



# Radon Detection and Measurements

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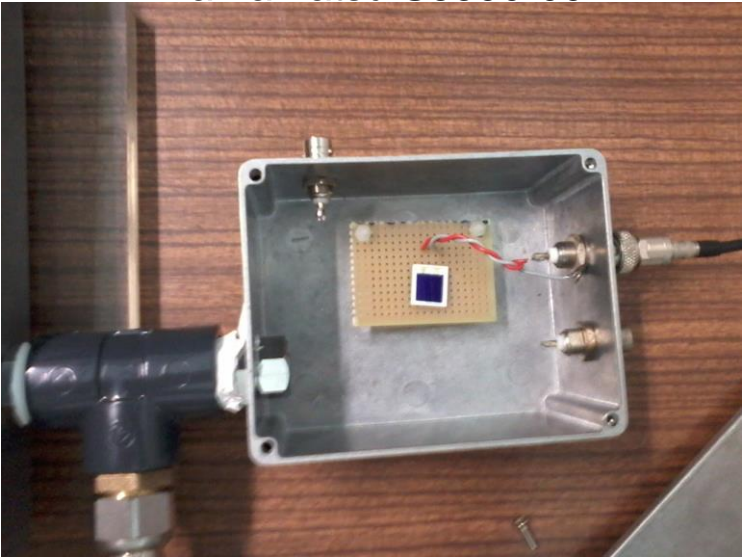
Catarina Monteiro, Master student

## **UBI team**

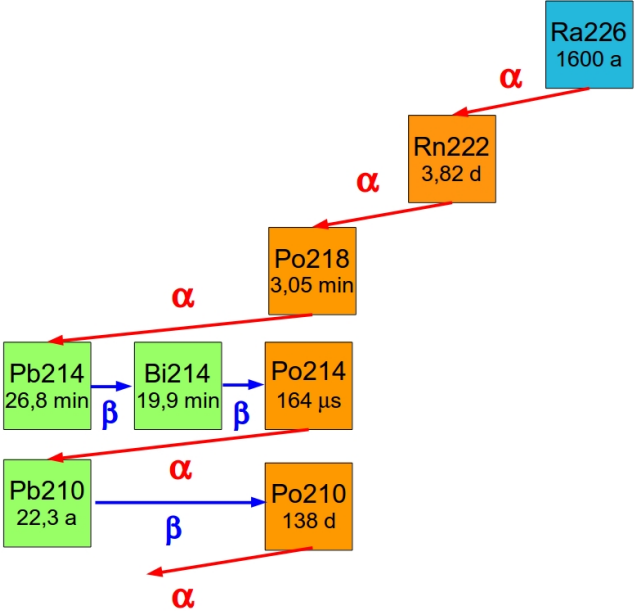
Pedro Gabriel Almeida

# Development of radon detectors in air

Si-Pin detector:  
Hamamatsu S3590-09

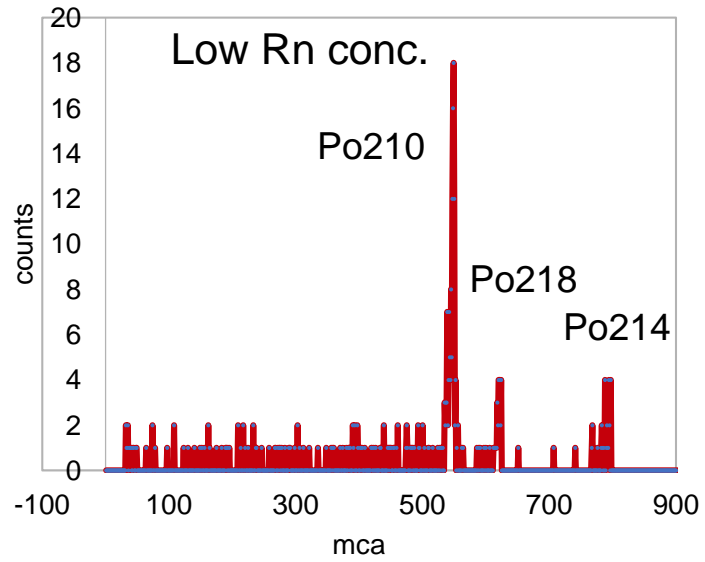


Scintillating fibers BCF-60  $\varnothing$ 4 mm

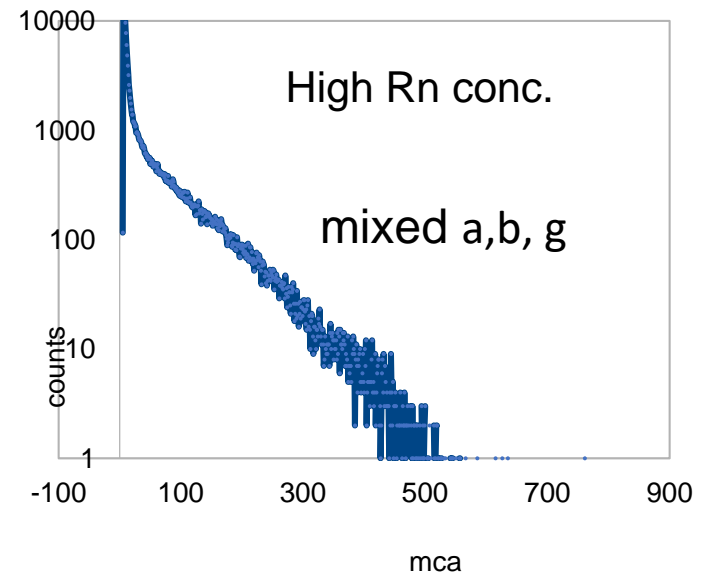
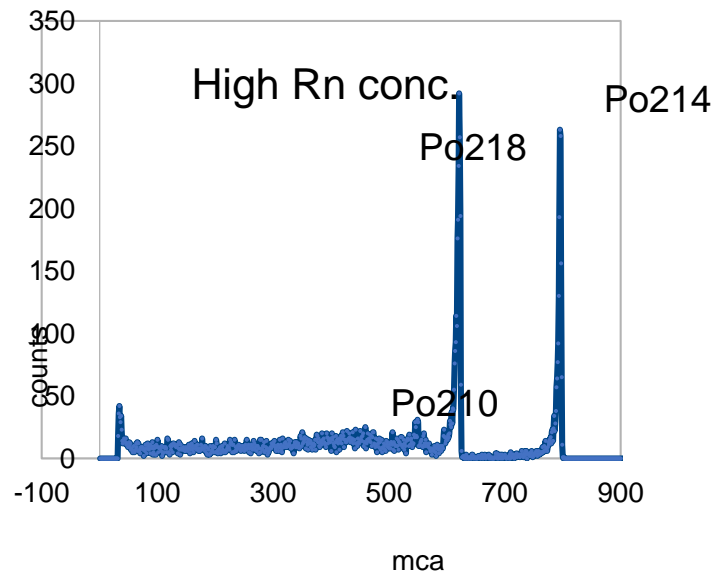
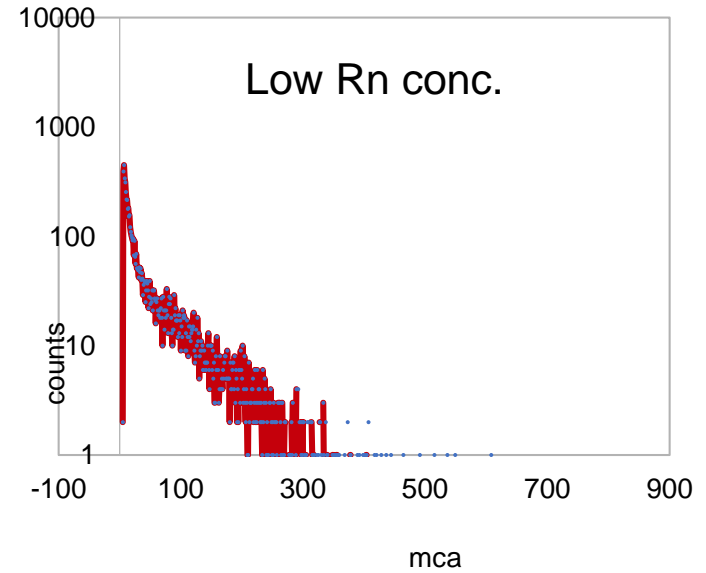


# Energy spectra (1 hour)

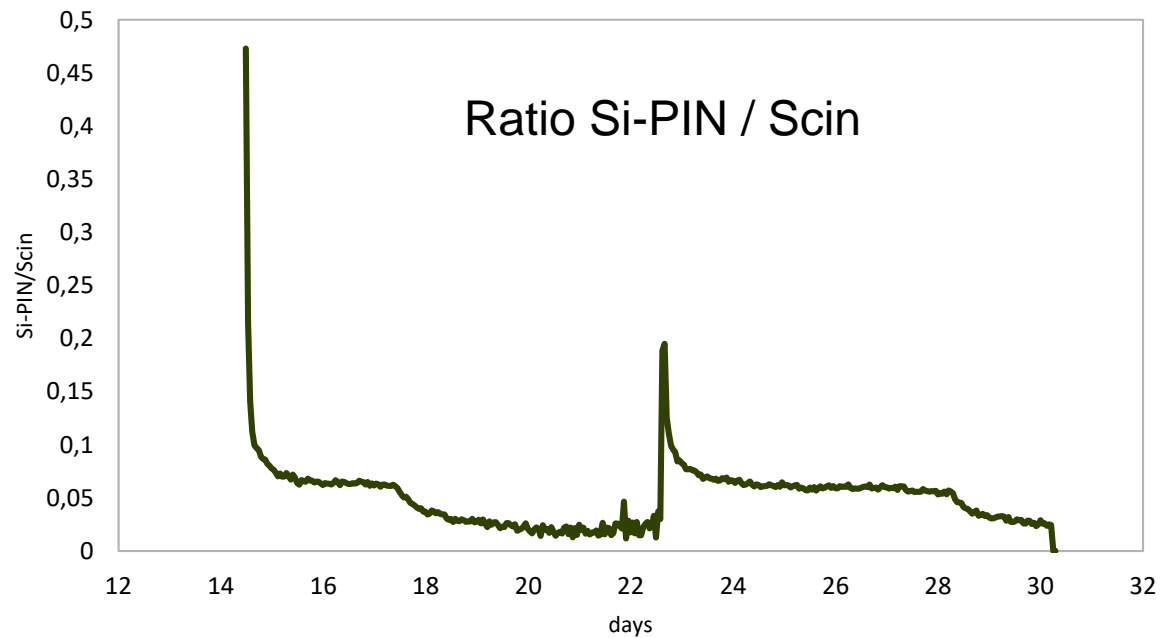
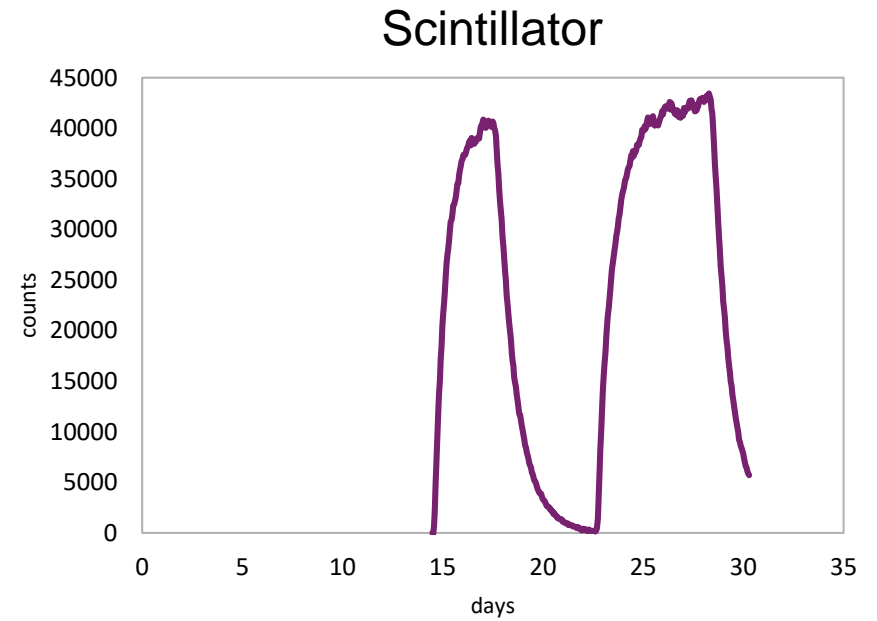
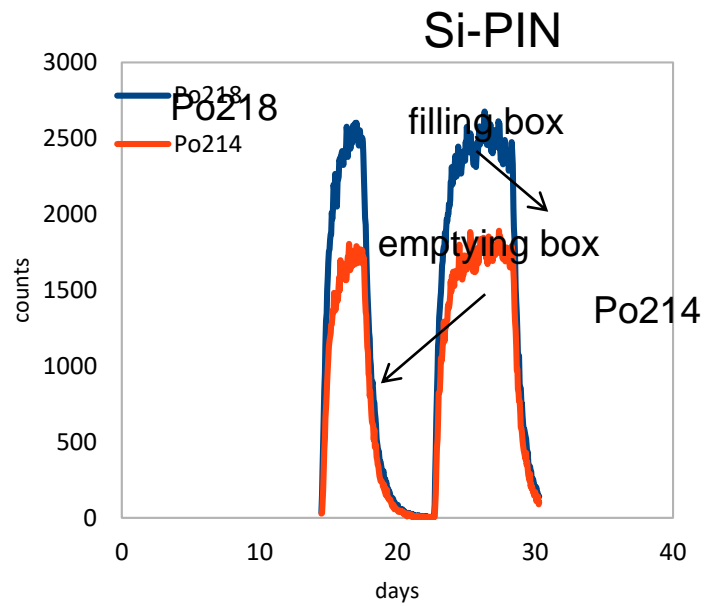
Si-Pin detector



Scintillating fibers



# Time evolution spectra



## Preliminary conclusions

Si-PIN and Scintillator have similar but not equal behavior

Si-PIN is sensitive to alpha-particles “sticked” to its surface

Scintillator mostly sensitive to beta-particles

Faster time response of scintillator

Optical Fiber Scintillator detector well adapted for field radon probe

Future: several detectors in network monitoring selected sites

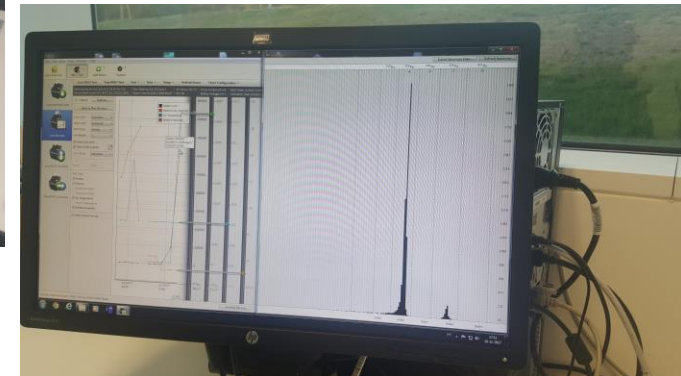


# Radon measurements

air / water / soil

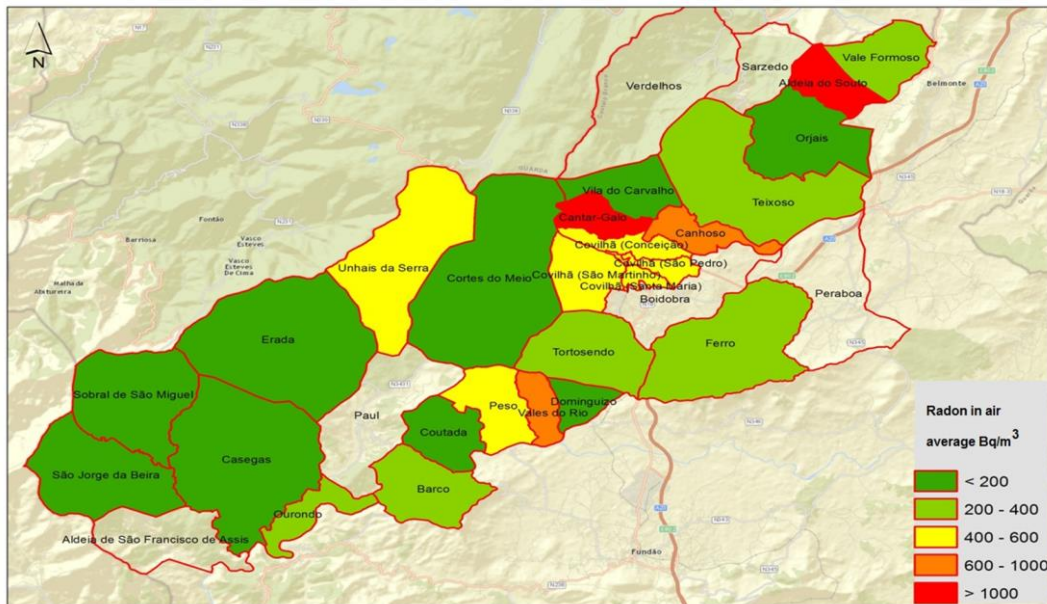
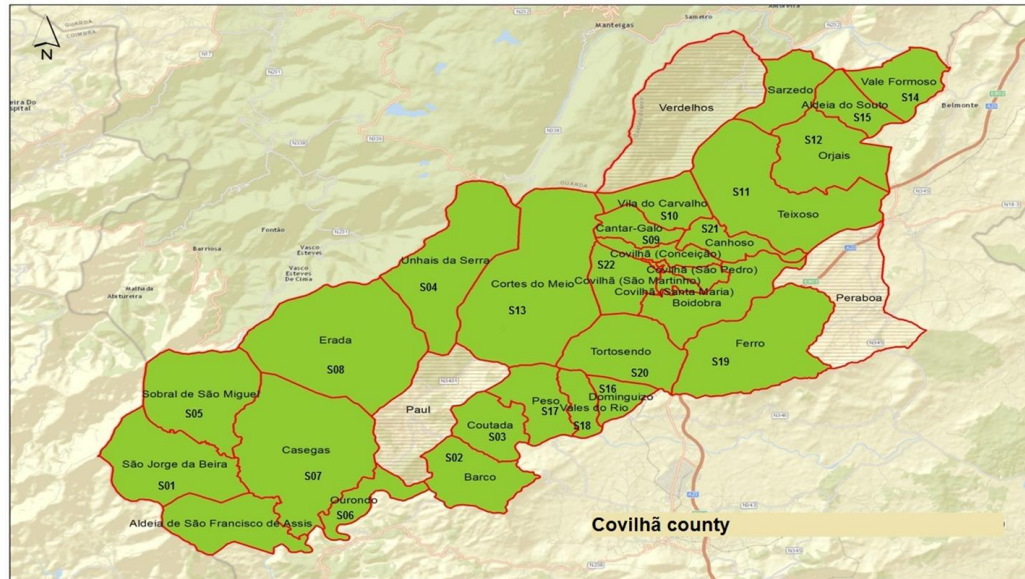


CR-39 – passive detectors and plastic diffusion chamber

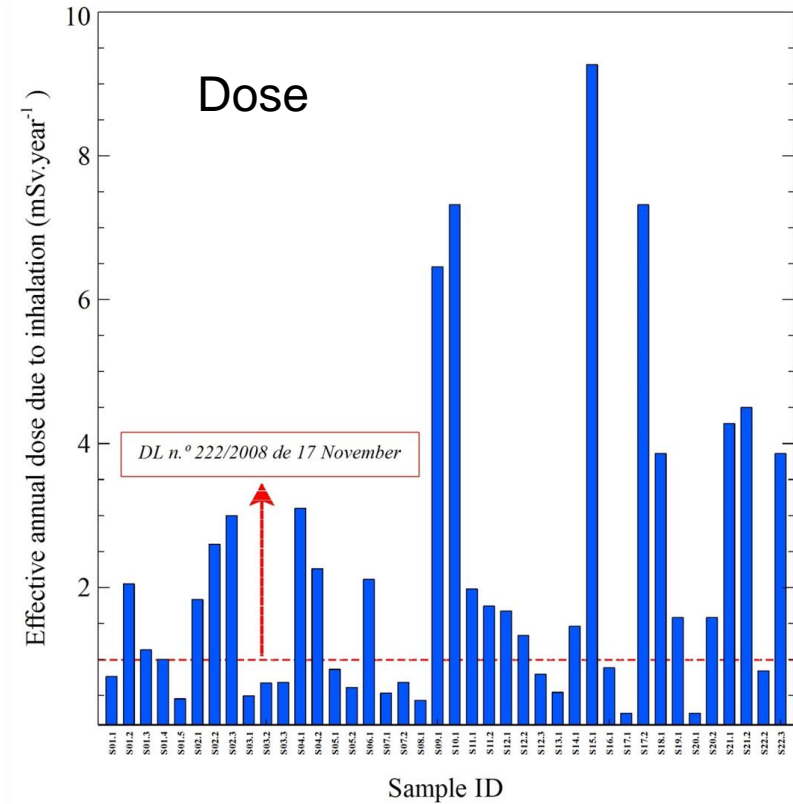
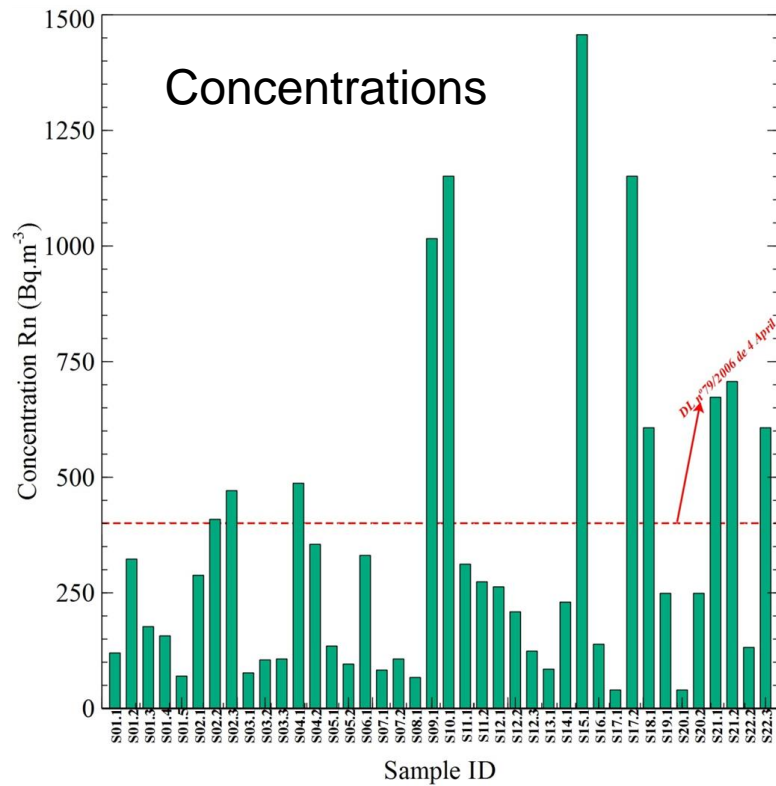


The DURRIDGE RAD7 equipment uses a solid state alpha detector

Radon measuring devices were deployed sampling 40 public buildings distributed over the Covilhã city.



The variation in radon concentration levels confirmed the influence of soil as the main source of indoor radon.



Concentrations 40 to 1457 Bq/m<sup>3</sup> / average: 342 Bq/m<sup>3</sup>.

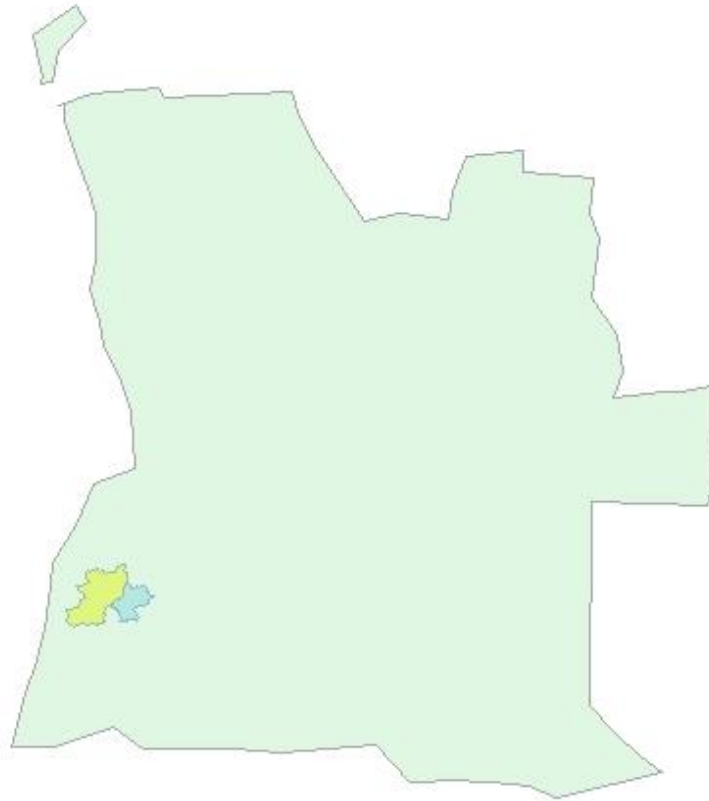
80% exceed the 100 Bq/m<sup>3</sup> from WHO IAQ

28% exceed 400 Bq/m<sup>3</sup> from national legislation

Winter/Summer average: 274 Bq/m<sup>3</sup> ⇒ 2.18 mSv/y (above legislation)



## Location map of study areas in Angola



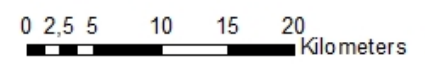
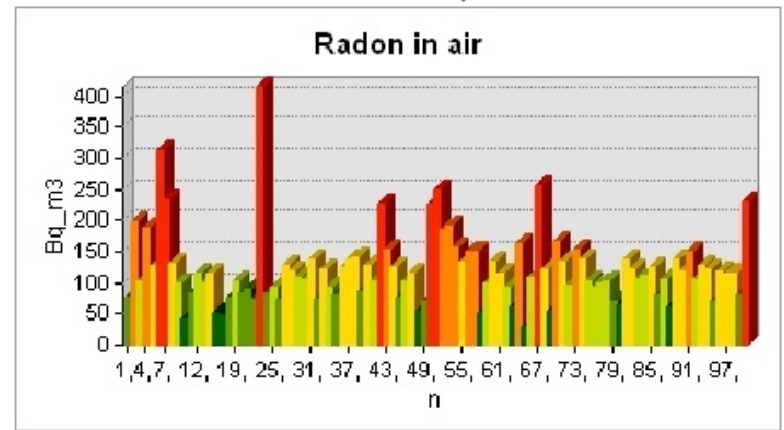
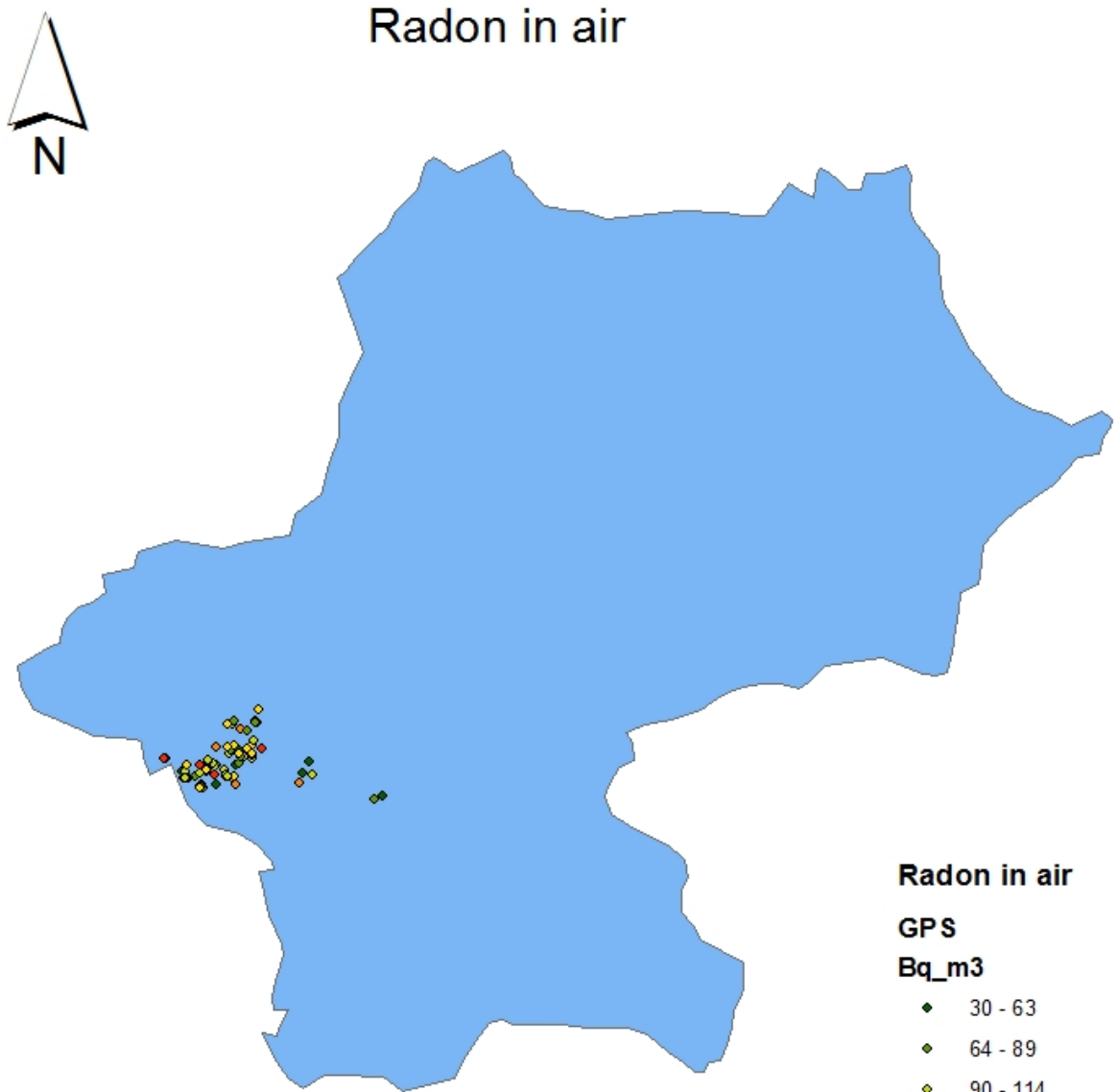
In order to determine the radon concentration on water samples, we used a RAD H2O accessory.

Schematic representation of Radon on air concentration experimental setup.  
In order to determine the radon concentration on air we use CR-39 detectors.



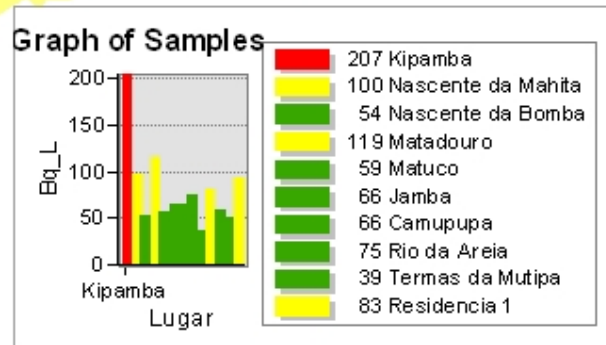
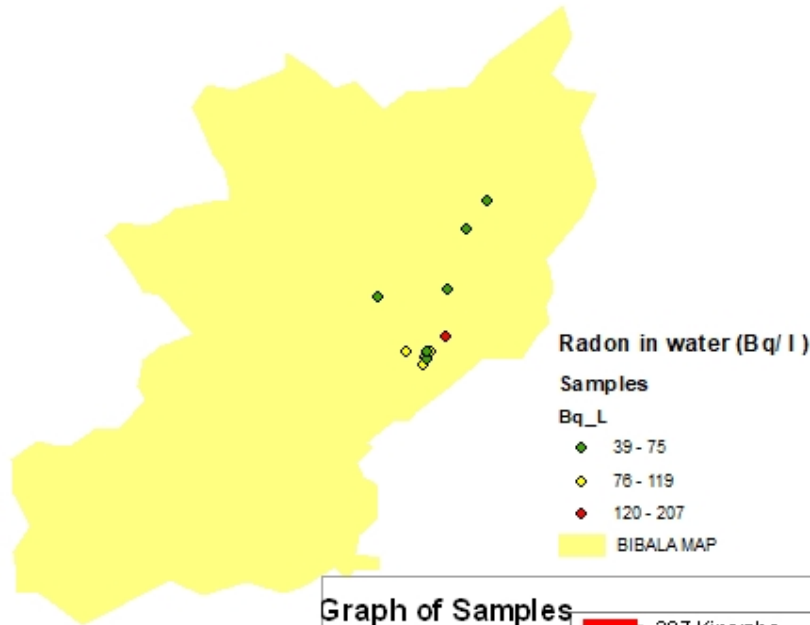
The aim of this work is to study the risks to human health, resulting from the inhalation of radon gas. Measurements were made in public buildings in the Lubango municipality.

Radon concentrations in studied buildings: 30 to 415 Bq/m<sup>3</sup>.





## Radon evaluation in Bibala-Angola



The aim of this work is to study the risks to human health, due to radon in drinking water. Measurements were made in public drinking water system, wells and springs in the Bibala municipality.

Radon concentrations in drinking water: 39 to 207 Bq/L.

Thank you  
for your  
attention

