16th INTERNATIONAL WORKSHOP GARRM

BEHAVIOUR OF RADON GAS IN THE INTERACTION OF GROUNDWATER AND SURFACE WATER

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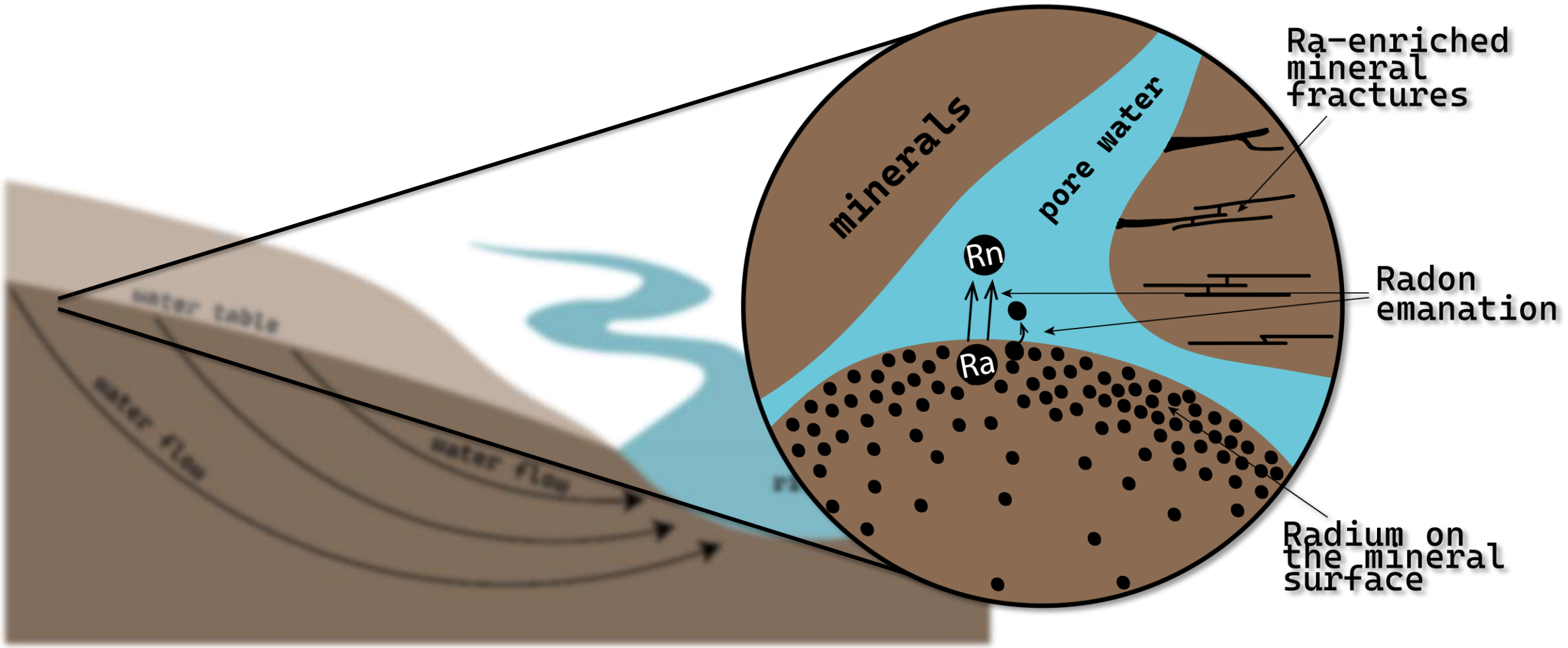
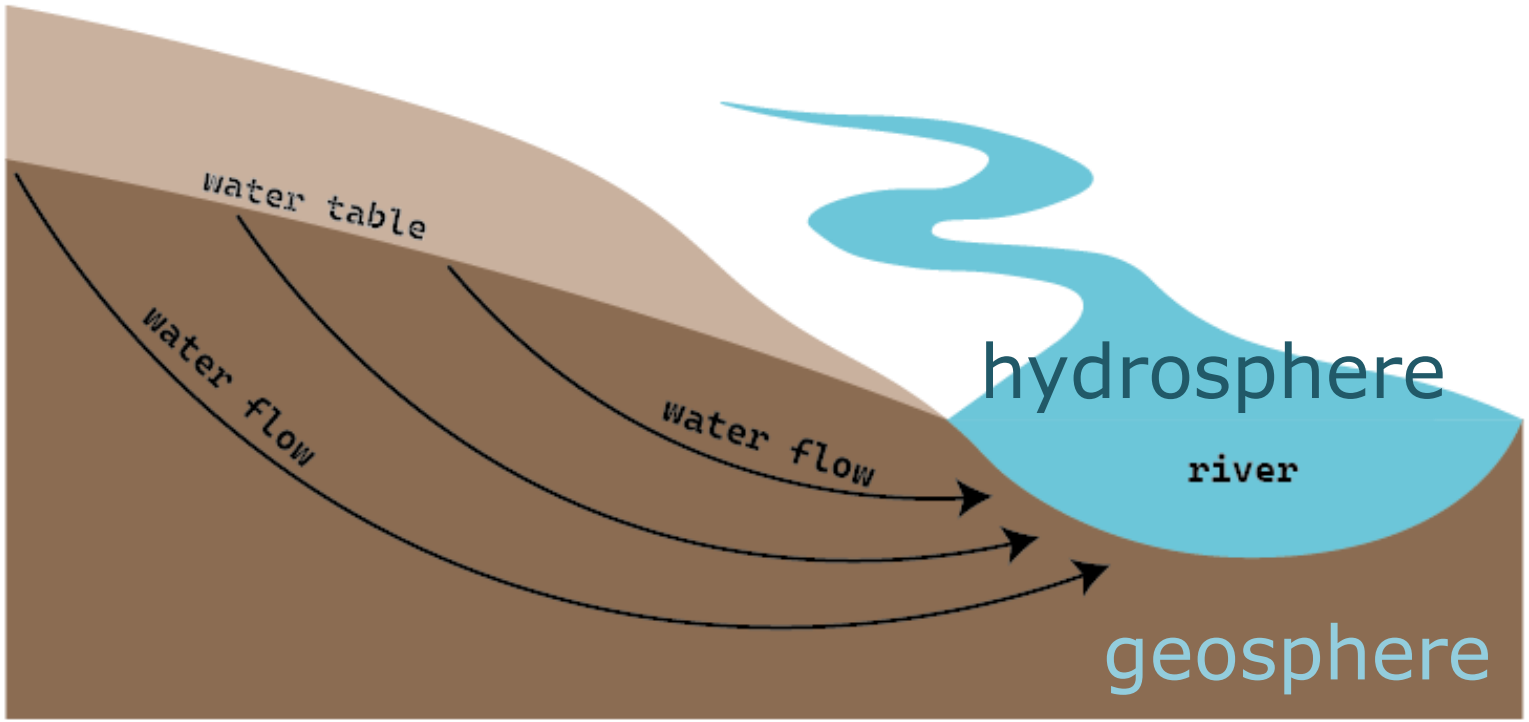
Introduction



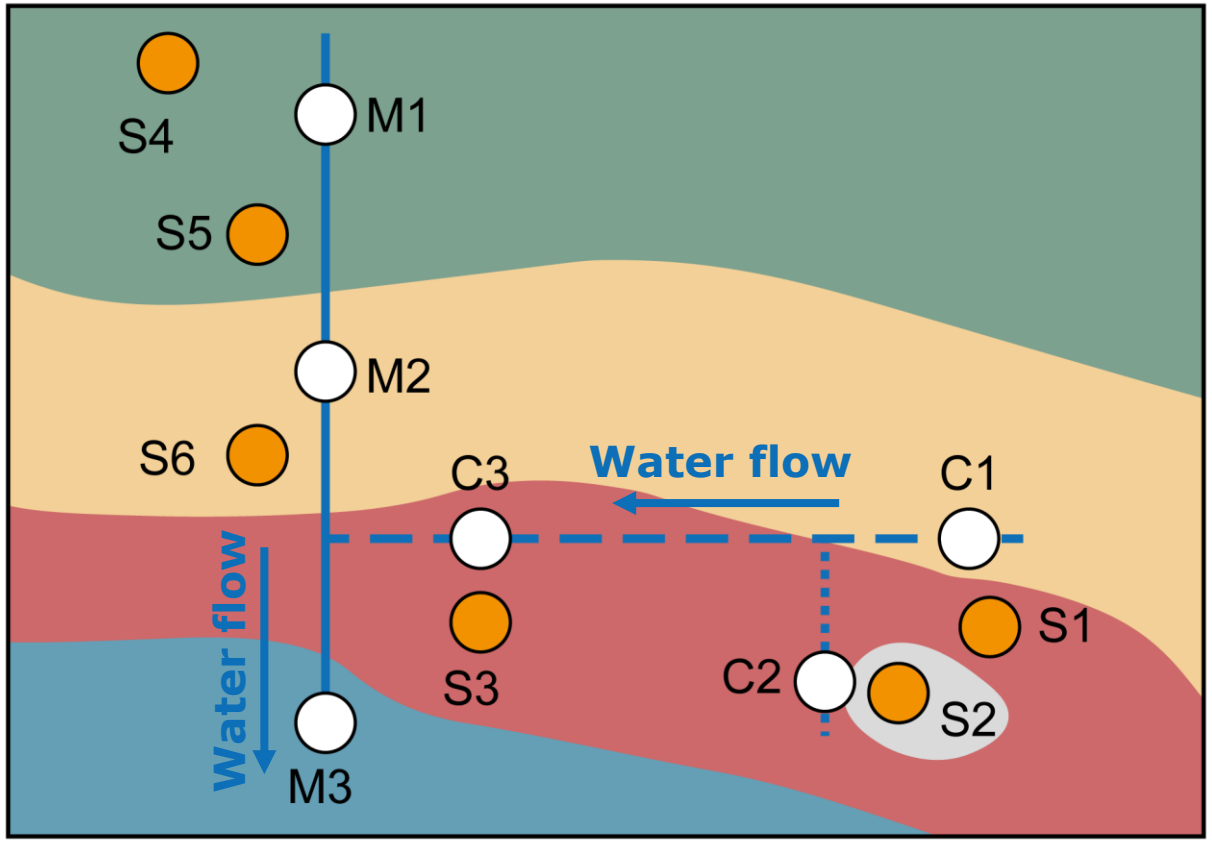
Introduction

Atmosphere



- The final goal of the present work is the study of the interaction between the groundwater and the surface water sub-systems.
- In this presentation we will focus on the description of preliminary results.

Geological Setting (a very schematic one)



Metamorphic rocks

Sedimentary rocks

Surface water

Groundwater

Mondego River

Ceira River

Dueça River

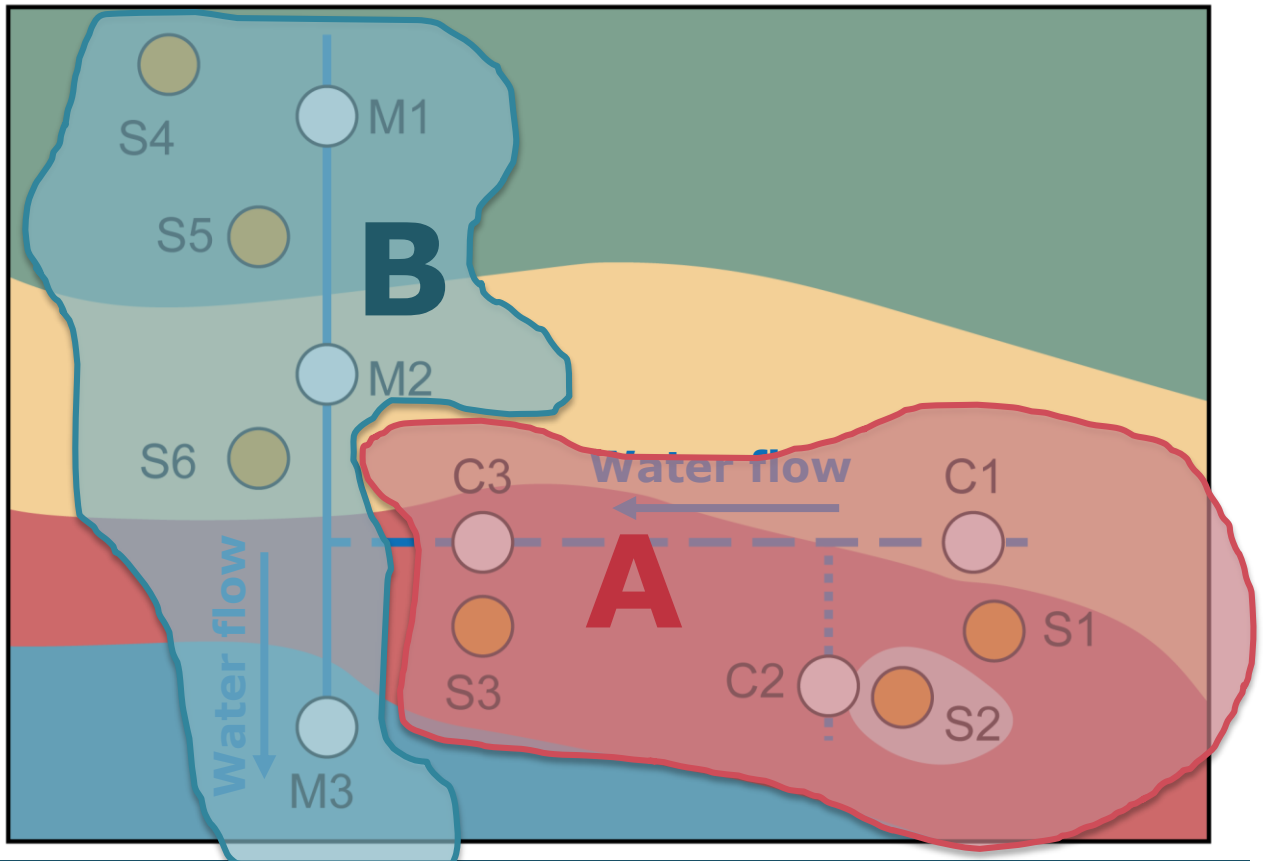
6 springs

6 surface waters

156 samples

Oct 22 May 23

Geological Setting (a very schematic one)



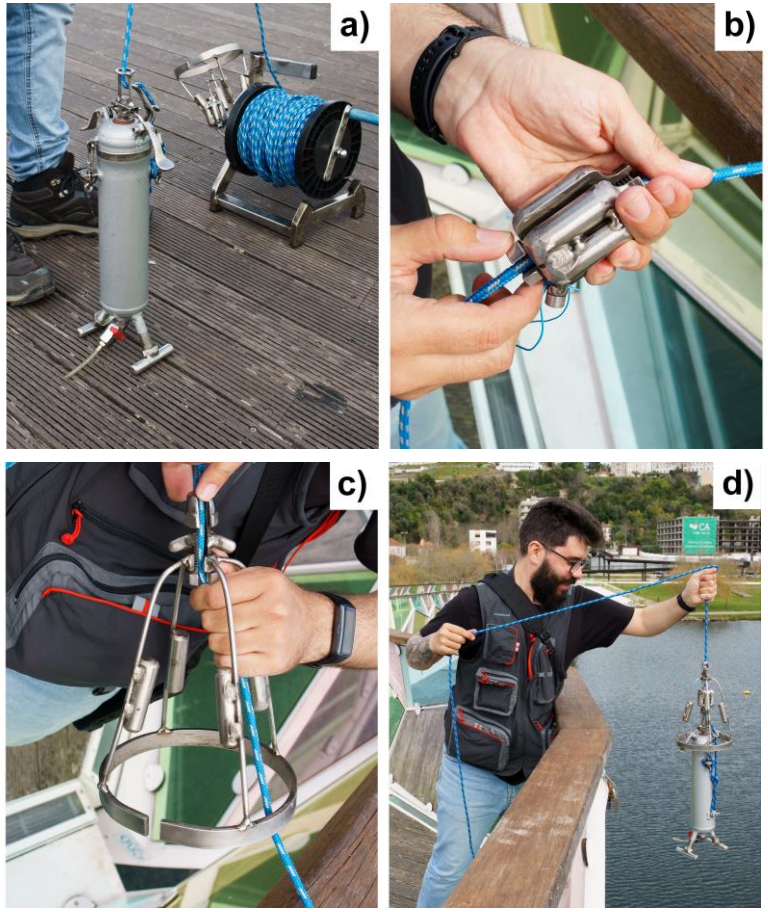
A Ceira and Dueça rivers

- spatially related to the sedimentary rocks, close to the geological contact with metamorphic rocks

B Mondego river

- greater affinity to the metamorphic rocks

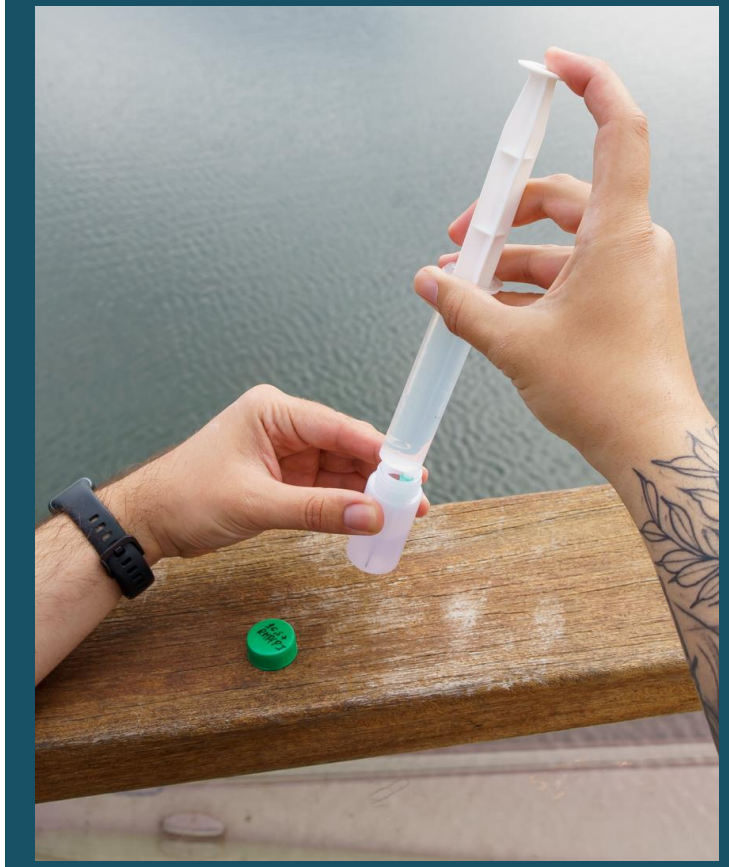
Methodology - Sampling



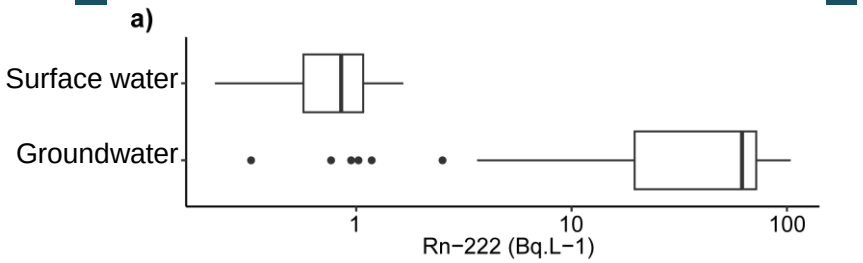
A. Descent B. Opening C. Closing

Methodology

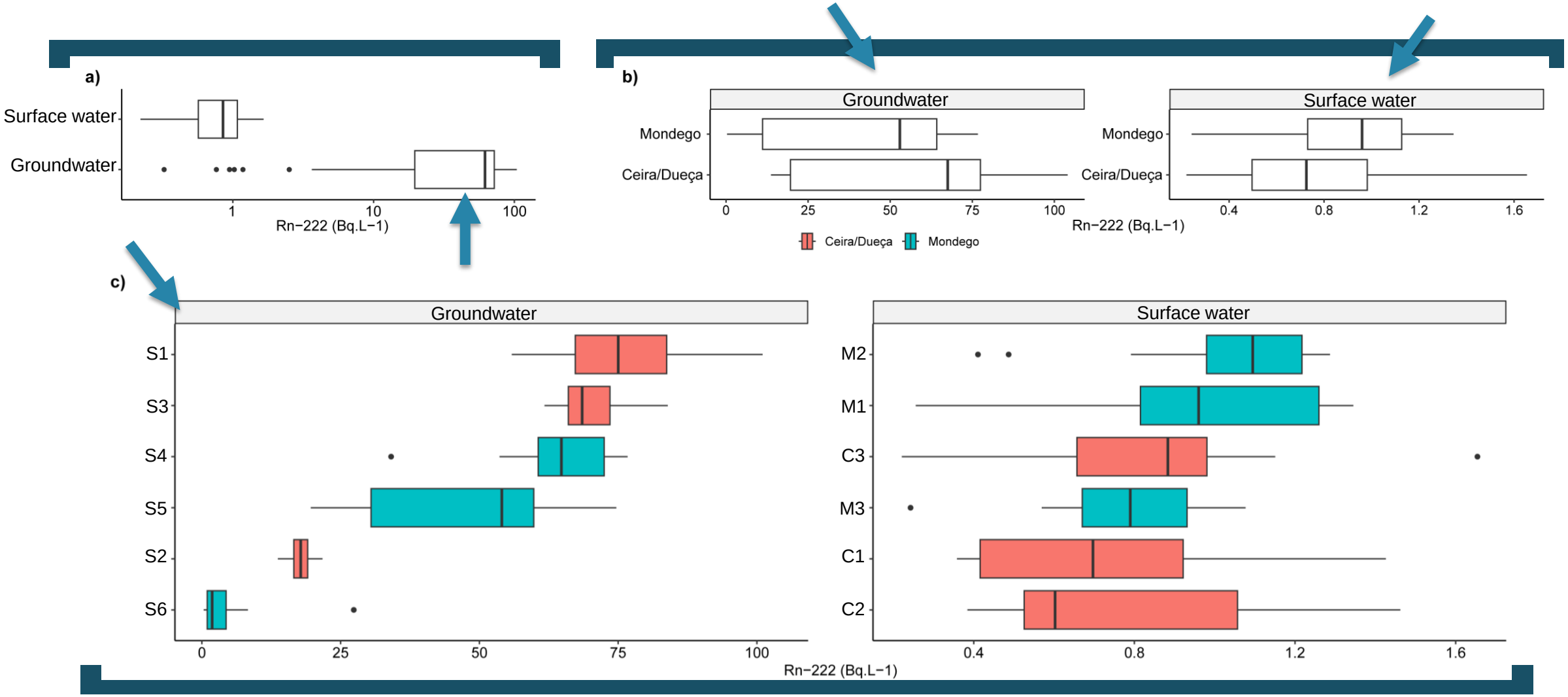
Liquid Scintillation Counting - ISO 13164-4



RESULTS

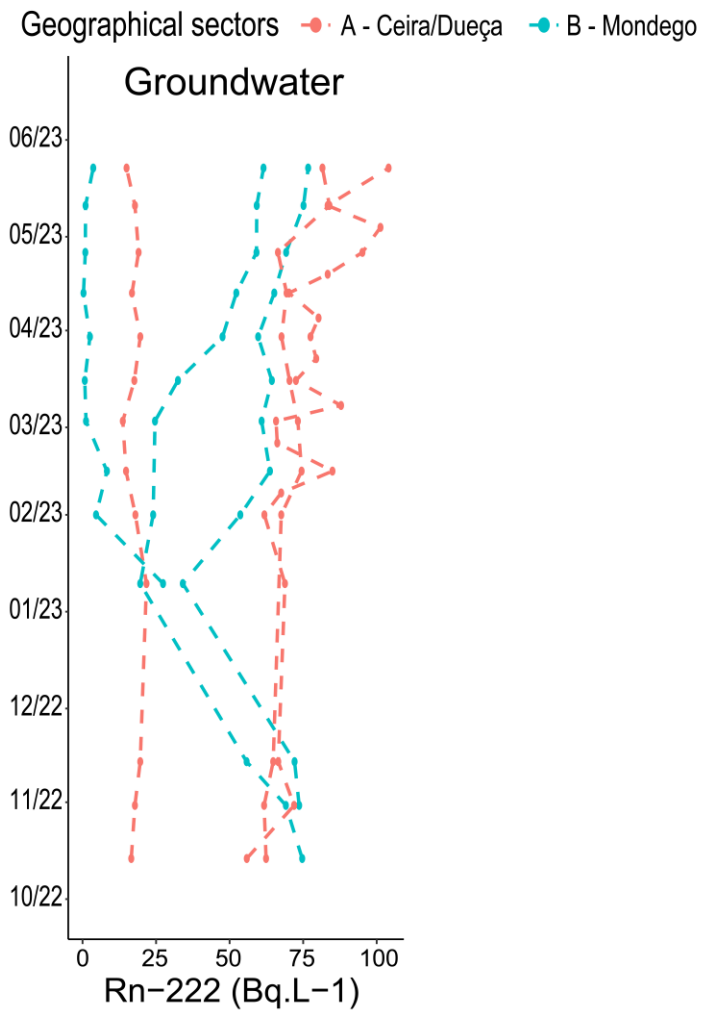


RESULTS


a)
Surface water
Groundwater
1
10
100
Rn−222 (Bq.L−1)
b)
Groundwater
Surface water
Mondego
Ceira/Dueça
0
25
50
75
100
0.4
0.8
1.2
1.6
Rn−222 (Bq.L−1)
Ceira/Dueça
Mondego
c)
Groundwater
Surface water
S1
S3
S4
S5
S2
S6
M2
M1
C3
M3
C1
C2
0
25
50
75
100
0.4
0.8
1.2
1.6
Rn−222 (Bq.L−1)

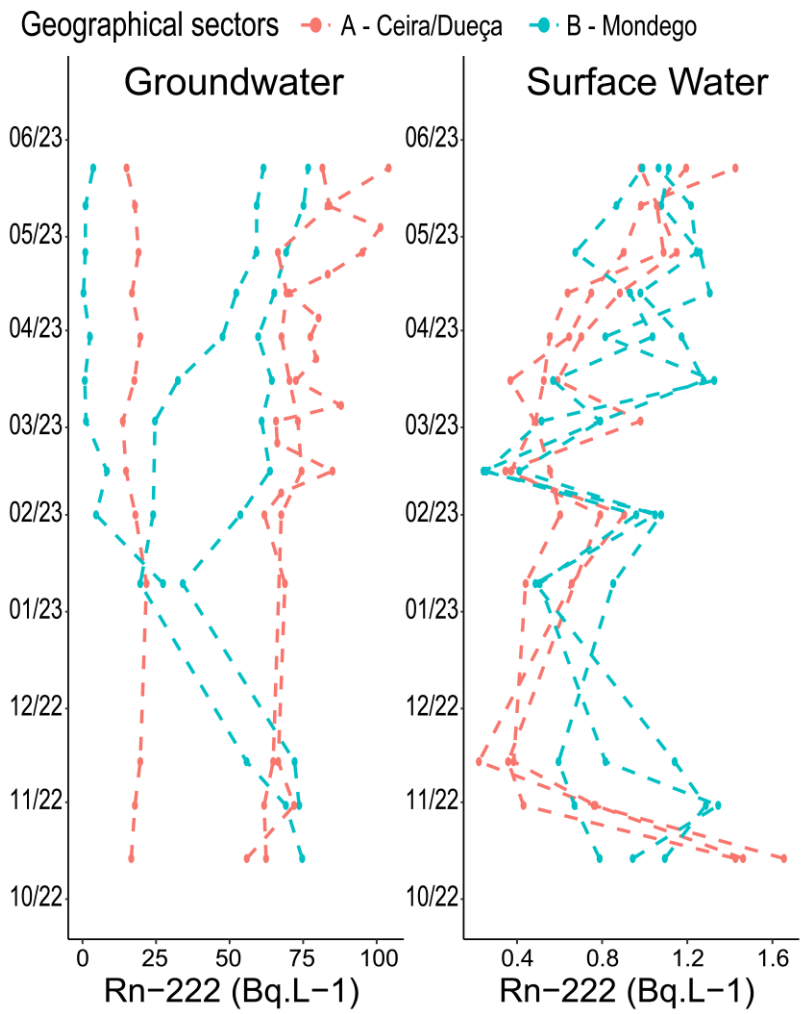
Discussion

- In groundwater the patterns seem to be controlled by the geographical sectors;
- Each time-series of the sector (A) have a lower variability than the ones in sector (B) which seem to have a different pattern, characteristic of its geographical sector.



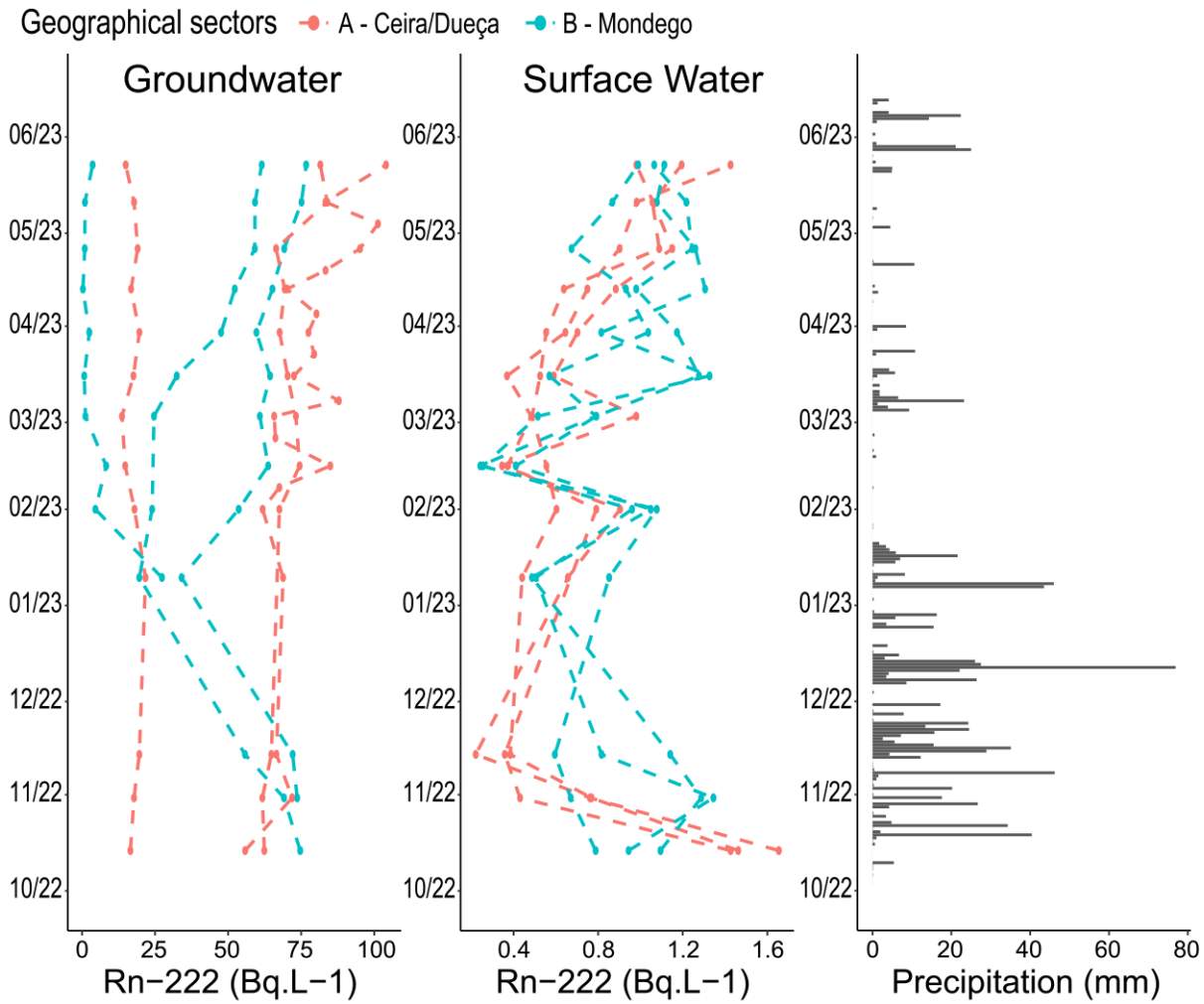
Discussion

- The pattern of surface waters is similar across the sampled locations;



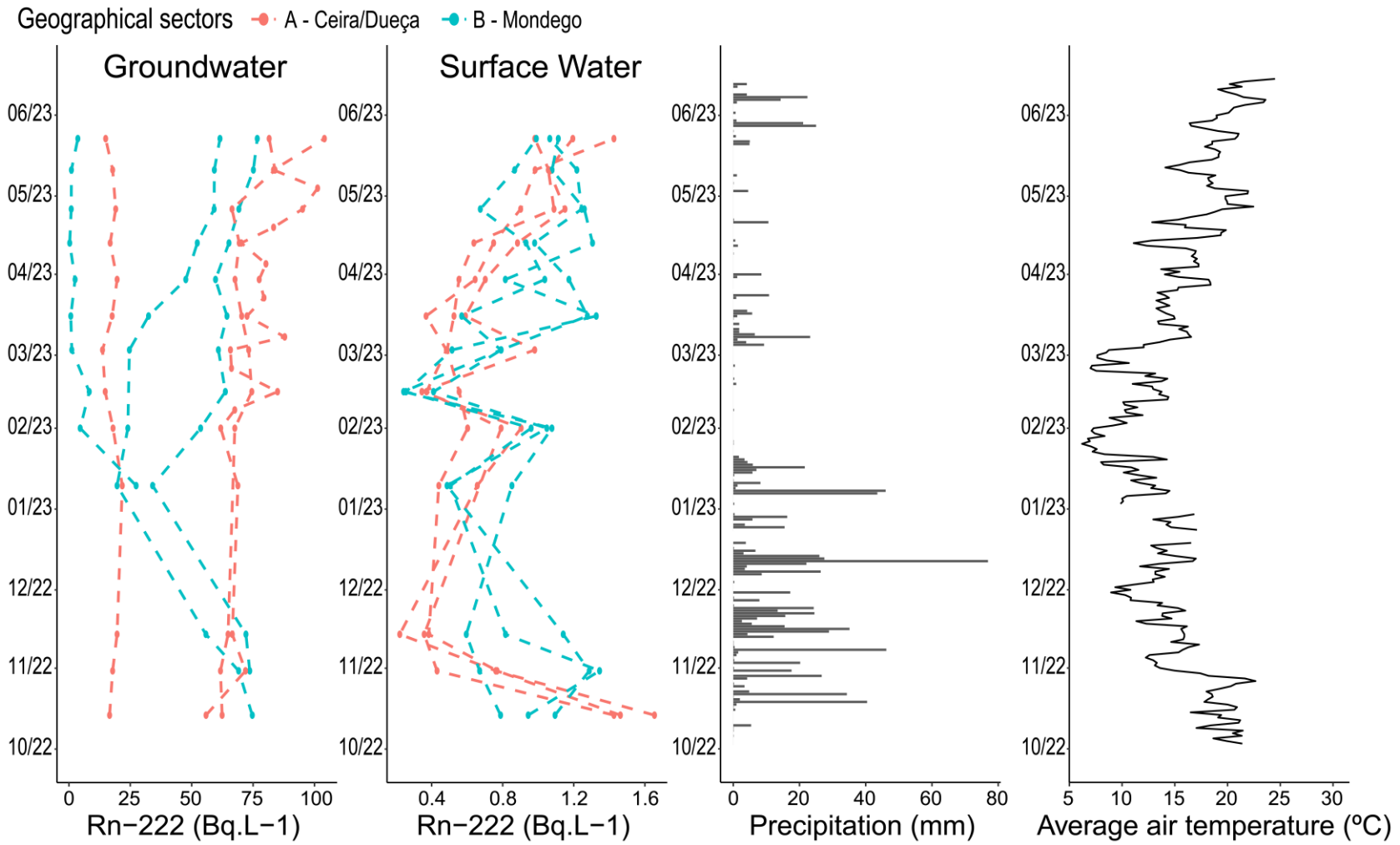
Discussion

- The pattern of surface waters is similar across the sampled locations;
- Precipitation plays an importante role;



Discussion

- The pattern of surface waters is similar across the sampled locations;
- Precipitation plays an importante role;
- It is also similar to the pattern of air temperature.



Final Remarks

- Rn-222 have shown important variability in time and showed spatial differences;
- Its variability is a reaction to external environmental pressures and to the hydrogeological setting;
- This preliminary results are emphasizing the importance of the timescale;
- One-time samples in space aren't enough to understand the highly variable water systems that react to external forces at different timescales;
- This is of greater importance to the study of these systems, in a future of possibly higher pressures and higher demands over them.

THE AUTHORS WOULD LIKE TO

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