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A REVIEW ON RAINFALL RUNOFF MODELING

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Abstract: The use of rainfall-runoff models in water resources planning and management has become essential. These models are used, for illustration, in the design and work in Hydraulic structures, for flood forecasting and evaluating possible changes taken place over the catchments due to urbanization. The nature of catchment will impact the selection of modeling way to use. Catchment size, location within river basin, impact of tides, backwater, there are including in consideration. Runoff controlled by broad categories of factors: metrological factors and watersheds physical conditions. Watershed factors are like: size, shape, topography, soils, land use and hydrological condition. Runoff are playing important role in the hydrological cycle by returning excess rain to the oceans and controlling how much water flows into streams system. Modeling of runoff is helping to understand, control, and monitor the quality and quantity of water resources.

Keywords: Rainfall, Runoff, Planning, Hydrological Condition, Erosion, Catchment Area.

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INTRODUCTION

Rainfall-runoff model is standard tools designed for hydrological investigations. The rainfall runoff relationship is complex hydrologic phenomena and rain patterns, and the number of variables concerned in the modeling stream of the physical procedure. It is used for many Purposes such as for detecting climate change toward catchment response, design flood forecasting, flood estimate, water resource management. Estimation of land use change impact, and stream flow prediction. Because various interacting processes that involve in the transformation of rainfall into runoff are complex, therefore inspiring the real-world connection using rainfall-runoff model is difficult task. These models use undemanding complex data and simple calculations that are more suitable to apply at areas which have insufficient data record.^[1]

Rainfall scenario in India

Large amount of rainfalls is falling the months of the June and July. In India climate are different, summer after the monsoon is bring. Rain is fall down to different place to different amount in India. Rain is vital role in economy of nation. Economy of India is dependent on agriculture so the rain is help in economy of country. Irregular rain is damage to the reap failure and drought. In some parts of India amount of rainfall is too high where in some parts it is lesser like desert^[2].

Indian meteorological department is constructed 1476 rain gauge Stations, it helps measuring rainfall data of yearly and monthly. Each rain gauge station 3401 km apart from another stations. Amount of rainfall is different each states. Highest rainfall amount observe in Andaman Nicobar Island. Average annual rainfall in Andaman Nicobar island is 2967 mm. and in cherrapunji 11619mm, Agumbe is small town and it is located in Karnataka it receives average rainfall of 7691mm, mahabaleshwar is located in Maharashtra, it receives yearly rainfall of 5611 mm ,amboli is hill station and it is located in Maharashtra, it receives yearly rainfall of 7500 mm, plasighat is located in Arunchal Pradesh and it is receives yearly rainfall of 4388mm. Gangtok is located in Sikkim and it receives yearly rainfall 3737mm. wettest place on earth is Mawsynram and it is located in Meghalaya and it receives yearly rainfall of 11872mm.Least rainfall fall in india like western part of Rajasthan, Kuchchh in Gujrat, north part of Jammu and Kashmir. Spectacular cloud formation takes place in Western Ghats of India where early monsoon are an average of 2000-5050 mm of rain is experienced on the windward slope of the regions.^[2]



Fig. 1 Rainfall Scenario of India.

Source: www.indiaenvironmentportel.org^[2]

Rainfall Scenario in Gujrat:

Monsoon rainfall in Gujrat is dependent on the weather systems travelling through central India towards Gujrat and Rajasthan. In Gujrat, amount of rainfall in district and talukas are varies. In Gujrat, southern part like Surat, Valsad, Navsari, rainfall is fall in large amount. Kutch, central Gujrat, north Gujrat have received very less amount of rainfall so it is impact on national economy. Valsad is located in Gujrat and it receives highest rainfall 2357mm.^[3]



Fig. 2 Rainfall Scenario of Gujrat.

Source: rainfall in india.com

Literature review

Baxter E, Matthew C (2004): A real-time hydrologic modeling system to determine the hydraulic properties a selected geographic region. In a preferred embodiment, a drainage network of individual cells is created for the geographic region. The present investigation is directed to a method for producing a real-time hydrologic model for a geographical region. it comprises a cell. The cell comprise a plurality of soil parameters and a plurality of surface parameters. The present invention further includes a method for producing a real-time hydrologic property model for an environmental region. It is characterized by at least a cell. Finally, the present invention includes a method for determining runoff of a biological region for flooding and water resources management. Previous Method for determining runoff provides only estimations based upon assumed uniform rainfall valued over an entire watershed. [4]

Keith Beven (2009): The future in rainfall-runoff modeling is therefore one of the uncertainty. But this then implies a further problem as to how best to constrain that uncertainty. The clear reply is conditioning on data, making, special estimate where time and importance of a particular application allow. It is totally appropriate that this introduction is available rainfall-runoff modeling techniques must end with this focus on the value of field data, it will be that want to try to constrain the uncertainty in the local predictions to satisfy local stakeholders. The result will be implementation of models of everywhere as a learning and runoff modeling that has seen prediction in un gauged basin scheme of the representative elementary watershed concepts, the development of land surface parameters as boundary conditions for atmospheric circulation models, the much more widespread use of distributed conceptual models encouraged by the availability of freeware software such as swat, development in data assimilation for forecasting [5].

Sophie Du1chesn, (1995): the invention relates to such a modeling techniques rain-flow and more specifically relates to a method for determining a water flow at the outlet of a watershed. By watershed here means in accordance with international glossary of hydrology, the set of a region having a common outlet for its surface runoff and boundary by a also-called geographical boundary watershed line. The output therefore drains all the water moving on the surface of geomorphological entity that forms the watershed. Generally, a model for transforming the flow rain, allowing the simulation, predetermination or flow forecasting, Facilitates water resources management and assessment of the impact of human activities[6].

Jl yang, GI Zhang(2016):the utility model discloses a purify rapid infiltration layer system of rainfall runoff, including rapid infiltration layer pond body to reach the last district that intakes that sets gradually extremely down of this internal follow of rapid infiltration layer pond, hold back the district pack and distinguish and discharge and area, holding back district intussusceptions and being filled with and packing one. The district intussusceptions of packing

is filled with two the discharge area intussuseption of packing and is filled with and packs three and wherein, pack and biological charcoals filler in two bases that include the homogeneous mixing of packing pack including natural river sand, the biological charcoal of modified sheep excrement and the biological charcoal of modified pig manure. The utility model disclosed fillers structure is simple, and area is little and construction and running cost are low, and secondary pollution is little. In realize the rainfall runoff [7].

Ashish Bansode, K. A. Patil (2014) Ashish Bansode (2014) say about that rainfall and runoff are important components contributing significantly to the hydrological cycle, design of hydrological structures morphology of the estimation of direct rainfall-runoff is always efficient but is not possible most of the problem in conventional methods for estimating runoff. In this paper, modified soil conservation system (SCS) CN method is used for runoff estimation that considers parameter like scope, vegetation cover, area of watershed [8].

CONCLUSION

In conclusion, The Objective of this study was to examine how various rainfall measurement and spatial rainfall variability affect runoff modeling for a small catchment. The impact of runoff modeling is aspects of rainfall observation were considered; measurement and data processing errors, the influence of rainfall inclination, and spatial rainfall variability. After reviewing mentioned research paper, Rainfall runoff modeling analyzed by the help of the SCS curve number method.

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