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## Evaluation of Impacts of the South Dike of the County Havana, Using a Model of Abrupt Interface

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The south dike of the county Havana, with a longitude of approximately 40km was built at the end of the 80's decade. Its objective is to reduce the discharge from the karstic aquifer to the channels of the coastal muddy fringe and in that way the groundwater resources are increased, an artificial hydraulic barrier is believed and then decreases the groundwater encroachment.

To evaluate the effects of the dike quantitatively a mathematical model was applied, a new algorithm was implemented in the software AQÜIMPE. This program in finite elements uses the quadratic triangle as discretization element and that it has been developed and applied in Cuba in aquifers closed in the last two decades with satisfactory results.

To apply the algorithm it is required to determine the position of the aquifer bottom for each discretization element. It is considered the interface position by the Ghyben-Herzberg formula and it is compared with the depth of the aquifer bottom to decide the thickness of the aquifer in each time step. The obtained results of the application of the algorithm are shown, what demonstrates the validity of the outlined hypotheses.

The pattern estimates the annual increment of the groundwater resources product of the dike in  $90\text{hm}^3$  by year.

The groundwater discharge is increased toward the sea, but she decreases the haulage of organic matter that feeding to the coastal fauna and the environment is impact by this reason.

Keywords: Groundwater. Karst coastal aquifers. Groundwater encroachment. Numeric modeling.

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