Using geogenic radon potential to assess designation of radon priority areas in Ireland

Hughes to greater than 1400 to over exclusively based on Radiological Protection Institute of Ireland (RPII) Th made using the IDW kriging function in ARC GIS Follow (figure 4)

Provided online Radon Potential of the study area (figure 5) was found there. This research journal of the The lowest radon soil

Indoor Radon Data provided under a GDPR agreement.

The Radon potential (RP) for the study area ranges from 5 to greater than 1200 (figure 3). Most of the study area consists of a radon potential higher than 35. RP values > 35 are considered as exceptionally high (Neznal et al. 2004).

The extremely high radon potential may be explained by the high radon soil-gas concentrations which range from 10 kBq/m³ to greater than 1400 kBq/m³ (figure 4). The lowest radon soil-gas concentrations (generally <100 kBq/m³) are found overlaying Carboniferous limestones (Choone Flagstones) and Namurian shales in the north of the study area. The remaining of the study area is composed of various Carboniferous limestones (un-bedded, bedded, bioclastic, argillaceous).

The EPA indoor radon data ranges from 5 Bq/m³ to over 1200 Bq/m³ (figure 5). Approximately half of the study area is lower than the reference limit. Higher indoor radon values (>400 Bq/m³) occur near faults. The highest value (>1250 Bq/m³) occurs near a fault bordering the Namurian shales. Indoor radon data for the area does not include information on building characteristics, remediation or presence/absence of a radon barrier. Indoor radon data are not available for entire area, so may not be representative. Soil surveys are important for local scale designation of indoor radon hazard.

Geologically, the study area is composed of two main Quaternary sediment types; till derived from Namurian sandstones and shales in the north and till derived from limestones in the remainder of the area. The underlying bedrock geology (figure 2) consists of Carboniferous siltstones (Choone Flagstones) and Namurian shales in the north of the study area. The remaining of the study area is composed of various Carboniferous limestones (un-bedded, bedded, bioclastic, argillaceous).

Fig. 1 Current legislative radon hazard map for Ireland

Fig. 2 Bedrock geology (1:100k Geological Survey Ireland) of the study area in SW Ireland.

Fig. 3 Radon Potential of the study area

Fig. 4 Radon soil-gas concentrations

Fig 5 EPA Indoor radon concentrations

References:


The Radiological Protective Institute of Ireland (RPII) since joined with EPA has produced a national radon hazard map (figure 1) exclusively based on indoor radon measurements grouped in 10x10km grids. The scale shows % of homes likely to exceed the 200 Bq/m³ reference level. Grids where ≥10% of homes are estimated to exceed the reference level are designated as high radon areas. This study focuses in the area of Castleisland in the South West of Ireland, which according to the legislative map is not a high radon area, even though an exceptionally high indoor radon value of 49,000 Bq/m³ was found there. This research investigates the use of in-situ Radon Potential (RP) measurements to assess the existing national legislative radon hazard map.