Modeling naturally fractured carbonate as potential CGS reservoir: a case study from Sulcis Basin.

Maria Chiara Tartarello, Sabina Bigi, and Livio Ruggiero
Department of Earth Science, Univerisità di Roma "Sapienza", Rome, Italy (mariachiara.tartarello@uniroma1.it)

The naturally fractured carbonates have a great potential for Carbon Geological Storage purpose because they could offer the possibility for storage in that areas where no sandstone are available. In Italy, we studied the Sulcis Basin, an area situated in SW Sardinia, where the "Miliolitico Fm." represents the potential reservoir. This Formation consists of well bedded, about 50 m thick, mudstones and grainstones with Miliolidae, deposited in a lagoon environment during the Early Eocene. This formation has a very low primary porosity and permeability, so it is essential to characterize the fracture network that characterize the reservoir's capacity.

We performed a detailed fracture analysis at the outcrop, using scan lines and scan areas techniques. We measured the fractures spacing, aperture, length and connectivity both linearly and on a surface. These parameters were used to build several Discrete Fracture Model, using Move 2016 (Midland Valley). In particular DFN were constructed varying length and aperture values to evaluate their influence on the total secondary porosity.

The same approach was also utilized in the Nuraxi Figus coal mine, where the Miliolitico crops out at a depth of -480 m b.s.l., in more confined pressure condition. Here we collected detailed scan lines. Major fractures/faults that cross the whole tunnel were also measured. These data were integrated with the previous ones for the DFN generation. A separate fracture model were generated to represent the fault network, to evaluate the different component of the brittle deformation (small fault and fractures). The fracture modeling was performed using Move 2016 and Petrel (Schlumberger); than the results were compared. The results show that most of the secondary permeability and porosity is due to faults, through which fluid circulate. Some fractures sometimes are affected by karst phenomena, that influence their aperture.