



Standardised Radon Index: a normalisation of radon data-sets in terms of standard normal variables.

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There is an increasing body of evidence which indicates that radon emissions from rocks, soils and groundwater can provide a diagnostic tool for some geophysical phenomena, e.g. tidal deformations and earthquakes. In this context, it is often informative to compare two radon data-sets, e.g. variations in radon concentrations in different locations. However, this can be complicated, e.g. by the use of different detectors, radon concentrations being orders of magnitude different or different non-linear responses of radon emissions to common or similar stimuli. Some of these factors can be taken into account by moving-averages and other de-noising techniques and normalisation of data sets to, e.g. unit mean. However, such techniques do not address different non-linearities.

We propose a Standardised Radon Index (SRI), an adaptation of Standardised Precipitation Index (SPI) methodologies under development at the University of Northampton to radon-data. SPIs were first proposed by McKee et al. in 1993, and can be summarised as a normalisation of precipitation data in terms of standard normal random variables. In effect, variations in the data are presented in terms of probabilities thereby revealing periods of relative drought or anti-drought and the same SPI in different data-sets represents the same relative drought/anti-drought across different precipitation regimes.

In the case of radon, this normalisation in terms of standard normal variables allows variations in different data-sets to be compared in terms of probability of occurrence: if two different non-linear radon responses to some stimulus are equally probable, this is revealed directly by the SRIs. This facilitates some types of analysis and comparison, and initial results will be presented.