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Conference Report
Water resources management: recycling and sustainability

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In the following section, we will present the key findings of the recent research in Water Resources Management and Engineering. During August 12–14, 2011, the 1st International conference on Water Resources Management and Engineering(ICWRME) was held successfully. Prof. Ranjit Kumar Majumdar, from Jadavpur University has deliver a keynote speech entitled "Integrated studies for groundwater resourse evaluation and hydrological charaterization vis-à-vis saline water intrusion of Sagar Island region". The conference received 95 papers from 8 countries. 40 papers was accepted and included in the proceedings. In the following section, the title and abstract are reported. The full paper can be found by google scholar or www.icwrme.org.

We want to express our thanks to the editorial board of *DESALINATION AND WATER TREATMENT* for the publication support, and also to the committee and peer-reviewers for their contribution and critical review.

ICWRME organization Committee

Research on vegetable diagnosis and treatment sxpert system based on CBR

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ABSTRACT: CBR technology applies on the diagnosis of vegetable pests, diseases and insect pests of vegetables diagnosis expert system to solve the knowledge acquisition bottleneck that exists. Pests and diseases for agricultural experts in the diagnosis of the thinking process and the consistency of the basic principles of CBR, CBR constructed expert system Diseases and Pests of vegetables, this paper, the general process of CBR, case representation, retrieval and matching, and vegetables for pest knowledge organizational methods. Pest and disease diagnosis for the vegetable has opened up a new way, be applied to the prevention and control of vegetable pests, not only can the general vegetable pest control work independently, and, because of the unknown cases of CBR has to draw some new conclusions reasoning function, and can assist agricultural experts to diagnose and control of complex issues. Production is of great significance.

Keywords: Case-based reasoning; Vegetable pests; Expert systems; Nearest neighbor method

Prediction of agricultural water demand based on GM (1,1) model in irrigation region

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ABSTRACT: The modeling principle of grey theory and the recognition method of model parameter were presented.

A grey GM (1,1) model was established based on the data of certain irrigation regional agricultural water from 2002 to 2008. The precision test of residual error examination and posterior difference examination showed that the fitting precision reached 98%. The model was applied to the prediction of agricultural water demand from 2009 to 2011. The result indicates that this grey model used in the agricultural water demand prediction conforms to its grey characteristic. The model has the advantages of good versatility, few requirements of data, and moderate computation quantity, and the result accords with the practical condition.

Keywords: GM (1,1) model; Precision test; Agricultural water demand; Prediction

Revisited environmental Kuznets curve in applying economic growth theory

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ABSTRACT: The paper applies the economic growth theory to set up two theoretical models linking the relationship between environmental quality and economic development, with which, the evolutional track of it is analyzed. In the process, it is proved that there exists an inverted-U curve shaped relationship between the environmental quality and economic growth, which is usually termed "the Environmental Kuznets Curve", briefly the EKC. Besides, a prerequisite condition of the existence of EKC, namely the income level of environmental turning point (ETP) can also be inferred in the above models. As a result, the paper intends, to certain extent, to provide guidance on the amount of pollution abatement investment and the improvement of environmental quality, both theoretically and practically.

Keywords: Environmental economics; Economic growth theory; Kuznets curve

Research on the simulation system of NC turning

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ABSTRACT: The general flame of the NC turning simulation system is designed, three-dimensional simulation model of NC lathe is constructed using by Visual C++ and OpenGL. Through the identifying and analyzing module of NC code, NC code is verified fastly and accurately, and then, the turning process is displayed dynamically. Finally, the development of NC turning simulation system is completed. The amount of data was greatl reduced to solve the image flicker problem of the system mainly in the turning tools movement the material removal, etc. The result shows the simulation effect is good.

Keywords: OpenGL NC turning simulation

Analysis of pollution pathway of water environment polluted by domestic garbage in China

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ABSTRACT: Domestic garbage polluted water environment, particularly in rural water environment, because domestic garbage has not been effective solid waste disposal and management. Figures 1 and 2 shows that there were some provinces that the ratio of domestic garbage treated harmlessly was more than 90 percent, such as Beijing, Tianjin and Jiangsu, less than 50 percent, such as Shanxi, Jilin, Heilongjiang and Gansu, there was a a certain relationship between the ratio of domestic garbage treated harmlessly and level of economic development. There are currently a lot of ways of water environment polluted by domestic garbage, mainly including pollution of garbage concentrated stacking, leachate pollution from landfills, pollution of domestic garbage discarded casually, hazardous waste pollution, it is a important significance for pollution prevention of domestic garbage.

Keywords: Domestic garbage; Water environment; Level of economic development; Pollution prevention; Hazardous waste

Hydro-geologic status on the temperature of water in aquifer surrounded by the well of standing column well heat pumps

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ABSTRACT: The temperature of water in aquifer surrounded by the well of the standing column well heat pump (SCW), by direct effects of the hydrogeology conditions, will directly impact on the energy efficiency of the heat pump and the life of SCW system. The temperature of water in aquifer surrounded by the well of SCW was simulated in this paper by using finite-difference simulation software, Flow Heat. The results show that both the permeability coefficient and the porosity of the soil around the well have little effect on temperature of the water in aquifer near the production segment of SCW, as well as the smaller the thickness of the aquifer, the larger the temperature change of water in aquifer of the pumping section.

Keyword: Ground water source heat pump; The standing column well heat pump; Numerical simulation

Study on dynamic adsorption characteristics of GAC

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ABSTRACT: Dynamic adsorption characteristics of organic matter in drinking water with granular activated carbon (GAC) adsorption were studied based on static adsorption. The results indicated that 8.6 min as empty bed contact time (EBCT) was the best adsorption condition considering removal rate of organic matter and treatment capacity in drinking water advanced treatment. The results calculated by fitting equation were approximately the same as practical operation. The equation could be used to predict the removal rate of CODMn and UV254 in different EBCT with GAC filtration. The factors which influence the adsorption capability were presented too.

Keywords: Activated carbon; Dynamic adsorption; Drinking water; Advanced treatment

Multiple criteria assessment of ecosystem services sustained by Qinhuai River in Nanjing

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ABSTRACT: This paper demonstrates how to integrate social factors into the ecosystem service appraisal with a social welfare weight using Qinhuai River as a case study. The AHP method is used to determine the social weight. With analysis of the Qinhuai River's functions, stakeholders and ecosystem services, a three-level hierarchical structure model is established. Ecosystem services provided by the Qinhuai River would include water supply, water regulation, recreation, gas regulation and water purification. After each ecosystem service was calculated, the total value of the Qinhuai River is determined by introducing the social welfare weight. After including the social welfare weight, the value of the Qinhuai River ecosystem services increases from 1.127 × 109US$/y to 3.226 × 109US$/y. These results will allow decision makers to compare the benefits generated by different water uses, including environmental services, and to manage scarce water resources under a long-term sustainable approach.

Keywords: Ecosystem services; Economic value; Qinhuai River; Social welfare

Is fresh water the unique water supply resource in crude oil refinery?

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ABSTRACT: The traditional concept of water supply resource in crude oil refinery was based on the fresh water, which could result in the low-efficiency water utilization in the water-stress condition. To solve the problem, the expanded concept of water supply resource was presented according to the crude oil refinery plant's water supply system analysis. The possibility of the water resources recycle was analyzed from the view of available resource according to the expanded concept. It provided an effective guide for water conservation and wastewater reduction in the crude oil refinery. And also, it provided the theoretical basis to accomplish zero wastewater discharge for petrochemical industry in the near future.

Keywords: Water resources; Water supply resource; Water allocation; Water recycle

Case study of drainage water classification for typical crude oil refinery

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ABSTRACT: The traditional crude oil refinery drainage systems were divided into the clean discharge water system and wastewater system. Old classification methods were not helpful to water network optimization. The typical crude oil refinery drainage classification was presented based on the water quality of all the point resource drainages. According to the possibility of drainages recycling, the drainage systems were classified to four levels and the recycle possibility summarized. This study is contributed to the primary analysis for water system optimization process and scheme to crude oil refinery.

Keywords: Crude oil refinery; Drainage water systems; Limiting concertration; Water system optimization

Operation models of wind-powered pumped storage system and case studies

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ABSTRACT: The actual operation for small simulation electrical network system, analyzed and summarized wind-powered pumped storage system were proposed as follows: WP is connected only with the PSS, WP is connected with both PSS and connected to the grid, WP only connected to the grid and to maximize the use of wind power resources in the target, the selected one of the ways a case study, research shows that the wind-powered pumped storage system is not only the full use of combined wind power resources in an effective way, but also improve the reliability of the grid and safety, with good economic efficiency and environmental efficiency.

Keywords: Wind-powered pumped storage station; Operation models; Model functions

Landscape pattern change research of land use in Chang-Zhu- Tan region based on fractal theory

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ABSTRACT: With the application of GIS technique, fractal theory was employed to study the change of Chang- Zhu-Tan Region in 1986, in 1995 and in 2005 three periods of land utilization landscape pattern data. The land landscape type degree of fragmentation, the fractal dimension and the index of stability have obtained. The results show: during 1986 to 2005, woodlands and paddy fields are dominant, formed a kind of spatial pattern of forest land surrounded the city. The fragmentation of woodlands and paddy fields is smaller, while the fragmentation of rural residents land and urban use is bigger. The fractal dimension value of paddy fields and aquatorium waters is larger, while the fractal dimension value of unused land and rural residents land is smaller. The stability of unused land, rural residents land, and urban use is stronger; the stability of paddy fields, aquatorium, woodlands is relatively weak.

Keywords: Land utilization landscape; Fractal theory; Stability index Chang- Zhu- Tan Region

Latent semantic index applied in question-answering system about agriculture technology

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ABSTRACT: In order to solve the existing problems in the function and business process of the agricultural knowledge question-answering system, this paper applied the latent semantic indexing technology to the agricultural knowledge question-answering system. This technology can enhance or reduce the influence of words in the document semantics and can make the semantic relationships between the documents more clear. And this technology realizes the natural language retrieval to a certain extent and eliminates the impact caused by synonymity and ambiguity of the words and obtains better search results.

Keywords: Latent semantic indexing; Agricultural knowledge; Questions and answers system

A laboratory study on dynamic evaporation of sand soil with a shallow water table

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ABSTRACT: Phreatic evaporation is an essential dicharge way of shallow buried groundwater, turning groundwater into soil water and atmospheric water. This laboratory study focus on dynamic evaporation when water table is gradually descending that induced by the evaporation. With decaying of water table, the evaporation rate will decreases as an function of the water table depth. An nonlinear correlation between the evaporation coefficient and the water table depth is observed in the laboratory experiment. This nonlinear correlation can be approximated by an exponential equation. A numerical modeling on Hydrus-1D is carried out to simulate the dynamic evaporation of

the sand column under the same boundary condition in the experiment. In the model the soil water retention curve is described as van Genuchten's equation in which the parameters are obtained though drainage experiment. Results of the model matches the observation of phreatic dynamic evaporation very well. This agreement between them indicates that the behavior of dynamic evaporation can be investigated fully with numerical method, instead of experiment method.

Keywords: Phreatic evaporation; Experiment of sand column; Hydrus-1D

Functions and values assessment of improving the living environment of comfort on urban forests

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ABSTRACT: The functions and values of improving the living environment of comfort on urban forests in Changsha were analyzed. the results showed that: urban forest could decrease effects of urban heat-island, with 2.7°C in fine days and 1.0°C in rain days, and raised air humidity by 12.88%; the comforable days increased 41.66%, and the more comfortable increased by 35.71%, so making the more uncomfortable days and the frowziness days decreased by 15.38% and 66.67%. the decreasing heat island effects was 10136853 × 104 yuan·a-1 × 104 Yuan·a-1, that of the air humidity value increased by 1832968.8 × 104 Yuan·a-1.,the total values was 11969821.8 × 104 Yuan·a-1. The conclusion showed that: the urban forest could improve small climate,and the living environment of comfort.

Keywords: Urban forest; Improving the living environment; Functions and values; Changsha city

The Status, problems and countermeasures of water resources management in chongqing rural area

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ABSTRACT: Water is a strategic resource for agricultural development, and it makes a crucial role for the development of agriculture. However, in recent years, because of the increasing of climate anomalies, many place suffered water shortage which affects the agriculture development seriously and food production stability. Although Chongqing has large of precipitation, it was affected by the water shortages, too. In my opinion, the lack of long-term planning in water resources management, the water pollution and waste serious are the mainly reasons for it. If we do more about scientific management in the rural area water management such as increasing the water repertory or pollution control effectively, we can effectively deal with the water shortages in rural areas in Chongqing and ensure the stable development of agriculture.

Keywords: Rural; Water resources; Water pollution; Scientific management

Analyze on factors affecting spatial distribution of ET based on MODIS image data

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ABSTRACT: Evapotranspiration (ET) is important for hydrologic cycle, and it is one of the most difficult tasks in the field of hydrology and water resources. In this research, ET was estimated based on MODIS image data, and the meteorological data provided by local meteorological stations, we calculated the ET in the source region of the Zaohuo River. Employing linear regression method to count the evapotranspiration trends in every pixel, we analyzed inter annual variation of evapotranspiration spatially. Using Geographic Information System, the impacts of temperature, surface land temperature, precipitation and NDVI (vegetation index) on evapotranspiration variation have been assessed. The results show that the rising temperatures with the Global Warming are the main factors to lead to inter annual evapotraspiration increasing. In space, Land surface spatial distribution of ET from south to north, from high altitude to low altitude mountain plain, faded as the groundwater depth, ET also become bigger. So we obtained that the groundwater depth is the most important controlling factor of ET. Findings of this study may be significant for finding out relationship between Surface Evapotranspiration and Water Table.

Keywords: Evapotranspiration; Remote sensing; MODIS; Zaohuo River basin

Establishment and enforcement of ecological compensation mechanisms around Fuxian Lake in yunnan province

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ABSTRACT: From the ecological compensation mechanism, this paper discusses how to establish and implement ecological compensation around Fuxian Lake. We believe that the ecological compensation for Fuxian Lake is the key to alleviate the contradictions between the economic & social development and ecological protection in Fuxian Lake Watershed. And through various forms of ecological compensation to protect Fuxian Lake, we can build a better ecological environment.

Keywords: Fuxian Lake; Ecological compensation mechanisms; Establishment; Enforcement

Optimal operation of supply water reservoir group based on decomposition-coordination method for large scale systems

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ABSTRACT: Optimal operation of reservoir group play a key role in rational allocation and effective utilization of water resources, the research bears both theoretical and practical significance. This paper regarding the water supply systems of Dapeng Bandao in Shenzhen city as the research subject, the regional water supply system is divided into four step subsystems according to the large system decomposition-coordination theory based on considering the hydraulic connection between water source engineering and water user. The authors set up a multi-objective programming model of the minimum water quantity diverting and consumption, and solve the model with dynamic program method. Through analysis the optimal operation results in different frequency inflow and different initial water storage capacity, the diverted water outside decrease with the reservoir initial water storage capacity increase, the average annual diverting water quantity is 4185 × 104 m^3. The model provide scientific basis for optimize regional water supply system.

Keywords: Optimal operation of reservoir group; Decomposition-coordination method for large scale systems; Multi-objective program; Dynamic program; Dapeng Bandao

How the runoff response to the climatic factors in the source region of the Yangtze River

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ABSTRACT: In recent years, especially after 1980s, climatic factors have varied more extremely and abnormally in the source region of the Yangtze River. As a typical sensitive area of climate change, to study the responses of hydrological variation has become more important to reveal relation between them. Combining with polynomial regression estimation (PRE), the Morlet wavelet transform (MWT) had been used to decompose annual runoff into various periods of 20 year and 7 year. Furthermore, based on the wavelet coefficients calculated between runoff and climatic factors, it revealed that 20 year period of runoff is only influenced by precipitation. And, in period of 7 year, its influence is greater than temperature.

Keywords: The source region of the Yangtze River; Runoff; Morlet wavelet transform; Climatic factors

Design of groundwater monitoring network in an ungauged catchment

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ABSTRACT: Groundwater monitoring data can provide an important basis for regional hydrogeological map compilation and the initial condition in groundwater modeling. Designing groundwater monitoring network is especially difficult in the area without or lack of observation data on groundwater. In this paper, a method to design and optimize groundwater monitoring network is proposed. Firstly, the referential water table distribution is generated through a rough numerical simulation with dense meshes. Secondly, the groundwater level is sampled from the modeling results at the nodes on an initially designed network, as a monitoring test. Then, a new contours of groundwater level is obtained with the monitoring test using Kriging method and the interpolation error is calculated through comparison with the referential water table distribution. With consideration of both the precision and investment, an optimal scheme among the alternative observation network is chosen. This method has been successfully applied in Hailiutu River Catchment, in Ordos Plateau, China.

Keywords: Groundwater level; Monitoring network; Optimization; Kriging interploitation; Ordos plateau

Region prediction of city water demand quantity based on partial least-squares regression model

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ABSTRACT: It is quite significant for the development of city to forecast scientifically the city water demand. The city water demand is influenced by many factors among which have multiple-correlation so that it can make some forecast results distort and make the adaptation of some formula weak. This paper adopts the method of Partial Least-Squares Regression to build up model, through applying the idea of Principal Component analysis and typical correlation analysis, and uses the method of component sampling to solve effectively the correlation of different factors and to establish the forecast model of city water demand quantity. Then it analyzes the model and finds that the fit and forecast accuracy of the model are better.

Keywords: Partial least-squares regression; City water demand; Prediction; Multi-collinearity

Development of integrated drinking water source protection in China

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ABSTRACT: With the living level of people has been greatly improvement, the safe of drinking water has become more and more taking into count. This paper examines the proposed approach to the planning and management of drinking water source protection. An institutional arrangement framework is used to facilitate comparison of the two initiatives with information coming from both analysis of policies and practices. The analysis reveals that source water protection largely occurred outside of the long-standing watershed planning process in China. Local involvement, a flexible approach, and linking the process of implementation to other land management initiatives are opportunities to realize synergies within the multi-barrier approach.

Keywords: Water source protection; Disease; Barriers; Challenge

A source water protection model based on geographic information system

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ABSTRACT: Consider the value of a dependable supply of clean, safe drinking water to the local economy, development opportunities, and quality of life. Source water protection plans can help drinking water systems and the communities they serve keep our drinking water safe. The analysis reveals that source water protection largely occurred outside of the long-standing watershed planning process in China. Although that's not the only reason for developing these plans, the local governments can involve in a flexible approach to realize source water protection.

Keywords: Water source protection; Model; Geographic information system

Study on the dynamic programming management model of groundwater with covariates

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ABSTRACT: Through the analysis of groundwater relation of mutual-feed joint-variation behavior process and its character, dynamic optimization groundwater management model containing covariates which solved using dynamic differential programming method is described. The groundwater system of Songyuan area in western Jilin province is taken as the case study. To solve the main relation of mutual-feed joint-variation problem, on the basis of simulation model, Qianguo Xian and Fuyu Xian was taken as important study area, groundwater dynamic programming management model with covariates was built using the state transition equation method and solved, then the optimal pumping amounts, the amounts of covariates and groundwater levels were obtained simultaneously. To sum up, this research expands the theory and method that dealing with relation of mutual-feed joint-variation in groundwater management model, so as to establish theoretical foundation and provide technical means for the solution of various practical problems.

Keywords: Groundwater management model; Differential dynamic programming method; Relation of mutual-feed joint-variation; Songyuan area

Double-wall cofferdam design construction of hero bridge

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ABSTRACT: Hero Bridge is an extraordinarily huge bride across northern branch Ganjiang River, in the city of Nanchang. Main tower adopted single column slanted pylon space twist face back cable structure. Its construction is based on double-wall cofferdam method. This literature introduces the design of double-wall cofferdam and key techniques in terms of platform underwater construction, which can be a reference for similar project.

Keywords: Hero Bridge; Double-wall cofferdam; Construction technique; Clanted pylon

Effects of river sediment on the biodegradation of organic pollutants in domestic sewage

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ABSTRACT: Complicated physical, chemical or/and biologic interactions exist between sediment particles and organic pollutants in natural water bodies on the water-sediment interface. The sediment plays an important role in the transportation and fate of pollutants. In the present study, two groups of sediment with different particle size sampled from the Yangtze River in China and the organic pollutants in domestic sewage was collected. Laboratory experiments were designed to investigate the effects of river sediment on the biodegradation of organic pollutants in domestic sewage using the method of carbon dioxide evolution test. The results indicated the biodegradation rate with river sediment were larger than that without sediment. The presence of sediment accelerated the biodegradation of organic pollutants. It implies that sediment may speed up the removal of organic pollutants from the domestic sewage and contribute to the ecological restoration in highly-polluted water body.

Keywords: River sediment; Biodegradation; Domestic sewage; Organic pollutants; Carbon dioxide evolution test; Biochemical oxygen demand (BOD)

Sensitivity assessment for soil hydraulic conductivity in a coupled surface-subsurface water flow model

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ABSTRACT: For coupled surface-subsurface water flow modeling, the soil layer is an important domain since it affects both the generation of surface runoff and water flux between surface and groundwater flow. There is a need to assess how the soil physical parameters affect the modeling results to help guide field measurements and model parameter estimations. This paper investigates the sensitivity of the modeling results in response to the soil hydraulic conductivity by performing a surface-subsurface water flow simulation for a sub catchment of Lake Taihu. Results indicate that soil lateral flow and groundwater recharge are the most sensitive flow components to the change of soil hydraulic conductivity. An increase in soil hydraulic conductivity results in an increase in these flows. An increase in groundwater recharge consequently causes the rise of groundwater table for the catchment, which induces more groundwater discharge to rivers as base flow. It is worthy to note that a change of soil hydraulic conductivity less than 30% does not cause a noticeable change in flow components. It is also interesting to notice that the model prediction accuracy of river discharge is not sensitive to the change of soil hydraulic conductivity, which implies that assessment of simulation accuracy and model validation using river discharge solely may not be sufficient for a surface-subsurface water flow simulation. Internal flow components are important and essential to use for a more reliable model validation.

Keywords: Soil hydraulic conductivity; Sensitivity assessment; Base flow; Groundwater recharge; Soil lateral flow; Coupled hydrological modeling, WATLAC

Performance and mechanisms of phosphorus removal from wastewater by Ca-contained waste

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ABSTRACT: Oyster shell and eggshell, which have high volume of calcium content, were used to removal phosphorus from wastewater. The phosphorus adsorption kinetics were examined, effects of pH adsorbent dosage as well as temperature on P removal were investigated. Adsorption mechanisms were discussed. Results showed that the pseudo-second order kinetic was fitted to the adsorption characteristics of oyster shell and eggshell; pH of wastewater showed great effect on phosphorus removal both with oyster shell and eggshell with the increasing of initial pH from 2 to 11, P removal efficiencies decreased from 98.2% to 50.9% with oyster shell, while from 97.3% to 23.7% with eggshell; the optimal dosage of oyster shell and eggshell was 0.5≈1 g/mg P, even when the initial P concentrations were different; the chemical precipitation of calcium and phosphorus was the dominating reaction.

Keywords: Oyster shell; Eggshell; phosphorus removal; Adsorption kinetics

Changes of water levels of Taihu Lake basin and influences of human activities based on IHA model

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ABSTRACT: This paper explores the influences of human activities on water level changes of Taihu Lake basin based on indicators of hydrologic alteration method. The results indicated that: First, the water levels of 1990s to 2000s are significantly higher than those of 1970s to 1980s and the increasing in non-flood season (October to April of next year) is bigger than that of flood season (May to September). Second, the hydrologic changes are the most significant in the highest and lowest water levels and the average water level from January to March among all the indicators of hydrologic alteration. Human activities represented by urbanization are the main factors causing these changes.

Keywords: IHA; Water levels; Taihu Lake basin

Theory research on creep constitutive model of rock considering temperature effect

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ABSTRACT: In the fields as reposition of nuclear waste, exploitation and utilization of geothermal resources, etc, the rock has the behaviors of the thermo-visco-elastic-plastic. Based on the rock model which consists of spring, dashpot and plastic elements under the condition of un-axial compression, the behaviors of the thermo-visco-elastic-plastic in rock are discussed, and the equations of the constitutive, creep and unload have been obtained, and this study gives an explanation of the rock rheological characteristics.

Keywords: Rock; Thermo-mechanical coupling; Creep; Unloading

Impact from EXTREME NATURAL DISASTERS on the economic system constituted by two Factors, three departments and four categories of residents — CGE model simulation

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ABSTRACT: A CGE model is built for the economic system constructed by two factors, three departments and four categories of residents and the impact effect of EXTREME NATURAL DISASTERS on this economic system is simulated by virtue of computer simulation. The fixed points of the economic system and the impact on distortion of general equilibrium of the economic system are computed by dint of MATLAB software and self-made program (genetic algorithm is adopted). Results: an EXTREME NATURAL DISASTERS may change the equilibrium price system (fixed points) of the economic system, the transaction costs of the economic system (in particular costs of property rights), residents' maximum utility and the department's equilibrium quantity through influence on employment resource quantity, demand structure, production structure, residents' real income and so on of the economic system. Conclusion: EXTREME NATURAL DISASTERS (Population and property damage) is the "negative value" production mechanism of the economic system with extreme high input-output rate.

Keywords: EXTREME NATURAL DISASTERS; CGE model; fixed point; Computer simulation; Impact effect

Development characteristic and tracer test of karst underground river in ShiPing No.1 mine

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ABSTRACT: Karst river of ShiPing No.1 mine in an ancient mining area of Bettywu is the main water filling source for mine water, mainly developed in the Maokou limestone of coal strata, karst of which is develop, strong water-rich. Through the early hydrogeological exploration, we have a certain understanding about the basic characteristics of the river development. We repeatedly expose a large water-guide collapse column or cave in the process of constructing which leads to water inrush. Through the statistics of the development regular pattern of underground limestone fissures, the plane path of underground river is modified. The tracer test confirms that water inrush points under the mine directly connect with the major underground river,

which is not only has practical significance for the prevention and treatment work of mine water, but also provides the basis for the comprehensive utilization of water resources in mining areas.

Keywords: Underground River; Karst development; Racer test; ShiPing No.1 mine

Study of China's groundwater resources utilization, problems and solutions

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ABSTRACT: The paper mainly discusses the development and utilization of groundwater resource. Combined with data, it analyzes the groundwater environmental problems caused by unreasonable exploitation, such as land subsidence, seawater intrusion, and groundwater pollution. Furthermore, the author put forward suggestions, including the strengthening of the monitoring of groundwater and improving water environment evaluation system; improving water management; promoting groundwater protection and enhancing groundwater resources Regional plan designing.

Keywords: Groundwater; Resources; Suggestions

Educational reform and practice of refrigeration unit curriculum design

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ABSTRACT: Refrigeration equipment is a practical course design and application are strong curriculum, teaching more difficult. Teachers should have the refrigeration equipment and automation technology research background, teaching content should be based refrigeration engineering, teaching methods should focus on theory and practice, and more about the case, the process of regression theory in practice, deepen their understanding of refrigeration theory, the understanding of the concept , the ability to provide students of engineering practice.

Keywords: Refrigeration equipment; Teaching reform; Case study

Assessment of climate change impact on the streamflow in Be river catchment, Vietnam

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ABSTRACT: A study of Be catchment was carried out to quantify the expected impact of climate change on the streamflow using a multimodel ensemble approach. Climate change scenarios (A1B and B1) were developed by ensemble four GCMs (CGCM3.1 (T63), CM2.0, CM2.1, and HadCM3) which showed good performance for Be catchment through evaluation of statistics between 14 GCMs control simulations and the corresponding time series of observations at annual and monthly level. SWAT (Soil and Water Assessment Tool), a physically based distributed hydrological model, was used to investigate the impacts on streamflow under climate change scenarios. The model was calibrated and validated using daily streamflow records. The calibration and validation results showed that the SWAT model was able to simulate the daily streamflow well, with Nash-Sutcliffe efficiency greater than 0.78 for Phuoc Long station and 0.65 for Phuoc Hoa station, for both calibration and validation at both daily and monthly scale. Their difference in simulating the stream flow under future climate scenarios was also investigated. Results indicate a 1.01–2.93°C increase in annual temperature and a 3 to -20% changes in seasonal precipitation corresponded to a change in streamflow of about 3 to -20%. The large decrease in precipitation and runoff are observed in the dry season.

Keywords: Climate change; SWAT model; Be catchment; streamflow

The evaluation of water resources in Shendong mining area

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ABSTRACT: Scientific evaluation of different water resources in coal mining areas is a premise that comprehensive utilization of water resources in large water-stressed coal mining areas, ensure sustainable development of social and economic in mining areas. Taking the shendong mining area for example, composition of water resources were analyzed in this area: water resources of research region consist of surface water resources, groundwater resources and mine water resources. Statistical method were used to compute amount of surface water resources and balancing method were used to compute amount of groundwater resources. The thesis evaluated water resources in shendong mining area in terms of water resources system.

Keywords: Water resources; Surface water; Groundwater; Mine water

Climate variability and vulnerability of rural people in Northern Ghana

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ABSTRACT: Issues of reducing the vulnerability of people and countries to the impacts of climate variability are high on the international agenda. The literature indicates that the poor and most vulnerable are most sensitive to climate variability. Moreover, other stressors which aggravate society's vulnerability to climate variability need to be taken into consideration in order to fully comprehend the effects of climate change. This study examines the livelihood strategies of three vulnerable communities in Northern Ghana, a region characterized by increasing climatic variability and climatic extremes. It also reviews Ghanaian governmental policies formulated to help the vulnerable deal with their challenges. The three communities are located in the Bongo District of Upper East Region in Northern Ghana. The research included semi-structured interviews of 45 households (15 households were interviewed in each community), semi-structured interviews of key informants, 6 focus group discussions (2) held in each of the three communities and finally a content analysis of Ghanaian policies on climate. The data collected were analyzed quantitatively and qualitatively using the Statistical Package for the Social Solutions Programme (SPSS). The study concludes that the government policies include strategies to address the needs of the vulnerable populace, but their impacts are not felt by those included in our research. We also conclude that there is an urgent need to put in place both structural and non-structural interventions necessary to address the potential impacts of climatic variability on poor rural communities, such as, improved infrastructure in the study area, community-based early warning systems and risk-transfer instruments such as index insurance experimented within some African countries.

Keywords: Vulnerability; Adaptation; Climate variability; Livelihoods; The vulnerable; Northern Ghana

One kind of new multimedia data memory structure

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ABSTRACT: The multimedia data includes formatted data and non- formatted data, it have brought about a lot of problems about administration of data and information. And it has produced very big effect and pound in the theory and method to tradition database. Relation database theory has driven database research and development. But it is not very proper in the field of handling the non- formatted data. But multimedia data is mostly composed of the non- formatted data. Facing information of large amount of non-regular, how carry out memory becomes the most important mission. The first part of the thesis analyses the problems that the multimedia data brings about to database memory aspect. At the basis of the method of analyzing the present multimedia data memory, the author puts forward one kind of document structure being suitable to multimedia data memory of the campus net. The final part sums up its advantages in brief.

Keywords: Multimedia data; Tradition database; Non-regular data; Memory