



Morphological Characteristics of Subansiri River, Assam

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Abstract

Subansiri is one of the major tributaries of the Brahmaputra in the north bank. The basin cover and are about 30,000 sq km where about area of 2700 sq km of the alluvial plain of Lakhimpur and Dhemaji districts of Assam and Subansiri districts of Arunachal Pradesh. The river which rise in the snowy part of the Himalaya enters into the plain near Dolongmukh and joins the Brahmaputra after flowing through plain southward for over 67 km. The river with its tributaries drain area of over 2200 sq km of Lakhimpur and Dhemaji districts and one of the most important tributaries of Brahmaputra in its north. Within the plains the width of the river varies considerably from less than a km to over 2 km at a place, the river channel is mostly meandering but is also braided and straight in some parts. The river channel bifurcates near Hechamara and reunites near Bebejia after flowing for 12 km, and western flow is known as Ghuna-Suti. The Subansiri river channel has shifted considerably during the last sixty years, near Chouldhowaghat it being shifted nearly 6 km westward since 1950. It is a perennial river: the snow melt account for most of the discharge during the dry season.

Introduction

The Subansiri rises beyond the great Himalayan range (Central Himalaya) having an average height of 17,000 ft. (5182m) and much of its catchment area falls in Tibet. This zone of the Himalaya comprises the high snow capped peaks which are about 140-150 km from the edge of the plain. In the higher reaches the Subansiri is flowing in an approximately east-west direction which is also the general trend of the ridges. In this zone the Subansiri is known as Tsari –Chu and is fed by numerous snow fed small tributaries mainly from north and south

The river cuts across the Central Himalayan ridge in which occur a series of high peaks 18000 ft. (5486m) and above and following a south easterly course along the Lesser Himalayan zone with an average height of 10000 ft and takes the Name Subansiri.

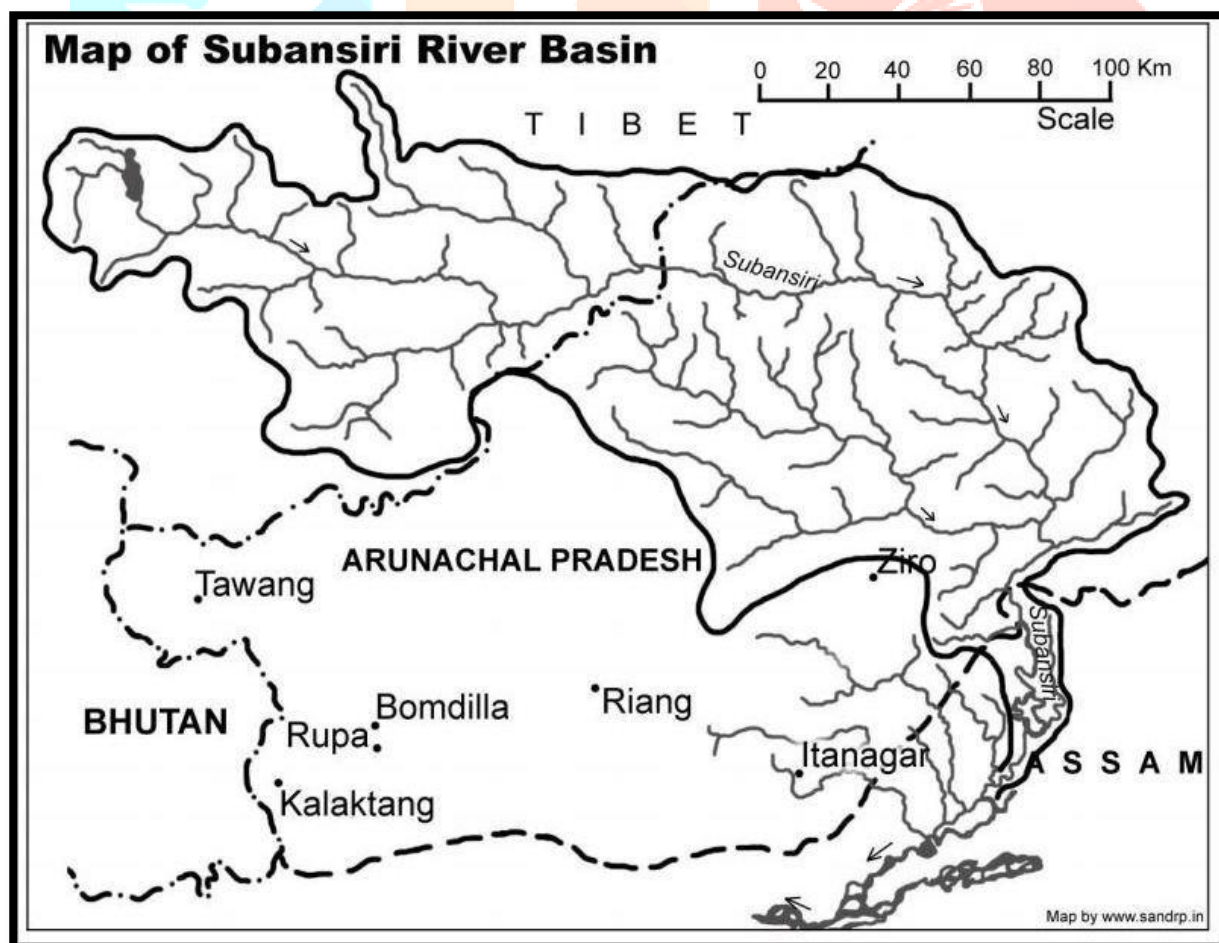
After traversing through the Miri Hills in the Outer Himalaya (Siwalik foot Hills) the Subansiri debouches in to the Plain of Assam near Dulungmukh. Before entering the plain Subansiri cuts a steep gorge of unique beauty through the Siwalik rocks of Arunachal Himalaya.

The total drainage area of the Subansiri River in the Himalayan terrain from about 18000 ft. In the Central Himalayan and Tibet to 500 ft. In the foot hills is about 30000 sq. Km. The total Length of the river in the mountainous terrain is about 208 km. The river bed fall from the height of 13800 ft. In the great Himalayan range to below 500 ft. Near Dulungmukh in the foot hills zone.

Through its journey from the central Himalaya to the Arunachal foot hills the Subansiri receives the discharge of numerous mountainous stream, big and small. The number of its tributaries are more in the Siwalik foot hills foot hill in comprised with other zone, Calculate from the survey of India topo-sheet, on scale 1:250,000 km. Subansiri can be classified in to 6th ordering stream.

Subansiri is a composite basin with two major sub basins viz. (i) The Ranganadi sub basin and (ii) Dikrong sub basin. Both these rivers originate in the Lesser Himalaya zones follow their courses through the hilly terrain and across the plain of Assam and finally meet the Subansiri before latter meets the Brahmaputra.

Location and extend: The Subansiri River Basin is located between $26^{\circ} 45'$ to $27^{\circ} 30'$ N. and latitudes $93^{\circ} 15'E.$ to $94^{\circ} 35'E.$ Longitude falls in the Survey of India topo-sheet no 82I/2, 82I/3, 82I/4, 82I/6, 82I/7, 82I/8, 83E/15, 83E/16 and 83J/1, 83J/5 which covers an area of about 30,000 sq km.



Geology: The Geology of the greater part of the north-eastern Himalaya is still to be explored and scanty information about the Himalaya is gathering only from the few earlier expedition and the line traverses recently carried out by the officers of Geological Survey of India.

From the available data it can be summarized that five major group of rocks occur in the Arunachal Himalaya. These are from the foot-hills to higher Himalaya.

- a) The Upper Tertiaries (Siwalik)
- b) The Coal-bearing Gondwanas
- c) A group of mainly quartzitic rock (Buxas)
- d) A group of low to high grade para-metamorphites with serpentinite and meta basic rocks
- e) The crystalline complex in the higher Himalaya

Hydrology: Of the total drainage area of the Subansiri river system only 1/8th part falls in the plains and the rest falls in the mountainous terrain ranging in height from 19,000 ft and above in the Great Himalayan Range to about 500 ft and below near the rege of the Arunachal foot –hills. As such various factors control the hydrology of the catchment area of the river.

The entire basin area is floored with Quaternary sediment brought by the Subansiri and its major tributaries from the Himalayan Mountain. The river emerging from the Himalayas are highly charged with sediments. Much of these get quickly deposited, once the river emerges into the plains. The sudden change of river gradient lowers the hydraulic of the rivers and causes the deposition. The Quaternary sediment of the area can be broadly classified into (i) Piedmont plain deposits (ii) Dissected flood plain deposits, as these two units have distinct lithological and morphological characteristic.

Glacial limit: The snow line or the limit of perpetual snow in Himalaya varies widely depending upon various local factors. The present snow-line varies in altitudes from about 14000 ft in the eastern parts to about 17000 ft in the Panjab Himalaya. More than 4000 sq km. Of the drainage area of the Subansiri falls in the zone of perpetual snow.

Sources of Surface Water: The surface in the Subansiri basin area is contributed by atmospheric precipitation, melting of the Himalayan snow and to limited extent, by groundwater discharge in the form of effluent seepage and springs. By far the most abundant source of surface water is the rainfall. The average annual rainfall in the area is 355 cm the major portion of which is transported to the Brahmaputra as source run-off. The surface water contributed by snow melts and spring discharges are also significant.

Rainfall: The principal rainfall in this part of the Himalaya occurs during the monsoon period between the end of May and October and rest of the year being comparatively dry. The maximum rainfall, on annual average of 500 cm takes places in the outer ranges of the Siwalik foot-hills region in a belt of 16 km width and the quantity gradually diminishes as one passes across the ridges. Behind the line of snowy peaks the rainfall is so small as to be scarcely perceptible for measurement. In the plains of Assam and Arunachal Pradesh the average annual rainfall is about 250 cm.

Vegetation: The dominant tree of the Himalaya foot-hills is the Chil or Chir (Pinus-----). Further north Sals (Shorea robusta) one of the most valuable of the green tree grow. Oak and Rhododendron are common in the higher elevation. Oak, Rhododendron begins at about 6000 ft and becomes abundant at a 8000 ft. Between 10,000 ft and 14,000 ft is many place it forms a mass of shrubby vegetation.

In the plains of Assam and Arunachal Pradesh fringing the foot-hills the vegetation predominantly consist of dense mixed semi-evergreen, evergreen the wet deciduous types because of the heavy monsoon rainfall, effective temperature and fertile soil, Among the evergreen the most common trees are Hollong, Nahar and Mekai etc.

Climate: There is perhaps no place in the Assam Valley and probably few in the plain of India, where the climate is more endurable than it is in the Subansiri Valley. The climate is on the whole cool and humid. In October the rain stops and the temperature begins to fall, the average maximum for the month being 32⁰C. During the four succeeding months the climate becomes increasingly cooler. In January the average maximum and minimum temperature are about 21⁰ and 10⁰ respectively. December and February are a little warmer. In March and April copious showers prevent the temperature from rising, the average minimum being only 15⁰ C and 17⁰C respectively, while the average maximum is under 15⁰C. The period from June to September is the only unpleasant part of the year. Maximum rainfall takes place during these month as a result of which the air blowing un saturated with moisture and the result climate is hot, though in comparison with other parts of India the mercury keeps fairly low. The period from May to September is the rainiest. More than 80% of the total annual precipitation takes place during this period. November and December are the direst months. The area is seldom visited by violent and destructive storms though and interval of dry weather in the rainy seasons is often closed by a thunder shower. Hail storms sometimes cause damage, especially to tea gardens, but are very local in their sphere of action.

Morphology of Alluvial in the river: In the Subansiri Basin there are innumerable stream which after traversing the Arunachal Himalaya debouch abruptly into the main valley. Of these there are three major stream namely the Subansiri, Ranga and Dikrong which ones comes across while moving from east to west; the last two join with the Subansiri much above the confluence of the Subansiri with the Brahmaputra.

The Subansiri after debouching into plains valley close to Dulangmukh flows for a distance about 72 km. In a approximately north-south direction and then it takes a south westerly course till it joins with the Brahmaputra. Near Dulangmukh an easterly flowing Dulang nala find its way inti it. About 3 km west of Bordeobam Tea Garden it throws off an off-shoot Ghuna-Suti which after taking a semi circular path flows in a meandering pattern and joins with it about 4.8 km west of Lalungaon. The meandering Ghagar nala flowing roughly in a north-south direction meets the Subansiri about 3 km south-west of Achharakata. The highly meandering Kherikhutia Suti- a spill channel of the Brahmaputra which flows in

a NNE-SSW direction joins with the Subansiri about 5 km. North –east of Nagargaon. From this points of confluence to downstream the Subansiri is also otherwise known as Lohit.

The Ranga Nadi emerging into the plains near Jaihing follows approximately a north-westerly course for a length of about 8 km, followed by a south-southerly course for a distance of about 16 km. In the subsequent reach of roughly 35 km for half of the distance it takes a north- south course and in the next half of a north-westerly course . The remaining part of the Ranga Nadi takes approximately west-south-west course. During its long journey it receives water from the meandering streams like Singra, Pabha, Boka and the Gerala in descending order from north to south and about 6 km north-east of Bedati it debouches into Subansiri.

The Dikrong debouches into plains near Doimukh. It joins the Subansiri west of Bedati after traversing a distance of over 46 km. From the foot-hills to the confluence it follows a north-westerly, west-north-westerly, north-westerly and ultimately a southerly course. The distance covered by the above directions has approximately 11, 13, 17, and 3 km respectively. It receives the water of the gently at a point about 5 km south of Nij Laluk.

The approximately length of the three major streams i the alluvial plain area as follow: Subansiri about 173 km Ranga Nadi about 80 km. and Dikrong about 48 km. These are mainly meandering river.

Conclusion: The Subansiri is a one of the largest tributaries of the Brahmaputra. Every year devastating floods take place in the Subansiri river, in multiple waves and flood much loss of life and properties. The devastating floods of the Subansiri very badly affect the economy of the area. The erosion of the river mainly of bank-eating types makes the situation worse.

The catchment area of the Subansiri in the mountainous terrain is very extensive. The fall of gradient of the river beds is quite steep. The fall is from 4700 to 150 m in a distance of 100 km to 150 km. The Subansiri and many of its tributaries in the upper reaches ar fed by melting of ice, About 4000 sq km of it catchment area in mountainous regions beyond the snow line. The fall of gradient from the foot-hills to Brahmaputra river in the south is very low. Nearly 90% of the total annual precipitation is discharge a surface run-off. This indicates the low absorption capacity of the sediments. Therefore reduction of surface flow by induced recharge will be of marginal significance.

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