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MEETING
PAPER

PREDICTION OF TURBULENT MIXED CONVECTION FLOWS WITHIN DISSOLUTION GENERATED CAVERNS

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ABSTRACT

This paper presents the general formulation and applications of a mathematical model to the prediction of coupled hydrodynamics, heat and mass transfers. The formulation accounts for fluid turbulence, positive and negative buoyancy forces, wall-flux relationships as well as forced convection effects. The applications include salt-dissolution and fluid behaviour in large underground caverns. Of special importance is the mass transfer at the cavern wall surfaces and its influences upon negative buoyancy forces. Rectangular geometries are considered and comparisons with experimental data whenever possible are indicated.

The model itself is based upon numerical solutions to sets of coupled partial differential equations. The solution procedure is of the finite-difference variety and possesses several novelties. The versatility of this modelling approach is emphasized.