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# BASIN AND RIVER DELINEATION USING SRTM DIGITAL ELEVATION MODEL

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## ABSTRACT

Conventionally basin and river network are delineated using topographic maps. Manual delineation on these data is cumbersome and error prone. Further, in the areas where the topographic maps are not available, the delineation cannot be done at all. In the situations, it is required to resort to other means for the thematic mapping. One of the most useful sources in such situations is the data generated in Shuttle Radar Topography Mission (SRTM). SRTM data were acquired in an eleven day mission of American Shuttle in February 2000. The data is available over the internet in GIS format.

GIS is a technology for input, manipulation, storage and output of the spatial data. Topography is represented through digital elevation models (DEM) in GIS. The DEM can be analysed in GIS for delineating basins and river networks. The thematic maps so prepared can be verified using other data sources, e.g., ETM+ data through visualization in GIS. The maps may require editing to correctly representing the feature on the earth surface. Basin and river delineation is done often automatically in GIS. For automatic delineation, various steps namely pit filling, flow direction, accumulation, watersheds and river delineation and vectorization are followed. The thematic maps so prepared require post processing. Stream delineation is in general good except in areas of narrow valleys, where DEM may be erroneous.

In this case study, the thematic mapping was done using SRTM version 4 data for Sankosh basin up to Sankosh MPP, Bunakha basins up to Bunakha HEP in

Bhutan and upper Sabarmati basin in India. Area of Sankosh and Bunakha basins are 9596 and 3540 sq. km respectively. A comparison is done between elevations at random points in the SRTM DEM and topographic maps. The maps were also compared visually. The mean elevation difference (Absolute) for Sankosh and Bunakha was 603 and 442 m respectively. The reason for large elevation difference was due to differences in the topography in the two maps. Stream delineation was near perfect in comparison to that depicted in the ETM+ data in the mountainously terrain in Sankosh and Bunakha catchments. In Sabarmati basin major differences were observed for few streams located in narrow valleys. To conclude, SRTM data provides a quick and viable alternative to prepare basin /channel network maps and DEM. Of course, some verification is always warranted in case of automatic delineation of streams and basins from SRTM data.