INDOOR RADON INTERCOMPARISON EXERCISES:
INTERNATIONAL EXPERIENCES AND PERFORMANCE EVALUATION
AT THE BRAZILIAN COMMISSION FOR NUCLEAR ENERGY –
POÇOS DE CALDAS LABORATORY (CNEN-LAPOC)

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OBJECTIVE

The Poços de Caldas Laboratory (LAPOC) of the Brazilian Commission for Nuclear Energy (CNEN) conducts indoor radon measurement studies (using 2 analysis approaches).

In order to implement quality control practices in laboratory and validate a measurement technique, LAPOC participates regularly in the Intercomparison Program of Passive Radon Detectors, promoted by Public Health England (PHE).

The PURPOSE of this study is to EVALUATE HISTORICAL SETS OF LAPOC’S INTERCOMPARISON RESULTS AND ASSESS LABORATORY PERFORMANCE THROUGH THE YEARS.

METHODOLOGY

Bias error values associated to measurement results from years of exercises were organized in excel tables.

Each table featured a set of bias values, pertaining to a different concentration exposure - 50 to 2500 KBq.m\(^{-3}\).h.

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ANOVA tests were then applied to this data, evaluating the laboratory’s performance along the years for each of the 5 levels of radon concentration.

In this one-way ANOVA test, the years became the variable – as the target of this study was a time progress assessment.
SUMMARY OF RESULTS

Results obtained from **ANOVA tests** demonstrate, in general, a lack of bias consistency along the years in terms of **concentration levels**, for both **manual and automated analysis approaches participations**, as all resulting means observed were statistically different.

However, **bias reduction tendencies** (for automated approach) and a certain **steadiness of obtained bias values** (for manual approach) have also been observed with the passing of years.

Due to tendencies, observed on a given exercise year, of negative bias values as well as bias increasing with radon concentration levels, **correction of measured values was conducted through linear regression.**

Fig 1 and 2. Bias interval plots produced for concentration level A for Lab 1 (manual approach) and concentration level B for Lab 2 (automated approach), respectively.