

3rd International Conference on **Hydrology & Meteorology**

September 15-16, 2014 Hyderabad International Convention Centre, India

Scale problem: A stepping stone in hydrology

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This paper is intended to investigate the effects of surface storage elements on catchment response at a range of spatial scales and experimental settings. The spatial scales include small-scale laboratory experiments, small-scale field experiments and large-scale field experiments. Interaction of surface treatments, slope orientations, rainfall patterns and initial soil-water conditions on one hand and surface storage, and resulting effects on runoff response including timing of outflow hydrographs on the other hand, are considered at these spatial scales. From the analysis of runoff data, it is found that when there is no infiltration, depression effects can be detected in response, i.e., effects due to size of depressions and spatial location of different sizes. However, in light of lack of this information, one could not delineate and attribute such spatial effects to response. In the presence of infiltration, it is extremely difficult if not impossible to distinguish depression effects from infiltration effects on catchment response. As for the interaction between infiltration and surface storage, it becomes clear that one has to be very careful estimating effective infiltrability from apparent steady state response conditions. From modeling applications, the above field observations and subsequent assessments are verified and found to be quite consistent.

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Geospatial analysis of groundwater quality in Suri – I and II blocks, Birbhum District, West Bengal

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A study involving geospatial analysis of groundwater samples from the Suri I and II blocks of Birbhum district, West Bengal (latitudes 23.76°N–23.99°N and longitudes 87.42°E–87.64°E) was carried out to assess their suitability for drinking, domestic and agricultural purposes. For this study samples were collected from 26 (twenty six) locations during the post- and pre-monsoon sessions spanning over 2012 and 2013. Groundwater samples were analyzed for their physical and chemical properties using standard laboratory methods. Various water quality indices like SAR, SSP, RSC, MAR, PI and KR have been calculated for each water sample to identify the irrigational suitability standard. According to most of these parameters, the groundwater has been found to be well to moderately suitable for irrigation. In the post monsoon session exceptionally high RSC values for around 80% samples indicate an alkaline hazard to the soil. The Piper's trilinear diagram used to determine drinking water suitability depending on the water type indicates groundwater in the study is of CaHCO₃ type in post monsoon and CaMgCl/CaCl types in pre monsoon, and hence is suitable for drinking as well. Gibb's diagrams prepared for the post monsoon and pre monsoon sessions indicate that the overall hydrogeochemistry of the study area is dominated by rock – water interaction processes.

Biography

Shreya Das joined as a Research Fellow under UGS-BSR scheme for meritorious students after completion of her Master degree in Environmental Science from Asutosh College. She has participated in the final round of Young Scientist completion in the 100th Indian Science Congress in Earth Science Section.

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