
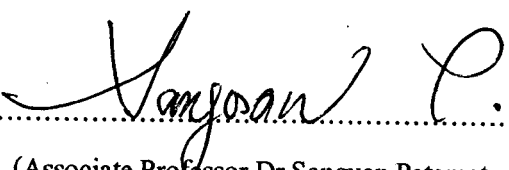


THESIS TITLE : APPLICATION OF VISUAL MODFLOW FOR SIMULATING SALINE
GROUNDWATER MOVEMENT RESULTING FROM
MAHASARAKHAM ROCK SALT

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ABSTRACT

Soil salinity problem always affects on agricultural and social activities in Northeast Thailand. The sources of soil and water salinity in the Northeast is the rock salt strata in Mahasarakham Formation, which is about 50 m to 1,000 m depth from ground surface. Groundwater is the vehicle that carry and disperses the salinity originated from Mahasarakham rock salt to groundwater surface.

This study is to apply Visual MODFLOW model to simulate salinity distribution. Visual MODFLOW is 3-d groundwater flow model. It is equipped with MT3D, a 3-d mass transport model that can simulate both groundwater flow and mass transport, here, for soil and water salinization process.

An area closed to Nong Han Kumpawapi Udonthani Province was selected to study because of existence of soil salinity spots and availability of topographic, climatic, and geological information. The study area is rectangular of 4,000 m x 6,000 m. Simulations include steady and transient states. Simulating time is 20 years. Three scenarios involved are normal, heavy abstraction from a well field, and large recharge situations.

The results show that the distributions of saline soil and water are similar for the three scenarios, which distribute along the stream courses on the western and along the road on the eastern part. The well field abstraction scenario gives slightly larger area of contamination. Wet and dry seasons have some effect on groundwater flow but none on salinity distribution. The salinity distribution is continuously and gradually expansion. It can be concluded that Visual MODFLOW is a powerful tool to study and understand the distribution of soil and water salinity, which originated from Mahasarakham rock salt.