

Geographic Information Systems (GISs) are the major data sources for numerical groundwater modelling, and it is common practice to couple groundwater models with GISs. There are three methods for coupling the numerical groundwater models with GISs, namely, “loose”, “tight”, and “seamless”. A seamless GIS groundwater model allows constructing, running model and visualisation of modelled results to be carried out all in a GIS environment, thus having the advantages of being easy to use and highly efficient. Currently, there is, however, no seamless GIS numerical groundwater flow model that produces groundwater levels based on hydrogeological processes; and groundwater flow modelling work is generally carried out by people with special numerical modelling skills. This was addressed by developing a BGS GISGroundwater – a simple two-dimensional finite difference groundwater flow model using C++. This model has a potential to become a spatial analysis function for any GIS capable of handling raster datasets, as demonstrated by developing its ArcGISTM add-in. The case study in the Thames Basin demonstrated that BGS GISGroundwater can be easily and efficiently applied in constructing a regional scale groundwater flow model with great flexibility; and only few hours are needed to build up a numerical regional groundwater flow model in ArcGIS using GISGroundwater. This model is valuable in developing preliminary groundwater flow models and evaluating hydrogeological conceptual models. The model, which will be downloadable free of charge, also lowers the threshold of carrying out groundwater flow simulation thus providing wider access to groundwater flow modelling.

GIS files can be downloaded from <http://www.bgs.ac.uk/gisGroundwater/>