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A reconnaissance study of radon concentration in Hamadan city, Iran.

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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 to 364 Bq/m3 with a mean value of 107.87 Bq/m3 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 reconnaissance 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, although further work is required to confirm these results. 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 to distribute water underground, 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.

Keywords: Radon; health; dwellings; clay floors; alluvial fan; surficial geology; Hamadan; Iran