



Estimation of preferential recharge and saltwater intrusion to a coastal groundwater system in central Vietnam by means of 3D stratigraphic modeling

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Saltwater intrusion is worldwide regarded as a major threat to groundwater resources. Mostly, saltwater intrusion problems are related to sea water level rise or induced intrusion due to excessive groundwater extraction in coastal aquifers. However, the hydrogeological heterogeneity of the subsurface might play an important role in (non-)intrusion as well. We study local (hydro)geological conditions for preferential recharge as well as saltwater intrusion to a coastal groundwater system in Vietnam where geological formations exhibit highly heterogeneous lithologies. A cluster analysis technique combined with a chronographic marker is used to distinguish and map well-log intervals of similar lithological properties in different geological formations. The cluster analysis is carried out on lithological composition, distribution depth and thickness of each lithological distinctive drilling interval of well-logs of 43 groundwater investigation boreholes carried out within the study area. The chronographic marker is a layer of clay originated from weathered basalt rocks, whose color and lithological properties can be distinguished from the other formations. Detailed to coarse 3D stratigraphic models, based on the above analysis, are constructed and used as a tool to estimate preferential recharge paths and saltwater intrusion to the groundwater system under study. Chemical analysis of groundwater water samples is also used to support the estimation. Result of this research work contributes to the interpretation of why the aquifer system of the study area is almost uninfluenced by saltwater intrusion which is relatively common in coastal aquifers of Vietnam.