



[Home](#) | [Journal Papers](#) | [About CNKI](#) | [User Service](#) | [FAQ](#) | [Contact Us](#) | [中文](#)

Full-Text Search :



《Scientia Silvae Sinicae》 2003-01

[Add to Favorite](#) [Get Latest Update](#)
[Similar Journals](#)

# SIMULATING RAINFALL-RUNOFF PROCESSES BY GSH MODEL, A PHYSICALLY-BASED DISTRIBUTED HYDROLOGICAL MODEL

Yu Pengtao Xu Deying Wang Yanhui (The Research Institute of Forest Ecology and Environment, The Chinese Academy of Forestry Beijing 100091)

The ecological services of forests, especially water and soil conservation, vary spatially due to the spatial heterogeneity of physical geographical elements, such as topography, soil, vegetation, climate. Guansi River hydrological (GSH) model, a general physically based distributed hydrological model on watershed level, was established in this paper. In GSH model, the watershed was distinguished into different regular cells. Each cell was supposed to be homogeneous in canopy structure, litter composition and structure, land surface features, and soil characteristics which were defined as different layers in the model. GSH model calculated water movements through the canopy and soil layers in every cell of the watershed and simulated water flow among neighbor cells, including rainfall, canopy interception, absorption of litter layer, infiltration, evapotranspiration, subsurface runoff and surface runoff. It can be obtained from GSH model the change of water distribution in the watershed when using the change of physical elements in both spatial and temporal dimensions as input of the model. By using GSH model, rainfall runoff processes were simulated in Guansi River watershed, Sichuan Province, Southwest China. The simulated result agreed well with the measured data.

【Key Words】 : **Forest hydrology Physically based distributed hydrological model Ecological services of forest Spatial heterogeneity**

【Fund】 : 国家“九五”攻关项目“生态林业工程建设信息管理系统、效益观测与评价技术研究”(96-007-04-06)

【CateGory Index】 : S715


[Download\(CAJ format\)](#)

[Download\(PDF format\)](#)

CAJViewer7.0 supports all the CNKI file formats; AdobeReader only supports the PDF format.

## 【References】

Chinese Journal Full-text Database

9 Hits

- 1 WANG Miao-lin 1,2,FU Hua 3,GAO Pan-yu 1 1.Bureau of Hydrology and Water Resources Survey of the Upper Yangtze River,Chongqing 400014,China;2.Key Laboratory of Water Cycle and Related Land Surface Processes,Institute of Geographical Sciences and Natural Resources Research,CAS,Beijing 100101,China;3.School of River & Ocean,Chongqing Jiaotong University,Chongqing 400074,China;[Research review on the applications of geo-information science in the distributed hydrological model](#)[J];Journal of Chongqing Jiaotong University;2006-02
  - 2 Deng Xiangwen Kang Wenxing Tian Dalun Xiang Wenhua Yan Wende(Research Section of Ecology, Central South University of Forestry and Technology Changsha 410004);[Runoff Changes in Chinese Fir Plantations at Different Age Classes,Huitong,Hunan Province](#)[J];Scientia Silvae Sinicae;2007-06
  - 3 WANG Yan-hui~1,JIN Min~2,YU Peng-tao~1(1.Research Institute of Forest Ecology,Environment and Protection,CAF,Beijing100091,China;2.Chinese Academy of Forestry, Beijing100091,China);[The Environment Problems Related with Forest/Vegetation and Water Resources in China and Future Research Requirements](#)[J];Forest Research;2003-06
  - 4 ZHU Zhi-fang CHEN Lin-wu ZHANG Fa-hui(Sichuan Academy of Forestry,Chengdu 610081);[A Preliminary Discussion on Design of Distributed Hydrological Models in the Wuangcanggou Watershed of the Jialingjiang River](#)[J];Journal of Sichuan Forestry Science and Technology;2006-06
- ZHANG Sheng-tang~(1,2),KANG Shao-zhong~(1,3)(1.Northwest Sci-Tech University of Agriculture & Forestry,Xianyang 712100,China;2.Shandong University of Science and Technology,Qin Zhou)

- 5 forestry, Yangling 712100, China; 2. Shandong University of Science and Technology, Qingdao 266510, China; 3. China Agricultural University, Beijing 100083, China); [Grid cell runoff distribution model based on vector roughness](#)[J]; Journal of Hydraulic Engineering; 2005-11
- 6 Song Zigang(The Academy of Forest Inventory and Planning, the State Forestry Administration of China, 100714, Beijing, China); [Eco-hydrological effects of forests and decision-making for forestry development](#)[J]; Science of Soil and Water Conservation; 2007-04
- 7 NIU Yun, LIU Xian-de, ZHANG Hong-bin, GE Shuang-lan (Academy of Water Resource Conservation Forest of Qilian Mountains in Gansu Zhangye, Zhangye 734000, China); [The Water Balance of Picea Crassifolia Forests in Qilian Mountains Based on Spatial Data Structure](#)[J]; Remote Sensing Technology and Application; 2006-04
- 8 LIU Jianmei~(1,2), PEI Tiefan~1, WANG Anzhi~1, YANG Hong~(1,2)((~1 Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110016, China; (~2 Graduate School of Chinese Academy of Sciences, Beijing 100039, China); [Construction and verification of distributed rainfall-runoff model for forested watershed in alpine and gorge region.](#)[J]; Chinese Journal of Applied Ecology; 2005-09
- 9 LIU Fu-yun~1, WANG Zhun~1, ZHOU Yong-li~1, LIN Xi-hua~2, WANG Jun-jie~2(1. Sichuan Forestry of Academy, Chengdu 610081, Sichuan, China; 2. Gongxian Forestry Bureau, Xunchang 644000, Sichuan, China); [A Study of the Monitoring and Assessment of Soil and Water Loss in Cinnamomum petrophilum Plantation](#)[J]; Journal of Central South Forestry University; 2005-01

## 【Co-citations】

### Chinese Journal Full-text Database

10 Hits

- 1 ZHOU Wei-wei et al(Institute of Environment and Plant Protection, Hainan University, Danzhou, Hainan 571737); [Comparative Study of Forest Soil Infiltration and Water Storage Capacity of Eucalyptus Plantations, Rubber Trees and Secondary Forest in Hainan](#)[J]; Journal of Anhui Agricultural Sciences; 2009-14
- 2 JIN Bo\lwen 1, 2, \KANG Er\si 1, \SONG Ke\chao 1, \LIU Xian\de 2 (1. Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou Gansu 730000, China; 2. Institute of Water Resource Conservation Forest in Qilian Mountains, Zhangye Gansu 734000, China) ; [Eco-hydrological Function of Mountain Vegetation in the Hei River Basin, Northwest China](#)[J]; Journal of Glaciology and Geocryology; 2003-05
- 3 Xie Chunhua; Guan Wenbin; Wu Jian'an; Cheng Genwei; Luo Ji. College of Soil and Water Conservation, Beijing For. Univ., 100083 P.R. China.; [Interception capability of dark coniferous forest ecosystem in Gongga Mountain.](#)[J]; Journal of Beijing Forestry University; 2002-04
- 4 QI Shi~1; WANG Yun-qi~1; SUN Ge~2; ZHU Jin-zhao~1; XIAO Yu-bao~1; YANG Hai-long~1; Steve McNulty~2. 1 Key Laboratory of Soil and Water Conservation and Desertification Combating, Ministry of Education, School of Soil and Water Conservation, Beijing Forestry University, 100083, P.R. China; 2 Southern Global Change Program, USDA Forest Service, Raleigh, NC 27606, USA.; [Modeling the effects of reforestation on peakflow rates of a small watershed in the Three Gorges Reservoir Area.](#)[J]; Journal of Beijing Forestry University; 2006-05
- 5 WEI Qiang~(1,2); ZHANG Qiu-liang~1; DAI Hai-yan~1; GUO Xin~1. 1 College of Forestry, Inner Mongolia Agricultural University, Huhhot, 010018, P.R. China; 2 Gansu Forestry Science and Technology Research Academy, Lanzhou, 730020, P.R. China.; [Surface runoff and soil erosion of different vegetations in Daqing Mountain, Inner Mongolia](#)[J]; Journal of Beijing Forestry University; 2008-05
- 6 Yu Xinxiao; Chen Lihua; Zhou Changqing; Tan Peng(College of Soil and Water Conservation, BFU 100083); [Dynamic Simulation of the Process of Surface Runoff on the Sloping Field of the Three Gorges Under Rainstorm](#)[J]; JOURNAL OF BEIJING FORESTRY UNIVERSITY; 1995-04
- 7 Zhang Jianjun; Zhu Jinzhao; Wei Tianxing(College of soil and Water Conservation, BFU 100083); [Analysis on the Runoff and Sediment Yields of Soil and Water Conservation Forests on Loess Slope in the West of Shanxi Province](#)[J]; JOURNAL OF BEIJING FORESTRY UNIVERSITY; 1996-03
- 8 Wei Tianxing Yu Xinxiao Zhu Jinzhao (College of Soil and Water Conservation, Beijing For. Univ., 100083, P.R. China); [Litter Interception of Forests in Southwestern Shanxi Province](#)[J]; JOURNAL OF BEIJING FORESTRY UNIVERSITY; 1998-06
- 9 LIU Shi-hai YU Xin-xiao HU Chun-hong LI Guo-yuan( China Institute of Water and Hydropower Research, Beijing, 100044, China Northwest Science and Technology of Agriculture and Forest University, Shaanxi Yangling, 712100, China Beijing Forest University, Beijing, 100083, China); [Studies on precipitation distribution property of the water resources protection forest in the Miyun Reservoir](#)[J]; Beijing Water Resources; 2003-01
- 10 Chen Kai (The Office of Water and Soil Conservation of Bijie Prefecture, Bijie, Guizhou, 551700); [The Effects of the Performance of Water and Soil Conservation on hydrological Environment in Bijie Prefecture](#)[J]; Journal of Bijie Teachers College; 2004-02

### China Proceedings of conference Full-text Database

1 Hits

- 1 Wang Xiaojiang~2, He Kangning~1, Tang Daofeng~1 (1 Beijing Forestry University, Beijing 100086; 2 Inner Mongolia Academy of Forestry Science, Huhahaote 010010); [Study on Water Consumption Characteristics of Several shrubs affect factors in kubuqi sandland](#)[A]; [C]; 2008

## 【Co-references】

Chinese Journal Full-text Database

10 Hits

- 1 LIU Hui min 1, DENG Hui ping 2 (1. Anhui Meteorological School, 241000, Hefei, Anhui, China; 2. Department of Geography, Anhui Normal University, 241000, Wuhu, Anhui, China); [THE PROGRESS IN THE GLOBAL CLIMATE CHANGE IMPACT STUDIES](#)[J]; JOURNAL OF ANHUI NORMAL UNIVERSITY(NATURAL SCIENCE); 1999-04
- 2 WANG Jinye; CHE Kejun; YAN Kelin; WANG Yilin; HE Hongyuan; (Institute of Forestry for Water Conservation in Qilian Mountains, Zhangye 734000); [Analysis of the Runoff Components in the Forestry Areas of the Qilian Mountains and Their Temporal and Spatial Variation](#)[J]; JOURNAL OF GLACIOLOGY AND GEOCRYOLOGY; 1999-01
- 3 ZHAO Wen zhi, CHENG Guo dong (State Key Laboratory of Frozen Soil Engineering, CAREERI, CAS, Lanzhou Gansu, 730000, China); [Ecohydrology — A Science for Studying the Hydrologic Mechanisms of Ecological Patterns and Processes](#)[J]; Journal of Glaciology and Geocryology; 2001-04
- 4 WANG Shu-gong, KANG Er-si, LI Xin (Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou Gansu 730000, China); [Progress and Perspective of Distributed Hydrological Models](#)[J]; Journal of Glaciology and Geocryology; 2004-01
- 5 TAN Ge~1, XIA Jun~1, LI Xin~2 (1. Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China; 2. Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, Lanzhou Gansu 730000, China); [Hydrological Prediction in Ungauged Basins](#)[J]; Journal of Glaciology and Geocryology; 2004-02
- 6 ZENG Tao, HAO Zhen-chun, WANG Jia-hu (Water Resources Development and Utilization Laboratory, Hehai University, Nanjing Jiangsu 210098, China); [Modeling the Response of Runoff to Climate Change](#)[J]; Journal of Glaciology and Geocryology; 2004-03
- 7 Wang Yanhui; [A QUANTITATIVE STUDY ON THE BENEFITS OF BLOCK LOCUST \(ROBINIA PSEUDOACACIA L.\) ON WATER AND SOIL CONSERVATION IN THE EASTERN LOESS AREA IN GANSU PROVINCE](#)[J]; Journal of Beijing Forestry University; 1986-01
- 8 Liu Wenyao Liu Lunhui Zheng Zheng (Kunming Institute of Ecology, Chinese Academy of Sciences); [Preliminary Study on Hydrologic Function of Differently Structured Pinus yunnanensis Forests in Central Yunnan Province](#)[J]; Journal of Beijing Forestry University; 1992-02
- 9 Yang Jianying Zhao Tingning Sun Baoping Sun Lida (Department of Soil and Water Conservation, BFU); [Kinematic Wave Theory and Its Application in Slope Runoff Simulation](#)[J]; Journal of Beijing Forestry University; 1993-01
- 10 Cheng Jinhua; Zhang Hongjiang; Yu Xinxiao; Zhang Dongsheng; Zhao Yutao. College of Resources and Environment, Beijing For. Univ., 100083, P.R.China.; [Water holding capacity characteristic of ground cover and soil under pure Abies fabri forest on the Gongga Mountain.](#)[J]; Journal of Beijing Forestry University; 2002-03

## 【Secondary References】

Chinese Journal Full-text Database

7 Hits

- 1 Deng Xiangwen Kang Wenxing Tian Dalun Xiang Wenhua Yan Wende (Research Section of Ecology, Central South University of Forestry and Technology Changsha 410004); [Runoff Changes in Chinese Fir Plantations at Different Age Classes, Huitong, Hunan Province](#)[J]; Scientia Silvae Sinicae; 2007-06
- 2 Zhang Shengli 1, 2 (1. College of Resources and Environment, Northwest A & F University Yangling 712100; 2. National Forest Ecosystem Research Station in Qinling of Shaanxi Yangling 712100); [Annual Changes and Trends in the Water Quality of the Forest Water Supply Region for the Middle Line of the South-to-North Water Transfer Project — A Case Study from the Huoditang Natural Forest Area](#)[J]; Scientia Silvae Sinicae; 2008-02
- 3 Song Zigang (The Academy of Forest Inventory and Planning, the State Forestry Administration of China, 100714, Beijing, China); [Eco-hydrological effects of forests and decision-making for forestry development](#)[J]; Science of Soil and Water Conservation; 2007-04
- 4 LUO Tu-shou, LI Yi-de, CHEN De-xiang, XU Han (Research Institute of Tropical Forestry, the Chinese Academy of Forestry; Jiangfengling Long-term Research Station for Tropical Forest Ecosystems of State Forestry Bureau, Guangzhou 510520); [Study on the soil water conservation capacities of water conservation forest in baipenzhu reservoir of Guangdong Province](#)[J]; Ecologic Science; 2007-02
- 5 LI Yi~1, 2, SHAO Ming'an~2 (1. College of Water Resources and Architecture Engineering, Northwest Sci-Tech University for Agriculture and Forestry, Yangling 712100, Shaanxi, China; 2. State Key Laboratory of Soil Erosion and Dryland Farming on the Loess Plateau, Institute of Soil and Water Conservation, China Academy of Sciences & Ministry of Water Resources, Yangling 712100, Shaanxi, China); [Effects of rainfall intensity on rainfall infiltration and redistribution in soil on Loess slope land.](#)[J]; Chinese Journal of Applied Ecology; 2006-12
- 6 YANG Hong 1, 2, PEI Tie-fan 1, LI Zhong 1, WANG An-zhi 1, GUAN De-xin 1, JIN Chang-jie 1, ZHU Jiao-jun 1 (1. Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110016, China; 2. Graduate University of Chinese Academy of Sciences, Beijing 100039, China); [Numerical simulation of vertical one-dimensional water movement in unsaturated soil: A case study on coniferous forest brown soil on northern slope of Changbai Mountain](#)[J]; Chinese Journal of Applied Ecology; 2007-01

mountains[J];Chinese Journal of Applied Ecology,2007-01

- 7 YANG Hong<sup>1,2</sup>, LI Zhong<sup>1</sup>, PEI Tie-fan<sup>1</sup>, WANG An-zhi<sup>1</sup>, JIN Chang-jie<sup>1</sup>, ZHU Jiao-jun<sup>1</sup> (1Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang 110016, China; 2Graduate University of Chinese Academy of Sciences, Beijing 100039, China).:Soil hydro-physical properties under broadleaved Korean pine and dark coniferous forests on northern slope of Changbai Mountains[J];Chinese Journal of Applied Ecology;2007-02

©2006 Tsinghua Tongfang Knowledge Network Technology Co., Ltd.(Beijing)(TTKN) All rights reserved

