Abstract
We study the ground water flow described by the following equations

\[ \Delta G(u) + f(u) = u_t, \quad x \in \Omega, \quad t > 0 \]  

where \( \Omega \) is a bounded one-dimensional domain and \( f(u) \) is the source term. We note that this equation for the particular choice of \( G(u) = u^m \) is the well known porus media equation.

We derive a maximum principle for a particular class of functionals defined on strong solutions of (1)

\[ \Psi(u, u_x^2) := (G(u_x^2) + \alpha u^2 + 2F(u)) \exp(2\alpha \beta t) \]

with \( F(u) := \int_0^u f(s) \, ds \), where \( \alpha \) is an arbitrary parameter \( \geq 0 \) and \( \beta \) is some positive constant to be determined. We compute a range of values of \( \alpha \) for which \( \Psi \) takes its maximum value initially, i.e. at \( t = 0 \) if \( f(u) = 0 \). If \( f(u) \neq 0 \), the solution \( u \) may blow-up at some time; so we establish conditions on data sufficient to prevent blow-up for \( u \) and even sufficient to obtain its exponential decay in time.