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HYDROLOGICAL AND LINEAMENTS FEATURES OF UPPER TUNGA PROJECT AT GAJANUR, SHIMOGA DISTRICT, KARNATAKA

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Abstract:

The lineaments are linear features of geological significance extending in length over a Kilometer or more, the lineaments are expressed as a subsurface phenomenon. Lineament based on Land SAT imageries are presences of N 10^0 E trending lineament found towards the east of the dam site area, a few technical reports are available for a preliminary understanding of the hydro geological conditions. The hydrogeology of the Tunga River has been studied with the help of Indian remote sensing imageries the study of subsurface conditions are developed were done by Indira (1988). Integration with the seismic data has shown that seismic activities have been found to occur in the vicinity of NNW – SSE to NW-SE trending major lineaments.

Key Words: Lineaments, Interpretation, Subsurface, Land, Imageries, Hydrology, Tunga River, Remote Sensing & Seismic Data

Introduction:

The Tunga river is a tributary of mighty river Krishna born in Western Ghats on a hill known as Varaha Parvatha at a place called Gangamula. The river flows through two districts is Karnataka, Chikmagalore and Shimoga. The river has a length of 147km from its origin and merges with Bhadra river at Kudli. The study area in and around Upper Tunga project to have witnessed for the geomorphic. Rejuvenation, Lineaments studies indicate two dominated trends of lineaments in NNW-SSE and NNS-SSE direction. The graben originate due to "Tensile stresse's in the directions of 35^0-215^0, the high intensity of lineament intersection points have been observed over geomorphologically high terrain and low intensity over low areas, the majority of landforms as such appear to be dominated by endogenic process, the geophysical approaches have helped extend the basement configuration below the sedimentary fill.

Location of Upper Tunga Project:

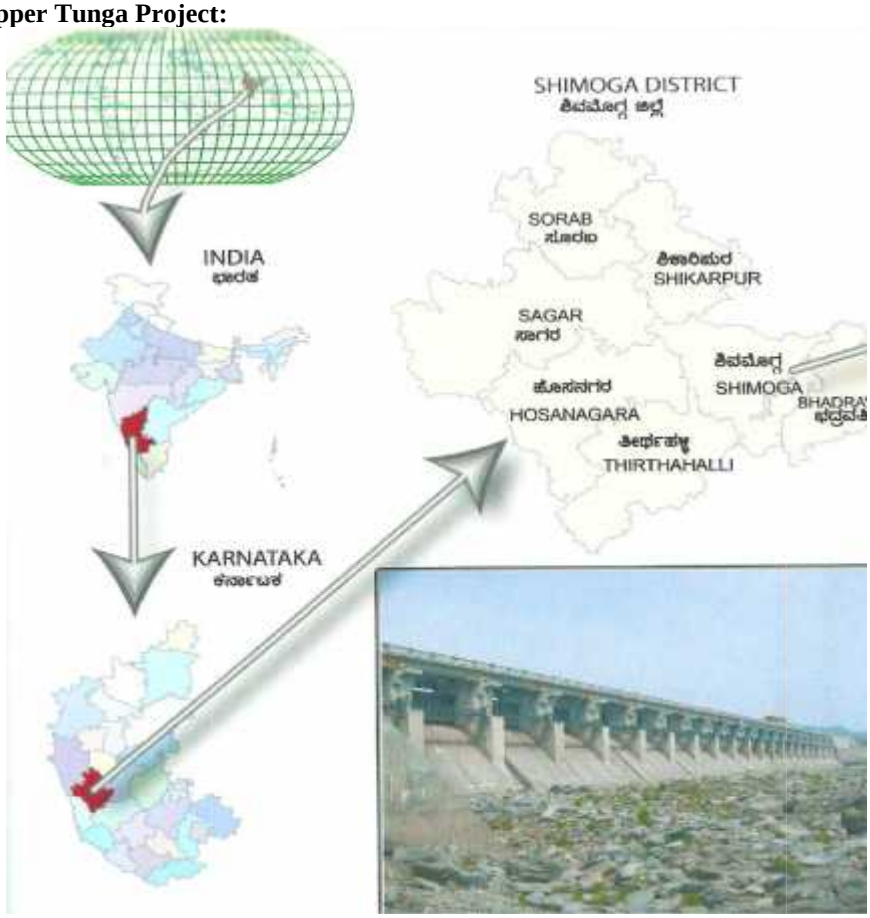

Figure 1: Location of Upper Tunga Project

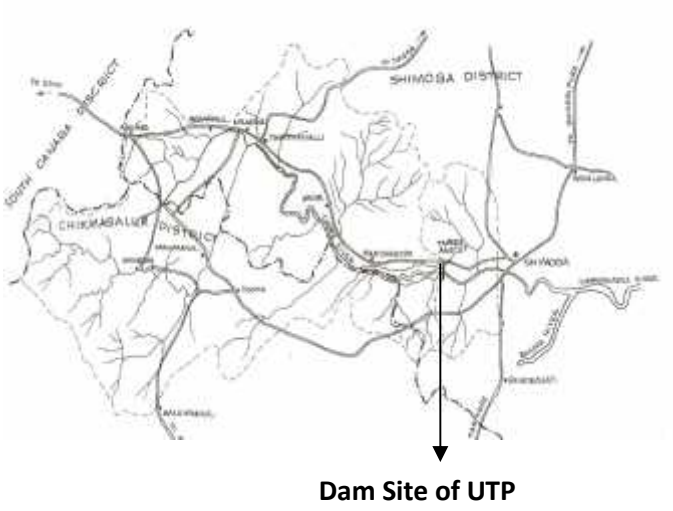

Figure 2: Dam site of UTP

Lineament Map of Tunga River Basin:

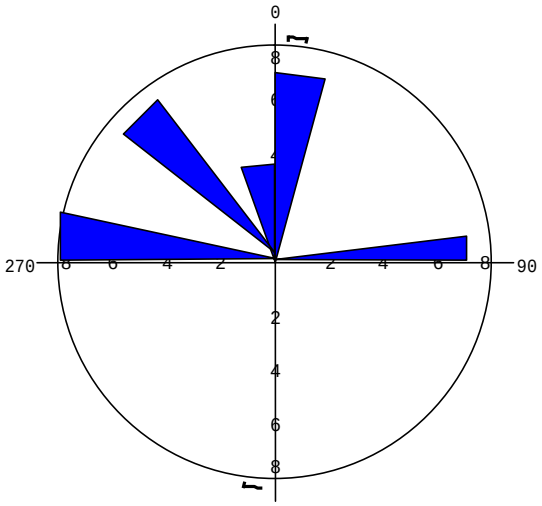

Figure 3: Lineaments Rose Diagram

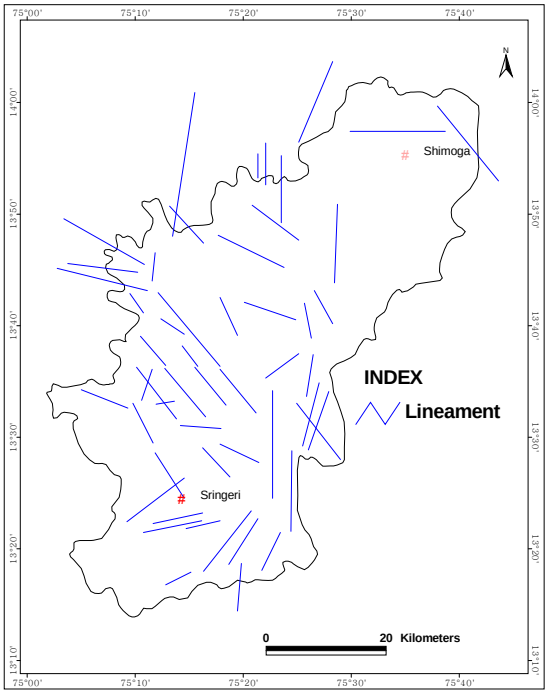

Figure 4: Lineament Map of Tunga River Basin

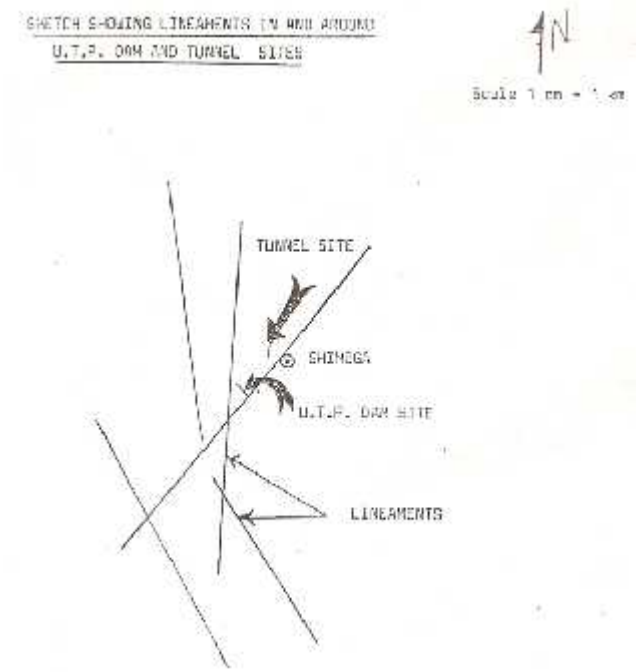

Figure 5: Lineaments in and around dam site

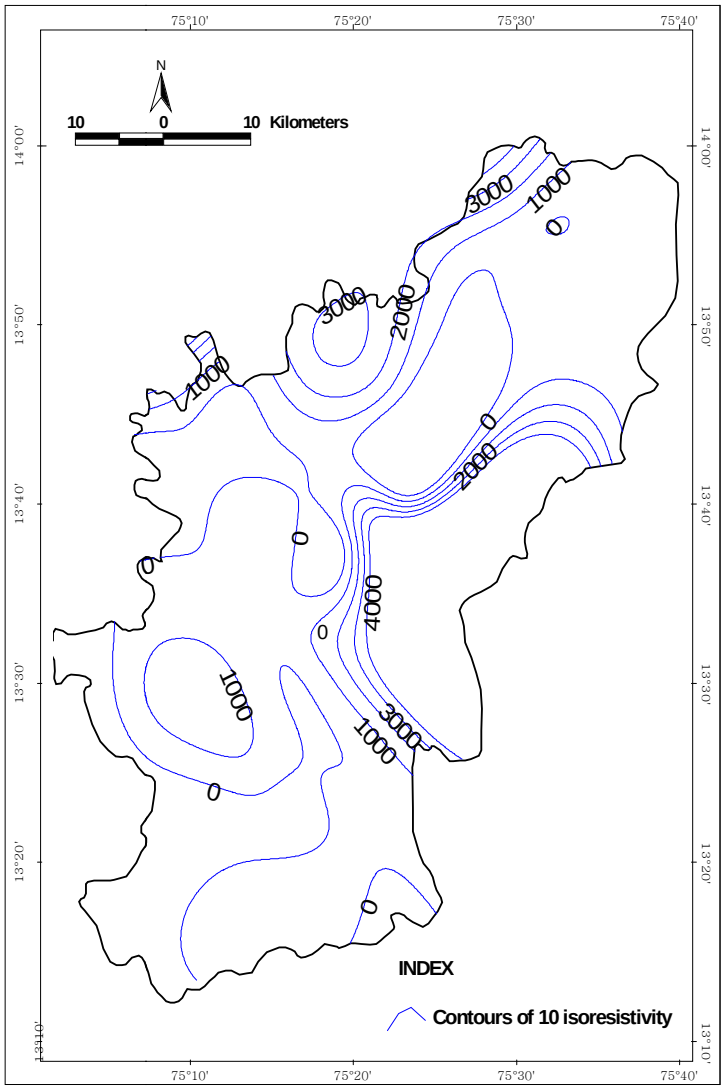

Figure 6: Tunga river system aquifer

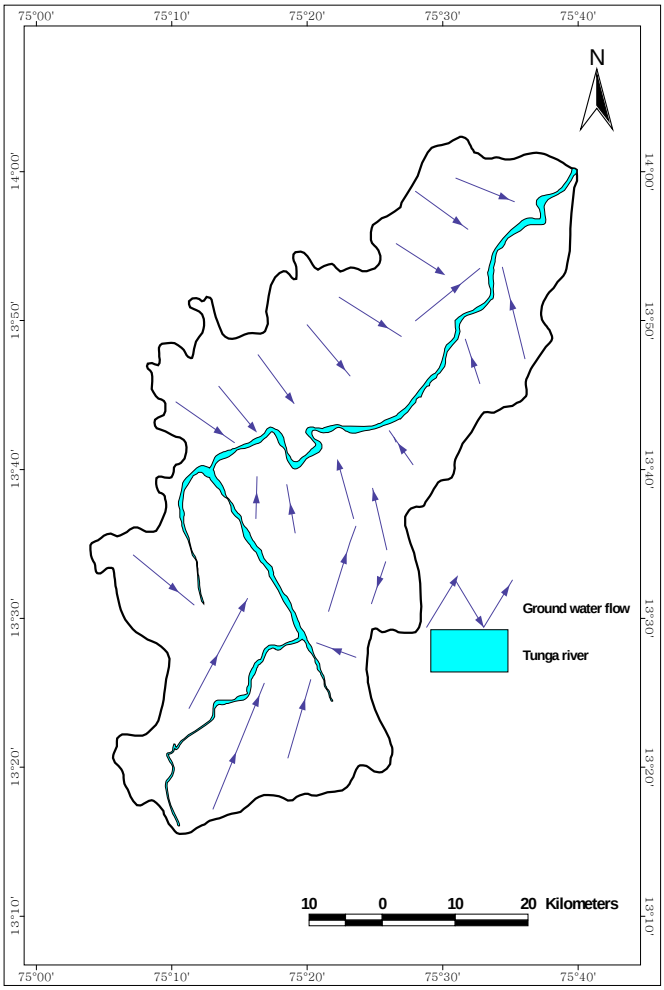

Figure 7: Groundwater flow direction of Tunga river system

Discussion and Results:

For long the Southern Peninsular was considered as seismically stable area. But earthquake which occurred since 1993 having magnitude of 4 and above of Mercalli scale have throw a light that most of the earthquake have occurred in the vicinity NNW-SSE to NW-SE trending major lineaments. This indicates that a moderate to high seismic activity is wide spread in the area. The proximity of this activity to major lineaments again indicates that some time or the other they have been reactivated (NRSA) 1981).

Water Table:

"Ordinarily the soils and rocks are saturated with water below a certain depth. The top of this saturated zone is known as the water table. "The gradient of the water table at any place is a function of the size and number of the interstices or openings in the ground and the quantity of water. A steep water table thus indicates tight ground with small interstices, or very large quantities of water;, conversely, a flat water table indicates large openings in the rocks or very small quantities of water.

- ✓ The water table usually slopes with, but less steeply than the land surface. The slope is away from the sides and towards the center of the valley.
- ✓ The water table varies with its proximity the canyons controlling large or small drainage areas. The water table will be higher in that portion of valley close to canyons controlling large drainage areas.
- ✓ The level of the water table changes with the season. This is due to the difference in amounts of water taken into, and to the difference in rate at which the water is discharged from the zone of saturation with different seasons. The amount of change at different points will depend upon number of factors. These factors should be investigated.

Water Table Contours:

The water table contours can summarize the information about the state; extend of the zone of saturation, gradient, direction of movement of groundwater, the places or zones of outflow from and inflow into the groundwater system. Representation of water table by conventional contour maps showing the elevation of water level above mean sea level is rather generalized in nature, being not capable of bringing out the pertinent features of the dynamics of groundwater flow and is often liable to subjective errors (Biswas *et al.*, 1967). This

is true in the case of hard rock areas like Tunga basin where groundwater occurs in the weathered, jointed, fractured and fissured pockets with variable dimensions.

Effect of Geology on Regional Flow System:

Subsurface stratigraphy and the resulting variations in hydro geological parameters can also make a large number of deviations in the flow regime. The tertiary sediments as well as alluvium of the basin are the promising potential zones where the flow conditions would be normal. The existence of quartzite hills controls the geometric configuration of the aquifer media and also the flow characteristics to be considered for stream-aquifer interaction.

Conclusion & Recommendation:

According to geophysical survey results, the depth to bedrock is varies between 3.00 m and 18.00 m and the rock type in the dam site area is chlorite schist and further downstream at some places gneisses and granitoids were exposed. The schist rock is fresh and hard with veins of quartz. The chlorist schist trend of N 30°W-S 30°E, the schist exhibits minor folds. For long the southern peninsular was considered as seismically stable area. But earthquake which occurred since 1993 having magnitude of 4 and above of mercalli scale have throw a light that most of the earthquake have occurred in the vicinity NNW-SSE to NW-SE trending major lineaments. According to Lineaments, structures, rock formations are not affected to the foundation basement construction of Upper Tunga Project therefore, the stability of basement rock formation is strong from compressive strength for foundations construction and to predict the stability of the dam site as well as storage and load bearing capacity is holds good and in this study area there is no difference between horizontal and vertical displacement at dam site.

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