010

Abstract: To investigate the possible variations of Rn concentration in crystalline rocks as a function of flow conditions, a held study was carried Out Of a fractured aquifer in granite. The method is based on the In situ measurement of Rn in groundwater, aquifer tests for the determination of hydraulic characteristics of the aquifer and laboratory measurement of Rn exhalation rate from rocks A simple crack model that simulates the Rn concentration in waters circulating in a fracture intersecting a borehole was also tested. The Rn concentrations in groundwaters from boreholes of the Study site ranged from 192 to 1597 Bq L-1 The Rn exhalation rates of selected samples of granite and micaschist were determined from laboratory experiments The results yielded fluxes varying from 0.5 to 1 3 mBq m(-2) s(-1) in granite and from 0 5 to 0 9 mBq m(-2) s(-1) in micaschists Pumping tests were performed in the studied boreholes to estimate the transmissivity and calculate the equivalent hydraulic aperture of the fractures. Transmissivities ranged from 10(-5) to 10(-3) m(2) s(-1) Using the cubic law. hydraulic equivalent fracture apertures were calculated to be in the range of 0.5-2 3 mm.
To gain a better insight into the spatial variability of Rn contents in groundwater. theoretical Rn concentrations were calculated from an available simple crack model using results from field and laboratory experiments. This model gave satisfactory results for boreholes characterized by low-flow conditions, in which case, the calculated Rn contents were in the range of Rn concentrations set by the analytical Uncertainty of concentrations measured in water However, for boreholes characterized by high-flow conditions. the model underestimated the Rn concentration in groundwater The higher the flow in the fracture, the larger the difference between calculated and measured Rn concentrations in water These observations led to performing pumping tests to obtain a better understanding of the hydrogeological control of Rn content in water The results clearly show an increase of Rn content in groundwater after the pumping test, which could be explained by the input of Rn-rich waters from the host matrix (C) 2009 Elsevier Ltd All rights reserved

ISSN: 0883-2927

DOI: 10.1016/j.apgeochem.2009.12.002

Record 378 of 474

Author(s): Raspa, G (Raspa, G.); Salvi, F (Salvi, F.); Torri, G (Torri, G.)

Title: PROBABILITY MAPPING OF INDOOR RADON-PRONE AREAS USING DISJUNCTIVE KRIGING

Source: RADIATION PROTECTION DOSIMETRY, 138 (1): 3-19 JAN 2010

Abstract: After a reference to the use of maps of radon-prone areas for indoor radon risk management, and to the methods used to produce them, there is a brief illustration of the geostatistical method of disjunctive kriging (DK) introduced by G. Matheron as a substitute for conditional expectation. There are some good reasons of using this method for the mapping of radon-prone areas as follows: (1) spatial correlation is exploited; (2) unbiasedness is conserved even in the conditions of quasi-stationarity; (3) lognormality of the data is not required; (4) choosing the point estimation allows drawing up smooth probability maps. An application of DK is also presented for the production of probability maps in a campaign of indoor radon measurements conducted by Institute for Environmental Protection and Research, in the provinces of Rome and Viterbo (Central Italy). In the application, it is assessed in particular how much the spatial correlation, even though low, influences the results.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp180

Record 379 of 474

Author(s): Kam, E (Kam, Erol); Yarar, Y (Yarar, Yascmin); Bozkurt, A (Bozkurt, Ahmet)

Title: A STUDY OF BACKGROUND RADIOACTIVITY LEVEL FOR TEKIRDAG, TURKEY

Source: RADIATION PROTECTION DOSIMETRY, 138 (1): 40-44 JAN 2010

Abstract: The level of background radiation for Tekirdag province of north-western Turkey was assessed in this study. Radon concentrations in indoor air were determined using CR-39 nuclear track detectors. and the average Rn-222 activity was found to be 86 Bq m(-3) (equivalent to an annual effective dose of 2.2 mSv). Measurements of gamma doses in air were performed using plastic scintillators and the average absorbed gamma dose rates for indoor and outdoor were found to be 5.7 and 5 mu R h(-1), respectively, corresponding to an annual effective dose of 300 mu Sv. The radionuclide activity concentrations in soil samples collected from the study area were measured through gamma-ray spectrometry and the average activities were determined as 29, 39 and 580 Bq kg(-1) for the natural radionuclides U-238, Th-232 and K-40, respectively, and 5.2 Bq kg(-1) for the fission product Cs-137. The natural radioactivity sources resulted in an annual effective dose of 75 mu Sv. The radioactivity levels of drinking water samples were measured as 0.044 and 0.1 Bq l(-1) for gross alpha and gross beta activities using a low-background counting technique (equivalent to an annual effective dose of 9 mu Sv). The results of this study showed that the region's background radioactivity level is in agreement with most Turkish cities.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp178

Record 380 of 474

Author(s): Darko, EO (Darko, E. O.); Faanu, A (Faanu, A.); Awudu, AR (Awudu, A. R.); Emi-Reynolds, G (Emi-Reynolds, G.); Yeboah, J (Yeboah, J.); Oppon, OC (Oppon, O. C.); Akaho, EHK (Akaho, E. H. K.)

Title: PUBLIC EXPOSURE TO HAZARDS ASSOCIATED WITH NATURAL RADIOACTIVITY IN OPEN-PIT MINING IN GHANA

Source: RADIATION PROTECTION DOSIMETRY, 138 (1): 45-51 JAN 2010

Abstract: The results or studies carried out on public exposure contribution from naturally occurring radioactive materials (NORMS) in two open-pit mines in the Western and Ashanti regions of Ghana are reported. The studies were carried out under International Atomic Energy Agency-supported Technical Co-operation Project GHA/9/005. Measurements were made on samples of water, soil, ore, mine tailings and air using gamma spectrometry. Solid-state nuclear track detectors were used for radon concentration measurements. Survey was also carried out to determine the ambient gamma dose rate in the vicinity of the mines and surrounding areas. The effective doses due to external gamma irradiation, ingestion of water and inhalation of radon and ore dusts were calculated for the two mines. The average animal effective dose was found to be 0.30 +/- 0.06 mSv. The result was found to be within the levels published by other countries. The study provides a useful information and data for establishing a comprehensive framework to investigate other mines and develop guidelines for monitoring and control of NORMS in the mining industry and the environment as a whole in Ghana.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp181

Record 381 of 474

Author(s): Cile, S (Cile, S.); Altinsoy, N (Altinsoy, N.); Celebi, N (Celebi, N.)

Title: RADON CONCENTRATIONS IN THREE UNDERGROUND LIGNITE MINES IN TURKEY

Source: RADIATION PROTECTION DOSIMETRY, 138 (1): 78-82 JAN 2010

Abstract: Monitoring of radon in underground mines is important in order to assess the radiological hazards to occupational workers. Radon concentration levels in three underground lignite mines (Tuncbilek, Omerler and Eynez) of Turkey were obtained in this study. For this reason, atmospheric radon level measurements were carried out in mines using CR-39 track detectors. Chemical etching of the detector tracks and subsequent counting were performed at Cekmece Nuclear Research and Training Center. The obtained results were evaluated according to the International Commission of Radiation Protection and the Turkish Atomic Energy Authority whose radon action levels for workplaces are 500-1500 and 1000 Bq(-3), respectively. The radon gas concentrations in the lignite mines were determined to be between 50 +/- 7 and 587 +/- 16 Bq m(-3). The results obtained in these experiments are far under the action levels. The computed radon doses for the mine workers of Tuncbilek, Omerler and Eynez lignite mines are 1.23, 2.44 and 1.47 mSv y(-1), respectively.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp179

Record 382 of 474

Author(s): Chen, J (Chen, Jing); Walker, B (Walker, Bill); Sorimachi, A (Sorimachi, Atsuyuki); Takahashi, H (Takahashi, Hiroyuki); Tokonami, S (Tokonami, Shinji)

Title: AN INVESTIGATION ON RADON AND THORON RESPONSE OF ALPHA-TRACK DETECTORS USED IN THE WINNIPEG CASE-CONTROL STUDY

Source: RADIATION PROTECTION DOSIMETRY, 138 (1): 83-86 JAN 2010

Abstract: The alpha-track detector was well designed for long-term radon measurements in the 1992 Winnipeg case-control study. However, its diffusion characteristic for thoron in comparison to radon was yet unknown. An investigation on radon and thoron response of these detectors was undertaken. The results showed that the relative sensitivity between thoron and radon is 2 %,, i.e. the detector sensitivity to radon is about 50 times higher than the sensitivity to thoron. It can be concluded that there was no significant influence of thoron on the radon measurements with these detectors.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp177

Record 383 of 474

Author(s): Misdaq, MA (Misdaq, M. A.); Amrane, M (Amrane, M.); Ouguidi, J (Ouguidi, J.)

Title: Concentrations of Rn-222, Rn-220 and their decay products measured in outdoor air in various rural zones (Morocco) by using solid-state nuclear track detectors and resulting radiation dose to the rural populations

Source: RADIATION PROTECTION DOSIMETRY, 138 (3): 223-236 MAR 2010

Abstract: Alpha and beta activities per unit volume of air due to radon (Rn-222), thoron (Rn-220) and their progenies were measured in the outdoor air at different locations in Morocco by using both CR-39 and LR-115 type II solid-state nuclear track detectors (SSNTDs). In addition, the radon concentration was continuously measured in one location by using the methods with SSNTDs and AlphaGuard counter. The influence of the geological and meteorological conditions as well as phosphate and building material dust on the radon concentration in the outdoor air of the areas studied was investigated. The committed equivalent doses due to Po-218 and Po-214 radon short-lived progeny were evaluated in different tissues of the respiratory tract of the members of the public from the inhalation of outdoor air. The annual effective dose due to radon short-lived progeny from the inhalation of outdoor air by the members of the rural population was estimated.

ISSN: 0144-8420

DOI: 10.1093/rpd/ncp242

Record 389 of 474

Author(s): Torkar, D (Torkar, D.); Zmazek, B (Zmazek, B.); Vaupotic, J (Vaupotic, J.); Kobal, I (Kobal, I.)

Title: Application of artificial neural networks in simulating radon levels in soil gas

Source: CHEMICAL GEOLOGY, 270 (1-4): 1-8 FEB 15 2010

Abstract: Anomalies have been observed in radon content in soil gas from three boreholes at the Orlica fault in the Krsko basin, Slovenia. To distinguish the anomalies caused by environmental parameters (air and soil temperature, barometric and soil air pressure, rainfall) from those resulting solely from seismic activity, the following approaches have been used. First, the seismic activity data were eliminated from the dataset and then an artificial neural network (ANN) with 5 inputs for environmental parameters and a single output (radon concentration) was trained with the standard backpropagation learning rule. Then the predictions of Rn concentrations (C-p) generated with this ANN for the whole dataset were compared to measurements (C-m) and three types of anomalies (CA - correct anomaly, FA - false anomaly and NA - no anomaly) have been detected in the signal vertical bar C-m/C-p - 1 vertical bar by varying five parameters describing an anomaly within predefined intervals. An exhaustive search among results was made to find the best ones and thus identifying the best set of parameters. Finally, an attempt was made to shorten the search procedure by training another ANN with numbers of anomalies of each type in the input and five anomaly detection parameters in the output. With these procedures we were able to correctly predict 10 seismic events out of 13 within the 2-year period. (C) 2009 Elsevier B.V. All rights reserved.

ISSN: 0009-2541

DOI: 10.1016/j.chemgeo.2009.09.017

Record 390 of 474

Author(s): Tommasino, L (Tommasino, L.); Tommasino, MC (Tommasino, M. C.); Espinosa, G (Espinosa, G.)

Title: Radon film-badges based on radon-sortpion in solids: A new field for solving long-lasting problems

Source: REVISTA MEXICANA DE FISICA, 56 (1): 1-4 Suppl. S FEB 2010

Abstract: New method and apparatus for the passive sampling of radon are introduced in the present paper. These samplers are based on the sorption of radon by layers of different types of solids. Said layers result in sources of alpha, beta or gamma radiations, which can be detected by any passive or real-time detector, thus obtaining a variety of new radon monitors. By way of example, by facing one of said layers against a damage track detector, it is possible to obtain a compact radon film-badge. Said radon-film badge makes it finally possible to solve most of the shortcomings of existing passive monitors for the measurements of short- and long-term exposures of radon in air, in water, and in soils. These devices can be easily implemented by any existing radon service just as a back-up technology, with little or no change of the presently-used passive monitors.

ISSN: 0035-001X

Record 391 of 474

Author(s): Penescu, L (Penescu, L.); Catherall, R (Catherall, R.); Lettry, J (Lettry, J.); Stora, T (Stora, T.)

Title: Development of high efficiency Versatile Arc Discharge Ion Source at CERN ISOLDE

Source: REVIEW OF SCIENTIFIC INSTRUMENTS, 81 (2): Art. No. 02A906 FEB 2010

Abstract: We report here recent developments of Forced Electron Beam Induced Arc Discharge (FEBIAD) ion sources at the ISOLDE radioactive ion beam facility, hosted at the European Organization for Nuclear Research (CERN). As a result of the propositions to improve the ionization efficiency, two FEBIAD prototypes have been produced and successfully tested in 2008. Off-line studies showed that the 1+ ionization efficiencies for noble gases are 5-20 times larger than with the standard ISOLDE FEBIAD ion sources and reach 60% for radon, which allowed the identification at ISOLDE of Rn-229, an isotope that had never previously been observed in the laboratory. A factor of 3 increase is also expected for the ionization efficiency of the other elements. The experimental and theoretical methodology is presented. The theoretical model, which gives precise insights on the processes affecting the ionization, is used to design optimal sources (grouped under the name of VADIS-Versatile Arc Discharge Ion Source) for the different chemical classes of the produced isotopes, as already demonstrated for the noble gases.

ISSN: 0034-6748

Article Number: 02A906

DOI: 10.1063/1.3271245

Record 392 of 474

Author(s): Nikezic, D (Nikezic, D.); Yu, KN (Yu, K. N.)

Title: Long-term determination of airborne concentrations of unattached and attached radon progeny using stacked LR 115 detector with multi-step etching

Source: NUCLEAR INSTRUMENTS & METHODS IN PHYSICS RESEARCH SECTION A-ACCELERATORS SPECTROMETERS DETECTORS AND ASSOCIATED EQUIPMENT, 613 (2): 245-250 FEB 1 2010

Abstract: We developed the theoretical basis for long-term determination of airborne concentrations of unattached and attached radon progeny. The work was separated into two parts. First, we showed that (stacked and multiply etched) LR 115 detectors could be used to determine airborne concentrations of the short-lived radon progeny, Po-218 and Bi-214. The equilibrium factor F between radon and its progeny could then be determined through the use of the reduced equilibrium factor F-red. The airborne concentrations of Pb-214 could then be determined. Second, we developed a method based on the airborne concentrations of Po-218, Pb-214 and Bi-214 to determine the parameters of the Jacobi room model, viz., the ventilation rate lambda(v), aerosol attachment rate lambda(a), deposition rate of unattached progeny lambda(u)(d) and the deposition rate of attached progeny lambda(u)(d). With these parameters, the unattached fraction f(p) of the potential alpha energy concentration could also be determined. Knowledge of fp. together with F, would enable more accurate determination of the effective dose in the human lung.

ISSN: 0168-9002

DOI: 10.1016/j.nima.2009.11.058

Record 395 of 474

Author(s): Tufail, SJM (Tufail, Sabiha-Javied M.); Asghar, M (Asghar, M.)

Title: Hazard of NORM from phosphorite of Pakistan

Source: JOURNAL OF HAZARDOUS MATERIALS, 176 (1-3): 426-433 APR 15 2010

Abstract: In order to investigate the radiological hazard of naturally occurring radioactive material (NORM) in phosphorite deposits of Pakistan, 26 samples of phosphorite were collected from the phosphorite mines near Abbottabad, and 20 samples of single superphosphate (SSP) fertilizer were obtained from the warehouses in Pakistan. Activity concentration in all the samples was assayed using HPGe detection system. Specific activity values of U-238, K-40, Ra-226 and Th-232 in the samples of phosphorite were 550 +/- 156 (329-845), 206 +/- 72 (93-362). 511 +/- 189 (316-830) and 52 +/- 17 (23-81) Bq kg(-1), respectively; and those in SSP fertilizer due to these radionuclides were 637 +/- 44 (596-687),164 +/- 24 (113-215), 589 +/- 44 (521-671) and 29 +/- 6 (16-45) Bq kg(-1), respectively. The results were compared with that of worldwide soil. Outdoor external dose rate due to gamma rays from phosphorite was calculated to be 276 +/- 94 (177-441) nGy h(-1) and external dose rate in a room made of phosphorite containing material was estimated to be 706 +/- 243 (455-1129) nGy h(-1). The concentration of radon was measured in phosphorite mines and in the warehouses for SSP fertilizer by an active method. Protective measures have been proposed to control the pollution in the phosphorite mining and processing, and fertilizer storage areas.

ISSN: 0304-3894

DOI: 10.1016/j.jhazmat.2009.11.047

Record 396 of 474

Author(s): Damla, N (Damla, N.); Cevik, U (Cevik, U.); Kobya, AI (Kobya, A. I.); Celik, A (Celik, A.); Celik, N (Celik, N.); Van Grieken, R (Van Grieken, R.)

Title: Radiation dose estimation and mass attenuation coefficients of cement samples used in Turkey

Source: JOURNAL OF HAZARDOUS MATERIALS, 176 (1-3): 644-649 APR 15 2010

Abstract: Different cement samples commonly used in building construction in Turkey have been analyzed for natural radioactivity using gamma-ray spectrometry. The mean activity concentrations observed in the cement samples were 52, 40 and 324 Bq kg(-1) for Ra-226, Th-232 and K-40, respectively. The measured activity concentrations for these radionuclides were compared with the reported data of other countries and world average limits. The radiological hazard parameters such as radium equivalent activities (Ra-eq), gamma index (I-gamma) and alpha index (I-alpha) indices as well as terrestrial absorbed dose and annual effective dose rate were calculated and compared with the international data. The Ra-eq values of cement are lower than the limit of 370 Bq kg(-1), equivalent to a

gamma dose of 1.5 mSv y(-1). Moreover, the mass attenuation coefficients were determined experimentally and calculated theoretically using XCOM in some cement samples. Also, chemical compositions analyses of the cement samples were investigated. (C) 2009 Elsevier B.V. All rights reserved.

ISSN: 0304-3894

DOI: 10.1016/j.jhazmat.2009.11.080

Record 397 of 474

Author(s): Goldstein, SJ (Goldstein, Steven J.); Abdel-Fattah, AI (Abdel-Fattah, Amr I.); Murrell, MT (Murrell, Michael T.); Dobson, PF (Dobson, Patrick F.); Norman, DE (Norman, Deborah E.); Amato, RS (Amato, Ronald S.); Nunn, AJ (Nunn, Andrew J.)

Title: Uranium-Series Constraints on Radionuclide Transport and Groundwater Flow at the Nopal I Uranium Deposit, Sierra Pena Blanca, Mexico

Source: ENVIRONMENTAL SCIENCE & TECHNOLOGY, 44 (5): 1579-1586 MAR 1 2010

Abstract: Uranium-series data for groundwater samples from the Nopal I uranium ore deposit were obtained to place constraints on radionuclide transport and hydrologic processes for a nuclear waste repository located in fractured, unsaturated volcanic tuff. Decreasing uranium concentrations for wells drilled in 2003 are consistent with a simple physical mixing model that indicates that groundwater velocities are low (similar to 10 m/y). Uranium isotopic constraints, well productivities, and radon systematics also suggest limited groundwater mixing and slow flow in the saturated zone. Uranium isotopic systematics for seepage water collected in the mine adit show a spatial dependence which is consistent with longer water-rock interaction times and higher uranium dissolution inputs at the front adit where the deposit is located. Uranium-series disequilibria measurements for mostly unsaturated zone samples indicate that Th-230/U-238 activity ratios range from 0.005 to 0.48 and Ra-226/U-238 activity ratios range from 0.006 to 113. Pu-239/U-238 mass ratios for the saturated zone are <2 x 10(-14), and Pu mobility in the saturated zone is > 1000 times lower than the U mobility. Saturated zone mobility decreases in the order U-238 approximate to Ra-226 > Th-230 approximate to Pu-239. Radium and thorium appear to have higher mobility in the unsaturated zone based on U-series data from fractures and seepage water near the deposit.

ISSN: 0013-936X

DOI: 10.1021/es902689e

Record 398 of 474

Author(s): Zeng, T (Zeng, Tao); Fedorov, DG (Fedorov, Dmitri G.); Klobukowski, M (Klobukowski, Mariusz)

Title: Multireference study of spin-orbit coupling in the hydrides of the 6p-block elements using the model core potential method

Source: JOURNAL OF CHEMICAL PHYSICS, 132 (7): Art. No. 074102 FEB 21 2010

Abstract: Careful spin-orbit multireference studies were carried out for the late p-block elements Tl, Pb, Bi, Po, At, and Rn and their hydrides using the model core potentials developed in the present work. The model core potentials were designed to treat the scalar-relativistic and spin-orbit coupling effects at the Douglas-Kroll level. The variational stability of the spin-orbit coupling operator was discussed in terms of the relativistic kinematic operators and depicted graphically. A detailed analysis of the spin-orbit multireference dissociation curves of the 6p element hydrides as well as of their atomic spectra allowed to establish the accuracy of the model core potentials with respect to all-electron calculations to be within several mA degrees for r(e), meV (ceV) for D-e at the correlation level of configuration interaction (multireference perturbation theory), 30 cm(-1) for omega(e), and about 350 cm(-1) for the low-lying atomic and molecular term and level energies. These values are expected to be the maximum error limits for the model core potentials of all the np-block elements (n=2-6). Furthermore, a good agreement with experiment requires that many terms be coupled in the spin-orbit coupling calculations. A timing study of Tl and TlH computations indicates that the model core potentials lead to 20-fold (6-fold) speedup at the level of configuration interaction (multireference perturbation theory) calculations.

ISSN: 0021-9606

Article Number: 074102

DOI: 10.1063/1.3297887