Texas A & M University and U.S. Bureau of Reclamation
Hydrologic Modeling Inventory
Model Description Form
June 2007

Name of Model: GBHM (Geomorphology-Based Hydrological Model)

Model Type: Physically-based distributed hydrological model

Model Objectives: Rainfall-runoff simulation, water resources analysis in large river basins

Agency and Office: Institute of Industrial Science, University of Tokyo

Technical Contact and Address: Dawen Yang, Ph. D.
Institute of Industrial Science, University of Tokyo
4-6-1, Komaba, Meguro-ku,
Tokyo, 153-8505, JAPAN
Tel: +81-3-5452-6381
Fax: +81-3-5452-6383
E-mail: yang@rainbow.iis.u-tokyo.ac.jp

Model Structure or Mathematical Basis: Flow interval-hillslope discretization scheme; physically based hillslope response model coupled with kinematic flow routing model

Model Parameters: Topographical parameters (hillslope length, angle, and elevation) estimated from DEM; soil water parameters estimated from field

Spatial Scale Employed in the Model: Non-constant hillslope size, less than 1-km in most case

Temporal Scale Employed in the Model: One hour

Input Data Requirements: Daily potential evaporation, hourly precipitation and air temperature

Computer Requirements: PC or Workstation

Model Output: River discharge at selected points, soil moisture, and actual evaporation

Parameter Estimation/Model Calibration: The anisotropy ratio of soil hydraulic conductivity, r_a, is not measurable, which needs to be calibrated.

Model Testing and Verification: Has been done in four Japanese catchments

Model Sensitivity: Hourly (or higher temporal resolution) hydrological responses are sensitive to the DEM resolution and the threshold area that used to extract the river network. The DEM resolution is suggested to be finer than 1-km; the threshold area is suggested to be less than 1-km^2.

Model Reliability: Stable for long-term hydrological simulations

Model Application / Case Studies: The Chao Phraya basin in Thailand, the Chaobai He catchment of the Haihe basin in China

Documentation: No

Other Comments: It needs GIS software (ARC/INFO) to support the pre-processes for preparing model parameters.