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STUDY OF QUATERNARY SEDIMENTS AND CLAY MINERALS OF MANJRA RIVER NEAR DIGHUL, BEED DISTRICT

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ABSTRACT:
The present work is carried out to study the field and laboratory investigation of Quaternary sediments of Manjra River near Dighul, Beed district. For this work extensive field work has been carried out in and around Dighul, Beed District. An attempt has been made to study the structural, geographical and lithological features of the sediments. The studies have found that the Deccan trap of age from Upper Cretaceous to Lower Eocene is found at the base of soil and Quaternary sediments. Samples have been collected from the field work for the laboratory investigations while carrying out the field work. The laboratory investigation includes the study of pH, sieve analysis and Granulometric studies. The studies have found that the flow regime is turbulent and it is mixture of varying size of sediments based on the nature of sediments. Beside this turbulent flow regime occurred at some places and also the flow is suddenly changed to stagnant, represented by the fine sediments. Beside this illite is the main clay mineral found in the study area. The overall investigations manifests that sediments of the study area are river transported in nature.

Keywords :- Quaternary, Dighul, Deccan trap, Sieve analysis, Granulometric.

INTRODUCTION :

The present work has been carried out to study the field and laboratory investigation of Quaternary sediments of Manjra River near Dighul. The various studies on geographical, lithological and structural mapping of a limited area and Quaternary sediments have been carried out from the upper and lower Godavari sediments by handful of workers from the area. This prompted the author to take up the similar studies in Manjara River. Hence, the area near Dighul was selected for the present studies. The field observations were made and samples from various sections were collected. Sediment supplies from continental sources to adjoining river are gently influenced by climatic and tectonic variables at various spatio – temporal scales (Milliman and Meade, 1983; Vaithyanathan, et. al. 2002; Wasson, 2003, Chakrapani, 2005). Relating the sediments characterizes to their provenance/ source is, therefore, essential to understand the mechanism of transport and sediment flux in the study area. Mineral magnetism method is used for such studies to characterize the sediment source, sediment dispersal and sediment mixing patterns amongst variety of depositional environments. The following pages incorporate the work carried out for the various parameters of sediments to understand their source and depositional regime. First the geological field work subsequent to laboratory work is explained respectively.

STUDY AREA:

Present study area is located near Dighul in Beed districts of Maharashtra. The area fall on the Survey of India Toposheet No. 47 N (Beed) and 56 B (Osmanabad). This can be reached by National High No. 561 by Road. The field locations can be reached by motorable road in all seasons. The

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river flows from west to east and the villages are on the either sides of the Manjra River. The samples were collected from Dighul (18⁰ 48' 168" N) (075⁰ 32' 237" E). The Manjra river is a tributary of the River Godavari. It passes through the states of Maharashtra, Karnataka and Telangana. It originates in the Balaghat range of hills near Pathardi in Ahmednagar District at an altitude of 823 meters (2,700 ft) and empties into the Godavari River. It has a total catchment area of 30,844 square kilometers (3,084,400 ha).

LITERATURE REVIEW:

As a first part of the research work all the available information about the area was collected from the various sources. The published and unpublished geological literatures, on the main as well as surrounding area were consulted and collected. This has enabled to get acquainted with the regional geological setting. The Mineral magnetic Characterization of the Godavari River and Western Bay of Bengal Sediments was carried out by Kulkarni et al. (2015). The similar work and the sedimentological work specially on Quaternary sediments has not been carried out on Manjara River. However, work on various geological – particularly sedimentological aspects was critically carried out by Rao(1982), Sonam and Kale(1993), and Deshpande (1998 and references therein).

GEOLOGY:

The Deccan basalt geology has been explained by several geoscientists for various parts of Maharashtra (Table. 1). The surrounding parts of the Manjra River are covered with black cotton soil, at places it is with grey and brownish coloured. The Deccan basaltic flows are spread over the longer distances on either side of the river. The Quaternary soil is mainly exposed in river flood plain and along the river in the river bed. In general The Deccan basalt of Upper Cretaceous – Lower Eocene is overlain by recent alluvium.

METHODOLOGY:

The collected samples were brought to laboratory for analysis of various parameters viz. sieving, pH, clay mineral analysis, cumulative curves, textural parameters. For understanding the depositional environment of sediments, the source rocks of the sediments, to know fossils content if any. From the river, various beds sections were taken, and care was also taken to avoid contamination of samples from different beds or levels. The collected samples were properly packed and brought to the laboratory then these were subjected to various analyses in the laboratory. The collected samples were brought to the laboratory for analysis of various parameters viz. sieving, pH, clay mineral analysis, cumulative curves, textural parameters. For understanding the depositional environment of sediments, the source rocks of the sediments, to know fossils content if any.

RESULT AND DISCUSSION:

Location 1 : (Dighul)

Lat. – Long. : 18⁰ 48' 168" N , 075⁰ 32' 237"

Situated in plane area. Boulders rocks are not present in more quantity. Pebble shape angular grains are present. Here only two sections are present S1 and S2. In S1 clay is present and it is not thick. In S2 clay to Very coarse sand grains are present it means that the situation may be medium in flow.S2 is very thick, and 150 – 200 cm in thickness.

CONCLUSION:

From the above data it is observed that all the beds formed in the river are of river sediments it is clear from the Moiola, Weiser and Friedman graph. In the studied samples percentage of Illite mineral is more. Sediments are very poorly and moderately sorted and they shows high percentage of strongly fine skewed type of sediments, it means generally sediments are

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extremely platykurtic. The sediments also can be said that they were less transported.

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Table 1. Stratigraphy of Deccan Basalt –After Beane et al. 1986, Bodas et al.1988, Cox and Hawkesworth, 1985, Subbarao and Hooper, 1988 and Khadri et al. 1988.

Sub group	Formation	Member / flow
WAI	Desur	
	Panhala	
	Mahabaleshwar	
	Ambenali	
	Pladpur	
LONAVALA	Bushe	
	Khandala	
	Bhimashankar	Monkey hill GPB Giravalli GPB
	Thakurvada	Thakurvadi chemical type Water type member Thakurvadi chemical type High TiO_2Thakurvadi basalt Thakurvadi chemical basalt Jammu patti member
KALSUBAI	Neral	Tunel type basalt Neral chemical type Termbre basalt Neral chemical type Ambivili pierite basalt
	Igatpuri	Kashele GPB Nilamati
	Jawhar	Thalghat GPB Juni Jawhar Val river Golbhan phyric Devbandh Khardi phyric

Table 2: Coloration and identification chat.

Clay mineral present	Clay suspension Methylene blue	Clay suspension + Methylene blue + KCl	Nature of the residue At the bottom of test tube
Kaolinite	Violet	Violet	Dense & compact
Illite	Violet – blue, Blue- sky blue	Blue, Blue Skyblue	Dense & compact
Montmorollinite	Violet	Blue, skyblue, Green	Jelly- like
Bedeilite	Green	Green	Jelly- like

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Table 3. Sieving Data

Sieve scale	7	16	30	60	120	240	270	total
Φ scale	-2	-1	1	2	3	4	5	
L4 / 1 / a	114.680	151.233	103.374	-	1.343	1.790	16.381	388.801
L4 / 1 / b	6.174	21.016	71.451	-	10.502	22.058	219.562	350.761

Table 4, a

Sieve Scale	Frequency %	Cumulative %	Φ Scale
7	29.50	29.50	-2
16	38.90	68.4	-1
30	26.59	94.99	1
60	-	-	2
120	0.35	95.34	3
240	0.46	95.8	4
Pan	4.21	100	5

Table 4, b.

Sieve Scale	Frequency %	Cumulative %	Φ Scale
7	1.76	1.76	-2
16	5.99	7.75	-1
30	20.37	28.12	1
60	-	-	2
120	2.99	31.11	3
240	6.29	37.4	4
Pan	62.60	100	5

Table 5.Granulometric table

Sample No.	Mz φ	Type of sand	σi φ	Vc	Ski	Vc	Kg	Vc
L4 / 1 / a	2.66	F. sand	0.69	Moderately sorted	0.20	F. skewed	0.78	Platykurtic
L4 / 1 / b	2.53	F. sand	2.23	V. poorly sorted	0.29	F. skewed	0.83	Platykurtic

Table 6. pH :

L4 / 1 / a	7.86
L4 / 1 / b	7.5

Table 7. Clay mineral analysis :

Sample	Clay suspension Methylene blue	Clay suspension + Methylene blue + KCL	Nature of the residueof the bottom of the test tube	Clay mineral present
L4 / 1 / a	Blue	Blue	Dense and Compact	Illite
L4 / 1 / b	Blue	Dark Blue	Dense and Compact	Illite

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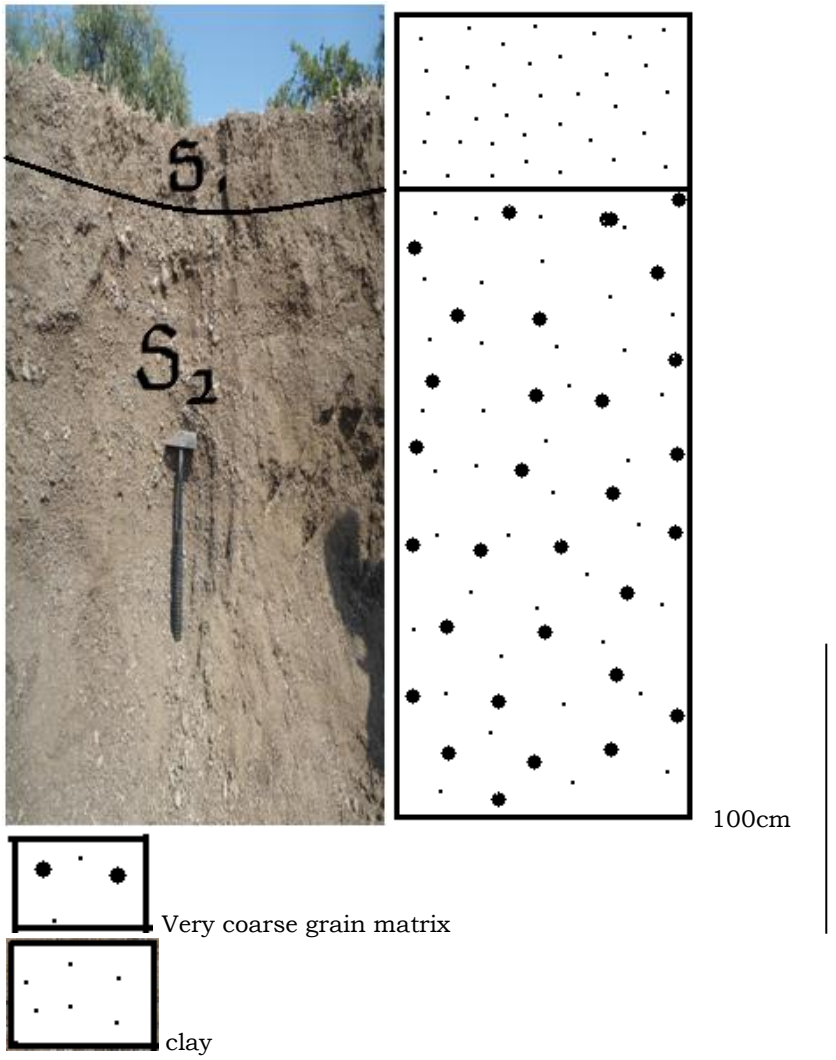
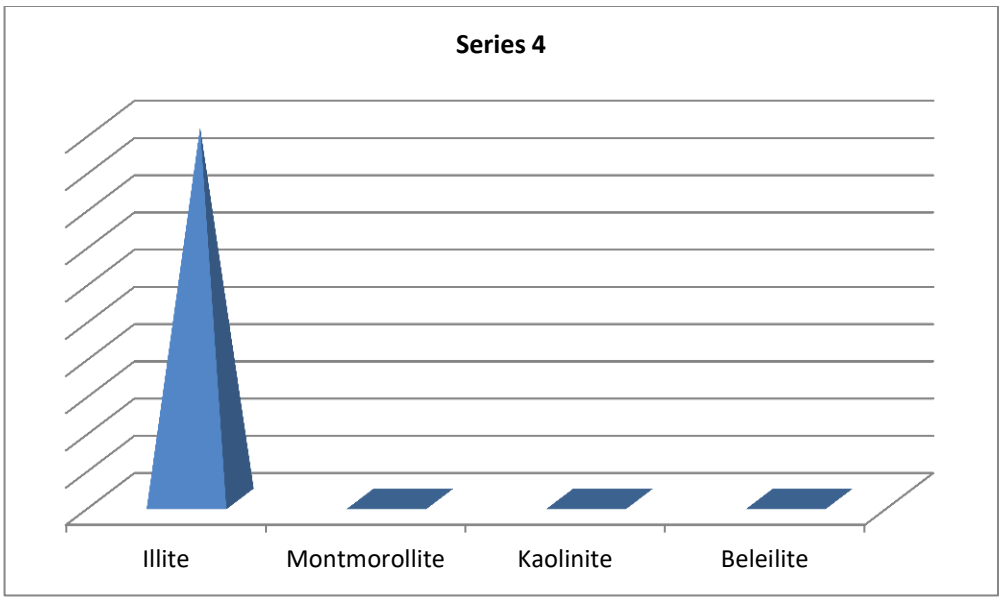


Fig. 1. Vertical section of Location 1.



Graph .1

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