

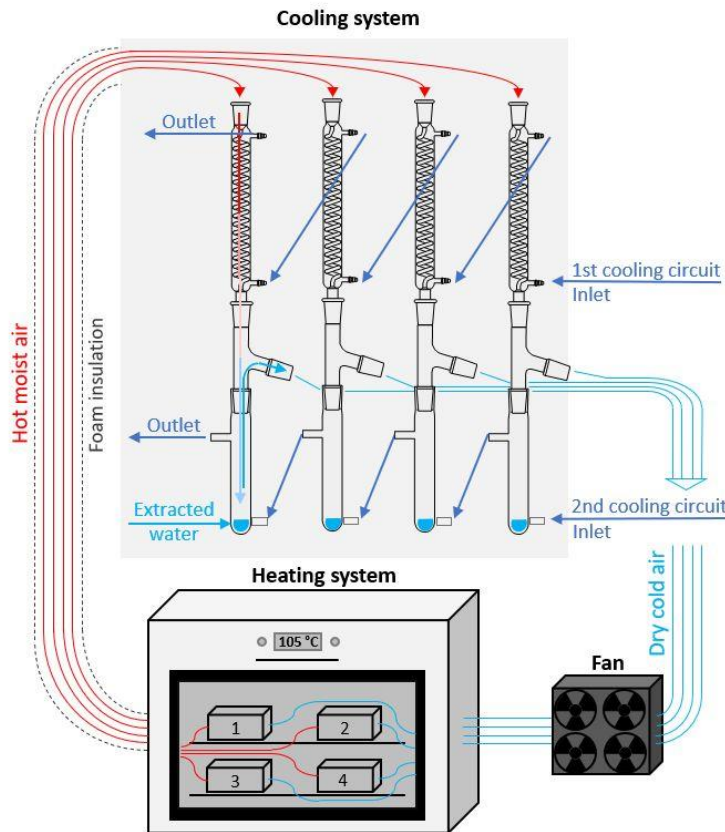
# Simple, exact and reliable way to extract soil water for stable isotope analysis

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## Circulating air extracting method (CAEM)

- Closed-circuit drying with carrier gas (air)
- A simple four-slot apparatus
- Low temperature extraction without vacuum (105°C heating, 8°C cooling (tap water))
- 3-5 hours extraction time

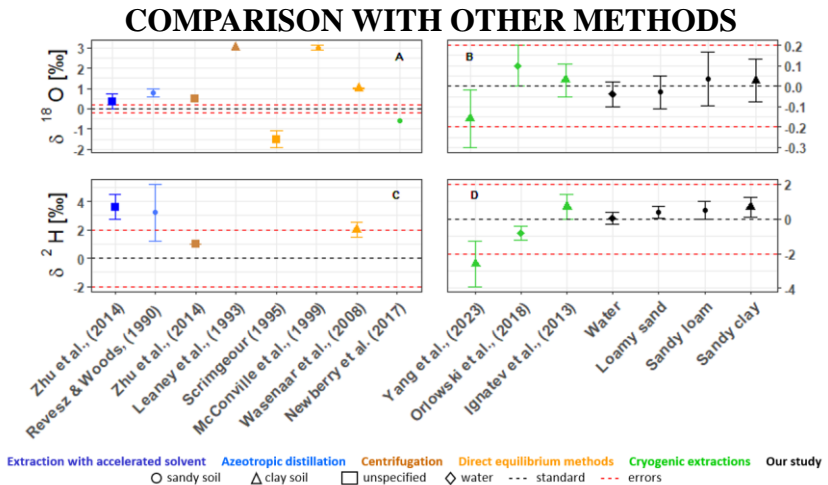
## SIMPLIFIED SCHEME OF THE EXTRACTOR



Simplified diagram of the three main components of the apparatus (heating system, cooling system and air circulation system (ACS)). The apparatus consists of four separate drying circuits and two cooling circuits.

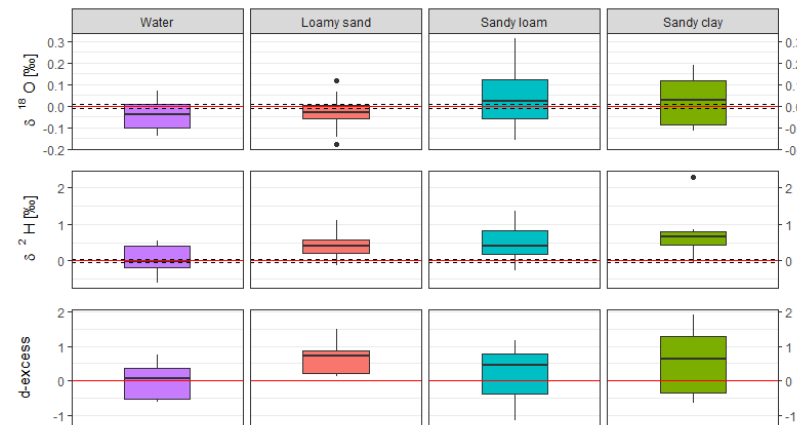


Photo of the newly designed apparatus.



Dashed black line represent the standards used in those tests. Dashed red lines represent errors of  $\pm 0.2\%$  for  $\delta^{18}\text{O}$  and  $\pm 2\%$  for  $\delta^2\text{H}$ , which is considered reasonable for hydrologic studies. The right side of oxygen graph (B) with more accurate methods has a zoomed y-axis.

## SPIKE EXPERIMENT TEST RESULTS



Relative deviation of the isotopic ratio of extracted water compared to the labelled water (red line) and its standard deviation (black dashed line).

## Pros

- High sample capacity -> high representativeness
  - up to 400 cm<sup>3</sup> of soil (per slot)
  - up to 25 ml of extracted water (per slot)
- Promising results even with clay samples
- Cheap and user-friendly apparatus

## Cons

- Not suitable for small samples extraction
- Lower throughput than other approaches

↓ preprint ↓

