techniques were used to conduct this study including interviews, questionnaires, focus group discussions, field visits and observations, GIS and remote sensing among others. The analysis comprised the disaggregation of the hazards' characteristics including description of the hazard, Triggering factors, Frequency, seasonality, Duration, sectors affected, impacts, time of recovery, intensity of the hazard and others. In terms of vulnerability. The analysis comprised physical, environmental, social, institutional, economic, profile of the most vulnerable populations, differentiation of impacts, and level of vulnerabilities.

The study results showed that the Disaster Risk reduction is very possible through a comprehensive risk management. There is also a big need to expand capacity building in terms of disaster management, risk mapping to reach cell and village levels, put in place and operationalize early warning systems or hydro-meteorological hazards and many others in order to minimize the disaster risks and where possible to transform them into opportunities. All disasters are not preventable but mitigation is always possible.

GIS BASED AQUIFER VULNERABILITY ASSESSMENT IN HANGZHOU-JIAXING-HUZHOU PLAIN, CHINA.

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Abstract

Hangzhou-Jiaxing-Huzhou plain is among the regions which faces the shortage of water due to its increasing population, industrialization, agriculture and domestic use; hence the high dependence on groundwater. In China, the exploitation of aquifers has been historically undertaken without proper concern for environmental impacts or even the concept of sustainable yield. In order to maintain basin aquifer as a source of water for the area, it is necessary to find out whether certain locations in this groundwater basin are susceptible to receive and transmit pollution, this is why the main objective of this research is to find out the groundwater vulnerable zones using Geographical Information System (GIS) model in Hangzhou-Jiaxing-Huzhou plain. GIS was used to create groundwater vulnerability map by overlaying hydro-geological data. The input of the model was provided by the following seven data layers: Depth to water, net Recharge, Aquifer media, Soil media, Topography, Impact of vadose zone and hydraulic Conductivity.

This study showed that Hangzhou-Jiaxing-Huzhou area is grouped into three categories: High vulnerable zone with 27.4% of the total area, moderate vulnerable zone which occupy the great part of that area 60.5% and low vulnerable zone with 12.1%. This research suggests first the prioritization of high vulnerable areas in order to prevent the further pollution to already polluted areas; next the frequent monitoring of vulnerable zones to monitor the changing level of pollutants; and finally suggests that this model can be an effective tool for local authorities who are responsible for managing groundwater resources in that area.

Key words: Hangzhou-Jiaxing-Huzhou plain, Groundwater vulnerability, GIS, DRASTIC model, shallow aquifer

FORECASTING THE PERFORMANCE OF AN OIL FIELD, COMPARISON OF VARIOUS USED METHODS: THE CASE OF SHUANGHE OILFIELD, CHINA

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Abstract: While being the dominant source of energy, oil has also brought affluence and power to different societies. Energy produced from oil is fundamental to all parts of society. In the foreseeable future, the majority of energy will still come from oil production. Consequently, reliable methods for forecasting that production are crucial. Petroleum engineers have searched for simple but reliable way to predict oil production for a long time.

Many methods have been developed in the latest decades and one common practice is decline curve analysis. Prediction of future production of petroleum wells is important for cost-effective operations of the petroleum industry. This work presents a comparative analysis of methods used to predict the performance of Shuanghe oilfield, China. Using decline curve analysis including three different methods: Arps empirical methods, LL-model and simplified model and the new simplified model, LL-Model, to crosscheck Arps exponential decline model prediction results. The results showed by the comparative analysis of predictions calculated proved LL-model to be the best predictor for Shuanghe oilfield since it takes into account more parameters than the old models used in this work. However, the subsurface information or parameters of the reservoir used in LL-model may not be available every time, therefore Arps models may apply as defined. In Shuanghe oilfield calculated average geological reserves N was estimated at 9449.41 $\times 10^4$ tons, the average recoverable reserves N_R were estimated to 4274.61×10^4 tons while the water cut was 97% and the water cut predicted by LL-model was 96.7%; not far from water flooding curves value. The exponential decline model showed recoverable reserves $\mathbf{N_R}$ estimated around 4685.88×10^4 tons of oil while the decline phase of total development was estimated around 34 years which means that if the actual production conditions remain unchanged, Shuanghe oilfield would continue producing for another 25 years from 2008.

Key words: Shuanghe oilfield/ Oil production prediction/ decline curve

ДИНАМИКА ЗАТОПЛЕНИЯ ТЕРРИТОРИИ ВОЛГО-АХТУБИНСКОЙ ПОЙМЫ ВСЛЕДСТВИЕ ПРОРЫВА ПЛОТИНЫ ВОЛЖСКОЙ ГЭС НА ОСНОВЕ ГИДРОДИНАМИЧЕСКОГО МОДЕЛИРОВАНИЯ

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THE DYNAMICS OF FLOODING IN THE VOLGA-AKHTUBA FLOODPLAIN BECAUSE OF THE VOLZHSKY HYDROELECTRIC DAM BREAK ON THE BASIS OF THE HYDRODYNAMIC MODELING

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Abstract. *The potential problem Volzhsky hydroelectric dam break is considered. A numerical model based on cSPH-TVD method using parallel technology was build. Numerical calculations are carried for the dynamics of development and consequences of flooding in the Volga-Akhtuba floodplain*.

Введение

Методы математического моделирования динамики поверхностных вод в приближении мелкой воды позволяют решать широкий круг задач, связанный с прогнозом и управлением гидрологического режима на заданной территории с учетом разливов рек и озер [Воеводин, 2009], осадков [Кивва, 2001], взаимодействия руслового и пойменного потоков [Егоров, 2009], аварийных ситуаций на гидросооружениях [Еремин, 2006], возникновением и динамикой цунами [Шокин. 1989], формированием погоды вблизи крупных водоемов, морскими [Чикин, 2001] и океаническими движениями [Педлоски, 1984].

Плотины на реках представляют собой потенциальную угрозу территориям, расположенным вниз по течению, поэтому задача прогноза последствий затопления в случае чрезвычайных (аварийных) ситуаций на гидросооружениях является актуальной и жизненно необходимой при разработке планов застройки и эвакуации населения при возникновении ЧС.

В данной работе описана математическая модель с учетом различных физических факторов и ее численная реализация. Представлены результаты моделирования динамики затопления территории вследствие аварии плотине Волжской ГЭС.

Математическая модель

Динамика поверхностных вод данной задачи описывается в рамках модели мелкой воды (рисунок 1), поэтому при моделировании используются уравнения Сен-Венана [Еремин, 2006], которые получаются