Numerical study of flow, temperature, and salinity distributions of a brine discharge problem

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ABSTRACT

In this study, the problem of brine discharge into sea is studied numerically. A 3D model for the heat and brine dispersion in the vicinity of discharge and intake ports is developed using Fluent package. The flow is taken turbulent and the fluid properties are considered variable with salinity and temperature. The results are expressed in terms of streamlines, isotherms, and salinity contours as well as velocity, temperature, and salinity profiles. These results give the excess temperature and salinity relative to the nominal values of the free stream. Effect of discharge mass flow rate on patterns of temperature and salinity contours is presented and analyzed. It is observed in particular that for the different simulations undertaken, the excess temperature and salinity can be important and the intake is always affected by the discharge conditions.

Keywords: Brine discharge; Numerical modeling; Shallow water; Dispersion; Heat and mass transfer

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