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ΘΕΜΑ: **Multiphase Fracture Flow Modelling for CO_2 Storage**

ΤΟΠΟΣ: Αίθουσα Σεμιναρίων ΕΙΧΗΜΥΘ-ΙΤΕ

ΗΜΕΡΟΜΗΝΙΑ: Τετάρτη, 23 Οκτωβρίου 2002

ΩΡΑ: 19:00

ΠΕΡΙΛΗΨΗ

The growing threat of global warming caused by the burning of fossil fuels has led scientists to explore solutions such as underground injection of CO_2. Possible alternatives for storage include deep saline reservoirs and depleted oil and gas reservoirs.

One of the key issues to be addressed with regard to underground reservoir storage is CO_2 loss from storage due to leakage through faults and fractures in the geological structure. Thus, while flow of CO_2 gas and water or oil through fractures is anticipated to occur, there is a high degree of uncertainty regarding prediction of flow phenomena. Complicated gas-liquid flow phenomena in geologically varied domains are also expected during CO_2 injection.

Various scenarios of CO_2 and water/oil flow in natural fractures are being investigated, under the anticipated field pressure and flow conditions. A numerical model has been developed in order to model the flow of gas and liquid in rough fractures. The model uses a finite difference scheme to solve the partial differential equations that describe two-phase flow. The outcome of the numerical simulations is being compared to experimental results. Large scale experiments with the transparent replica of a natural fracture are being used for gas and water flow tests under high pressure conditions. In addition, micro-models are also used to examine details of the complicated flow phenomena that take place inside the fractures. High quality video recordings are utilised in conjunction with data logs in order to obtain information such as breakthrough pressures, phase velocities, formation of discrete gas bubbles and bubble interaction phenomena.

A new methodology of creating silicon rubber moulds of the fracture area is also being applied in order to estimate local fracture aperture values. The numerical simulations can then be compared to experimental results.

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