

DOSIMETRY OF RADON WITH NUCLEAR TRACK DETECTORS

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Radon and its decay products are always present in the open atmosphere, but are found in higher concentrations in the confined atmospheres of buildings and underground workplaces like natural caves, where workers are exposed to these radionuclides. In some instances, members of the public may also be exposed to radon and its progeny. Radon levels at several workplaces are determined using SSNTD exposed at least three months over a time period of more than one year. The committed effective doses are evaluated for workers and general public according to the ICRP procedures. Radon exposure was assessed at "Termas de Araxá" spa, MG and in some of the most frequented caves of the Turistic State Park PETAR, SP. At "Termas de Araxá" spa, the effective committed dose received by the spa workers is below ICRP 60 annual dose limits of 20 mSv.y⁻¹ for occupational exposure, considering a working time of 2000 hours per year. For general public, the radiation dose is below ICRP 60 dose limits of 1 mSv.y⁻¹. Although the patients do not belong to the controlled group, in terms of radiation protection, the radiation doses received by them are below 1 mSv.y⁻¹, even considering the extreme situation of a patient submitted to all treatments at the same time. PETAR is a conservation park with more than 180 recorded caves, receiving nearly 40,000 people by year. Radon concentrations are studied at several caves of Santana (FIG.1) and Ouro Grosso visit centers.

The results from Oct/03 to Jul/04 show radon concentrations varying from 512 ± 86 Bq.m⁻³ to 6607 ± 179 Bq.m⁻³. The complete assessment will be achieved by March 2005.



FIGURE 1 - Santana Cave showing the SSNTD.

MAJOR AND TRACE ELEMENT RECORDS AT VIRAÇÃO LAGOON SEDIMENTS, FERNANDO DE NORONHA ARCHIPELAGO, BRAZIL, DATED BY Pb-210

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Fernando de Noronha is an isolated group of 21 volcanic islands located in the South Equatorial Atlantic, approximately 545 km from Recife, PE, Brazil. This archipelago is a protected and isolated habitat with restrict access. Viração Lagoon, at 20 meters above the sea level, is a pristine small lake located in the main island. Two sediment cores (27 and 41 cm-long) were extracted in order to determine the chemical and mineralogical composition of the sediments, and also the sedimentation rates. The sediments are made up of smectite, hematite and Ti oxides. The sedimentation rate was determined for the 27 cm-long core using the ²¹⁰Pb dating method. The results allow to distinguish three periods with mean sedimentation rates of 1 cm y⁻¹ (2001-1994), 0.57 cm y⁻¹ (1994 -1980) and 0.18 cm y⁻¹ (1979-1934). The mean sedimentation rate for the whole period is 0.4cm.y⁻¹. As, Ba, Br, Co, Cr, Cs, Hg, Rb, Sb, Sc, Se, Ta, Th, U, Zn and some REE were determined by NAA and major elements by XRF. Their concentrations are similar to those reported for NASC, except for Fe, Ti, REE, Cr and Zn, which are enriched. There are increasing concentrations of Al, Ca, Fe, Mn, P, Cr, Se and REE, and decreasing concentrations of Br and Rb with depth. These data suggest that there is a geochemical response to the changes of the sedimentation rates. Therefore, they can provide an additional proxy to reconstruct environmental changes.