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Time Series Analysis of Radon Concentration at Different Depths in an Underground Goldmine

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Abstract : Indoor radon concentrations were collected monthly over a period of one year in 10 different levels in an underground goldmine, and the data was analyzed using a four-moving average time series to determine the relationship between the depths of the underground mine and the indoor radon concentration. The detectors were installed in batches within four quarters. The measurements were carried out using LR115 solid-state nuclear track detectors. Statistical models are applied in the prediction and analysis of the radon concentration at various depths. The time series model predicted a positive relationship between the depth of the underground mine and the indoor radon concentration. Thus, elevated radon concentrations are expected at deeper levels of the underground mine, but the relationship was insignificant at the 5% level of significance with a negative adjusted R2 (R2 = – 0.021) due to an appropriate engineering and adequate ventilation rate in the underground mine.

Keywords : LR115, radon concentration, rime series, underground goldmine
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