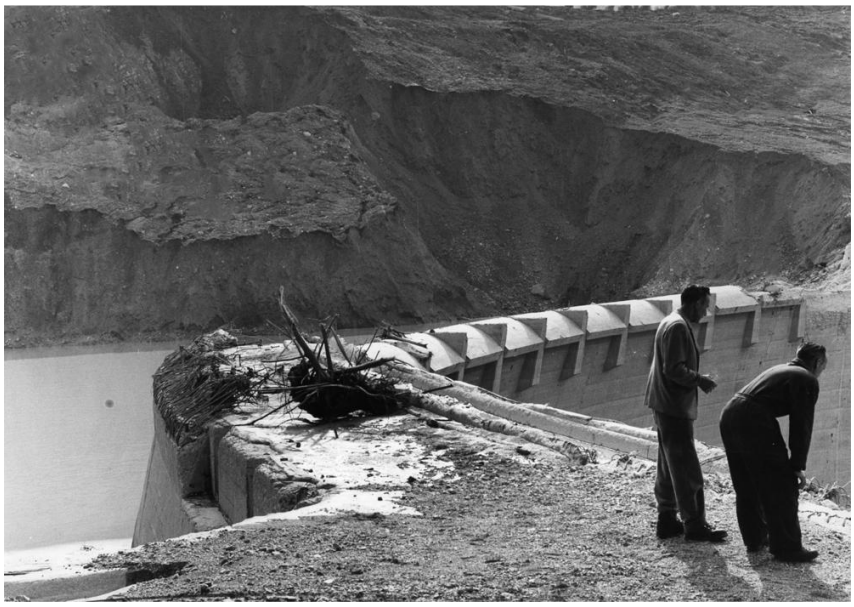
Multiphysics modelling of multiphase geomaterials

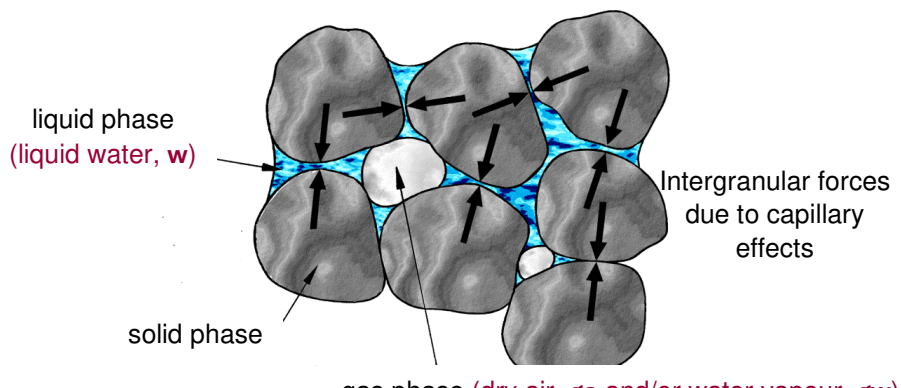
Coupled equations and finite element solution, with application to model strain localization, diffuse failure and desiccation cracks

Abstract:

The aim of this talk is to illustrate a fully coupled, non-linear, and very general physical, mathematical, and finite element model for the multiphysics modelling of non-isothermal multiphase porous materials. Applications to the numerical simulation of strain localization in dense sand, a prototype of the Vajont landslide, the diffuse failure of a large-scale experimental slope stability test, and desiccation cracking in clayey material will be shown to describe the model capabilities and how material and structural behaviour are strongly affected by the couplings between the phases of porous geomaterials.

The seminar lecture will be presented at a basic level to demonstrate the effectiveness of the proposed approach and the very challenging real-world problems that can be analysed with it.




liquid phase
(liquid water, **w**)
Intergranular forces
due to capillary
effects
solid phase
gas phase (dry air, **ga** and/or water vapour, **gw**)