

# Influence of layering on the formation and growth of solution pipes and cave conduits

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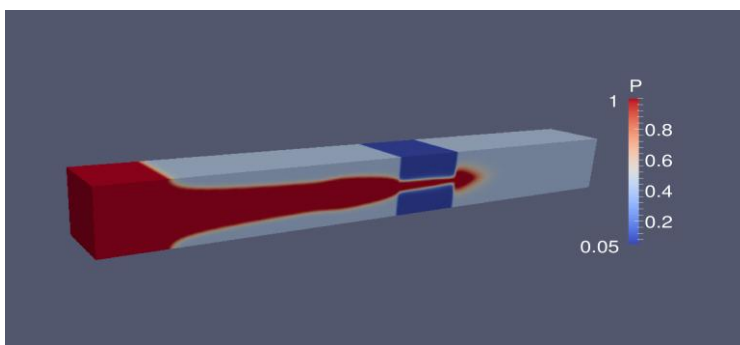
## ABSTRACT

Karst systems are the product of the dissolution of carbonate rocks. Their formation are controlled by physical processes (gravitational flows), chemical erosion of the rocks  $\text{CO}_2$ -saturated water and hydrogeological conditions such as the stratigraphy of the porous medium. These processes are strongly coupled, which can lead to a number of different instabilities, resulting in the formation of dissolutional voids, caverns and conduits [1-2].

Arguably the simplest systems of this kind are solution pipes, in which gravitationally driven water movement carves long-and-thin vertical conduits in limestone rocks. In the homogeneous rocks these conduits are often cylindrical, with almost a constant diameter along their length. However, in a stratified medium, the presence of less porous layers leads to the appearance of the pipes with variable cross-sections – narrower in the tight layers and wider in more porous ones.

In this communication, we investigate numerically these effects with a goal of linking the characteristics of natural forms (such as their lengths, widths or aspect ratios) with the main physical parameters which control their formation (such as flow and dissolution rate and the stratigraphy of the system). We find that not only the shapes of the individual pipes are affected by stratification, but also the growth rates of the pipes and the interaction between them is altered by the presence of the tight layers in the rock [3].

Finally we comment on the possible link between these results and the morphologies of the cave conduits.



Porosity field corresponding to a hydraulic conduit penetrating a less porous layer.

## References

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