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Biogeography and Volcano Crater Analogy of Swinging land, Jaljali, Mainpat Plateau, Surguja, C.G, India

H. D. Mahar[1], Durgesh Mahar[2], Divya Mahar[3], M.K. Jhariya[4], N.K. Banjare[5], A. M. Agrawal[6]

[1] Dept. of Botany, RG PG College, Ambikapur, Sarguja, C. G. 497001, India (drhdmahar@gmail.com)

[2]Universe Research Center,Ledari, C.G, India (durgehsmahar@gmal.com)

[3]Green City College Bangalore, Karnataka, India

[4]Farm Forestry Dept, UTD Sarguja University, Ambikapur, C.G. India

[5]RG PG College, Ambikapur, Sarguja, C.G. 497001, India.

[6]NSS, Guru Ghasidas Central University, Ballarpur, C.G. India

Abstract

An exploration was done for study on biogeography, biodiversity and swinging parameters of Jaljali, Mainpat, Surguja, CG India. Its Co-ordination is $22^0$49'15.00"N, $83^0$15'08.00"E. and 1078m (3534F) altitude. Topography and soil science is studied and wave formation in oscillation of swinging land was measured. Geological study of spongy topography in volcanic crater along with flowing crater lake and filled by fossilized biodiversity result such geophysics of swing. The origin of swinging geomorphology is discussed along with its significance and origin of a Plateau" Mainpat". Biodiversity of Jaljali has been studied along with soil science. Social impact of Jaljali and agro forestry application of Jaljali Crater Lake is discussed.

Key Words

Mainpat plateau, Swinging crater land, Spongy topography, Fossilized biodiversity, Geomorphology of Jaljali.

1. Introduction

A volcanic crater is a roughly elliptical depression in the ground caused by volcanic activity. (1) Some volcanic craters are popular e.g. Bromo mount, Irazu mount, Rainier mount ect. This paper deals with a bio-geographical exploration of “Jaljali” which is an old volcano crater with a Crater Lake and soft swinging grass land. It is located on “Mainpat” plateau in Surguja CG, India. “Jaljali” term is local name the geo-vibrating place. Its length is 119.37m width is 50.00m and perimeter is 313.74m. Where earth is so soft that vibrates with walking feet. “Jaljali” local means water stagnant. But one may think of small “Jaljali” that means calamity like dame breaking, tsunami, earth--quake or volcano. Since the soft soil of “Jaljali” is on a crater of volcano erupted about 10 million year before. After cooling, filled with rain water,and delicate hydrophytes and water animals, there fossils layered with sandy soil brought by wind and leaching of nearby land, these natural process continued up to now in a cycle, resulting so soft soil that a scientist may enjoy a swinging walk, i.e. earth surface oscillates with walking feet. “Jaljali” is situated at the distance of 56 km from Laboratory at Ambikapur, CG India.(2)

The exploration of Swinging land Jaljali results that it’s grass less swinging, while bare land swinging more comparatively. It might be due to peoples practice to swing causes to be bare like foot path in forest. Geo diversity is variety of geomorphology affecting to biodiversity (3, 4)

There are many Volcano craters, having their mountains with or without, their crater lakes, either stagnant water from rain or spring of geo-origin Mount Bromo is an active volcano and part of the Tengger massif, in East Java, Indonesia. It is on altitude of 2,329m (7,641 ft), coordination 7°56′30″S 112°57′00″E .. Mount Bromo sits in the middle of a plain called the "Sea of Sand", a protected nature reserve since 1919. The volcano belongs to the Bromo Tengger Semeru National Park..(5,6)

An another volcano is The Irazú active volcano in Costa Rica, situated in the Cordillera Central, close to the city of Cartago. (7) The Irazú Volcano is the highest active volcano at 11,260 feet (3,432 m) 9°58′45″N 83°51′09″W, in Costa Rica. (8, 9) Mount Pinatubo is a result of an eruption of Novarupta in the Alaska Peninsula.((10,11) It Coordinates: 15°08′30″N and 120°21′00″E. It is estimated this volcano ejected roughly 10,000,000,000 tones (1.1×10^{10} short tons) or 10 km^3 (2.4 cu mi) of magma, and 20,000,000 tones of Gases bringing vast quantities of minerals and toxic metals to the surface environment. (12,13) Mount Rainier is the highest mountain of the Cascade Range of the Pacific Northwest, and the highest mountain in the U.SA.

It is a large active volcano located at the distance of 54 miles (87 km) from Seattle as a Mount Rainier National Park. It’s elevation is 14,411 ft (4,392 m), coordinates: 46°51′10″N, 121°45′37″W (13) It is located east of Eatonville and south - east of Seattle and Tacoma..(14) It has a small crater lake of about 130 by 30 ft (39.6 by 9.1 m) in size and 16 ft (5 m) deep, on the

highest in North America with a surface elevation of 14,203 ft (4,329 m), occupies more than 100 ft (30 m) of ice and is accessible only via the caves.(15)

Generally, all volcano craters have a mountain on their around and a crater lake is also present with about all volcano craters. Although some of recent and current volcanoes may not have lake. But after long geological time, they would also have their lakes. Jaljali has properties to be an ancient volcano crater due to its geomorphology, geo physics and origin with a crate lake transforming in to a rivulet which is applied for agro-forestry and ends in Mainpat village of Mainpat plateau. There are some geological studied of origin and geology of Mainpat plateau. (16-18). But Jaljali is not yet has been studied for comparative study.

2. Material and method

Geographical position and geomorphology of Jaljali.

Geomorphology, physical measurement and geographical position search were done. Jaljali land is protected by iron wirings fence with iron poles in a regular distance of 95.5 Cm (about 1m). The poles of east, west and south fence were counted and length, width are calculated. While north fencing is absent from where there is entrance to Jaljali swinging land. Therefore, it was estimated by map measurement, thus perimeter of Jaljali crater land was calculated. Fig1 represents satellite view of Jaljali, It is divided into three parts:

A. **Grass land and Swinging area**: Grass land is soft and swinging area of the Jaljali land. People come to enjoy and experience to swing with the earth. Soft land is also found of two parts. A grass bed swinging land and bethought grass (bare) swinging land. It is found that bare part is more swinging then dense grass land.

B. **Swamp – mud area** This area is in between Crater Lake, its rivulet and Grassland swinging area. Swamp mud part of Jaljali contains decaying biodiversity and mud.

C. **Crater lake and rivulet flowing area**. In the north pole of Jaljali land, there is a large lake with its origin in Jaljali is present and it’s rivulet.Jaljali lake is full of water lives and it is applied for social need like bathing etc. by tribal It give rise Jaljali rivulet, which flows parallel to west fence of Jaljali land and it is applied for agricultural irrigation beyond Jaljali on south direction in Mainpat village of Mainpat plateau.

3. Biodiversity collection of Jaljali.

Fig.2 represents herbarium collection of grasses and herbs of Jaljali. We did also water sample collection from Crater Lake and muddy water lives collection at a spring.

4. Soil Analysis of Jaljali

Soil Samples were collected from four different places of Jaljali land covering all dry moist and mud portion. Soil testing was done and comparative analysis, with the soil samples collected from three road side villages of same plateau, (from out of Jaljali swinging land,) was done.

5. Measurement of Swinging parameters

A long iron wire was fixed from east fencing pole to west fencing pole passing through Jaljali rivulet swampy grassland and less grass land (bare) soft swinging land part of Jaljali. It is made so tightly fixed that it might not loose and remain stable at fixed height parallel to swinging land. Fig 3 represents a man producing swing on Jaljali land and fig.3 represents a diagrammatic scheme of swing measurement with the fixing of stable wire parallel passing through Jaljali land on a definite height.

A tripod stand of 1.5m height was fixed with meter tap along with stand with cello tap and iron wires position is noted at stable condition on meter tap. A swinging force is applied by own (human) body weight and land get start oscillation (swinging). Position of wire is noted at stable, at upper swing and at lower swing. This is repeated three times at deferent points, and many people applying swinging force. Simultaneously, the stop watch is started at swing – started and swinging gradually decreases to be stopped. The time took to be stable, *i.e.* stop of swinging geophysics made up by man jump is noted with stop watch down loaded in cell phone. Fig.5 represents swing duration and fig.6 represents swing measurement experimentation.

Fig.1 Satellite view Fig.2. Herbarium Collection

6. Cardio graphic Simulation

A hole is made on a wet mud land of 7-10 Cm. diameter and 10 cm depth water get automatic filled in ditch. Then we applied body weight for swing and wave formation of water in ditch is photo-video graph recorded. A video graph of the ditch water represents Cardio graphic simulation of the Earth.

Fig.3 Man making swing

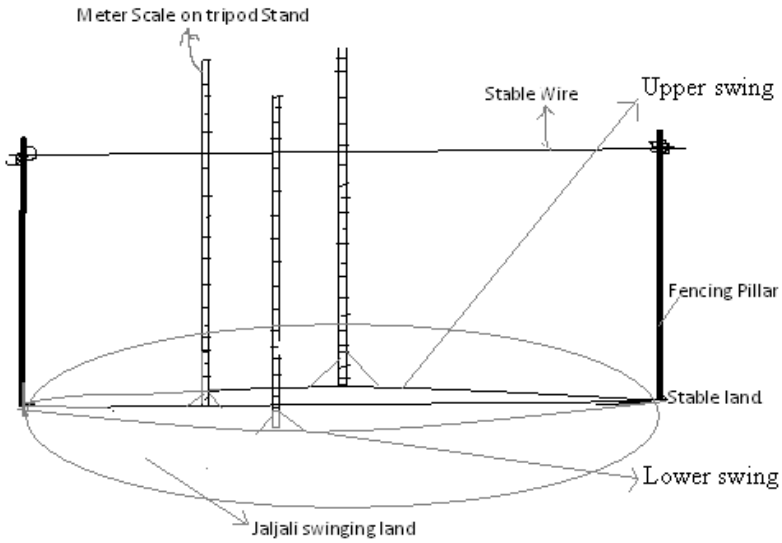

Fig.4 Swing measurement

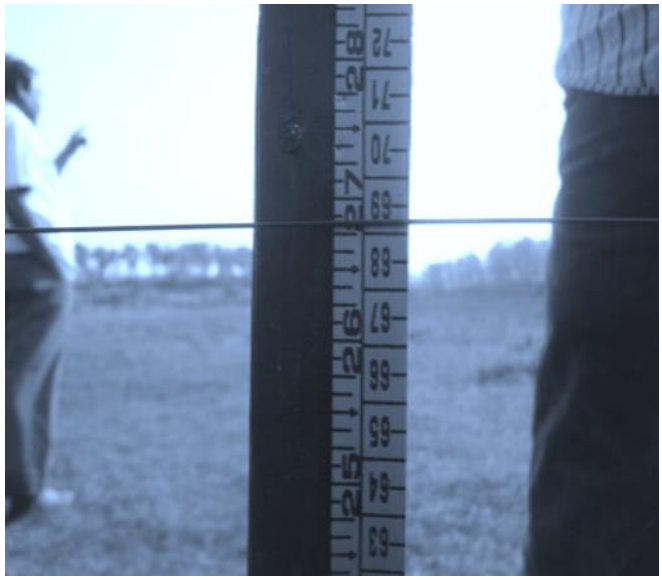

Fig.5 Swinging duration Fig.6 Swing reading

7. Result and discussion

There is an entrance to Jaljali from its north side where no fencing is done, and all other three sides there are fencings supported with the iron poles.

The distance between two poles = 95.5Cm (less than 1m)

N^0 of fencing poles in east side =75, Length = 75x95.5Cm = 71.62m

N^0 of fencing poles in south side =50, Length = 50x95.5Cm= 47.75m

N^0 of fencing poles in west side =125, Length = 125x95.5Cm = 119.37 m

Length of north side boundary of Jaljali (here fencing absent) = 75.00m

Total perimeter =71.62+47.75+119, 37+75.00=**313.74m.**

Average width of Jaljali = 50.00m

Table 1. Amplitude of Swinging Parameter during Swing of Jaljali Land (Oscillation /vibration)

Serial N^0	At stable reading in Cm.	Lower reading in Cm.	Upper reading in Cm.	Time to stable Seconds	N^0 of Human making swing	Total swing amplitude in Cm.
1	21.35	21.00	21.35	03.10	1	1.35
2	27.90	26.80	28.00	04.40	2	1.20

3	37.35	37.30	39.15	04.60	3	1.85
Average	**--**	**--**	**--**	**04.00**	**2**	**1.33**

Table N^0 1 represents the swing measure. the was generated by human jump action represented Table2 represents soil testing of Jaljali land, which is of four types 1. Periphery of Jaljali, 2. Swinging bare land, 3. Jaljali dense grassland and 4. muddy swampy area, although, fifth part is a large lake with a rivulet full with hydrophytes and aquatic animals.

Table3 represents soil testing of Mainpat plateau around and out of Jaljali swinging land. Chemical analysis was done in district biotech. Lab. (established for agriculture service). Soil samples of three villages, namely Bargawan, Aamgaon and Baghadand were analyzed. Average values of the soil parameters were calculated for further comparison with average parameters of soil samples of soil collected from inside of Jaljali swinging land.

Table4 represents the differences of soil parameters between Jaljali land and out of Jaljali land. Comparative average parameters of chemical composition of soil samples results shows that pH, Electrical conductivity, Nitrogen, Potassium, Iron and Manganese is positive (more) in Jaljali land in comparison with the soil of other villages from out o Jaljali.

Table 2. Chemical property of soil of Jaljali swinging land, (Electrical conductivity is represented in D.S./m).

Sr.	Position at Jaljali	pH	Conductivity	C %	N Kg/H	P Kg/H	K Kg/H	SO_4^{--} Kg/H	Zn mg/Kg	Fe mg/Kg	Mn mg/Kg	Bo mg/Kg
1	Periphery of Jaljali	6.12	0.64	0.20	95.00	15.00	198.00	14.75	0,4.	1.4	1.9	0.2
2	Swinging (bare) land	5.90	0.35	0.38	156.0	30.00	128.00	18.00	0.3	2.4	1.3	0.2
3	Jaljali Grassland	6.15	0.39	0.54	262.0	18.00	342.00	17.90	0.2	1.9	1.4	0.1
4	Mud of Jaljali	6.30	0.72	0.37	269.0	17.40	333.00	18.00	0.3	1.2	1.8	0.2
-	**Average**	6.11	0,.52	0.37	195.5	20.10	250.25	17.16	0.3	1.725	1..6	0.17

Table 3. Chemical property of soil from out of Jaljali swinging land. (Electrical conductivity = D.S./m)

Sr.	Villages	pH	Conductivity	C %	N Kg/H	P Kg/H	K Kg/H	SO_4^{--} Kg/H	Zn mg/K	Fe mg/	Mn mg/K	Bo mg/K

									g	Kg	g	g
1	Bargawan	5.30	0.21	0.61	230.0	10.40	412.00	15.70	0,3.	1.6	2.0	0.1
2	Aamgaon	5.85	0.23	0.36	162.0	16.00	306.00	19.80	0.2	1.9	1.4	0.3
3	Baghadand	6.29	0.11	0.34	139.0	13.00	230.00	18.40	0.2	1.2	1.0	0.3
-	**Average**	5.79	0.18	0.43	177.0	13.13	316.00	17.96	0.23	1.56	1.46	0.23

Table 4. Comparative average chemical composition of out of Jaljali land and Jaljali swinging land (Electrical conductivity = D.S./m)

Sr.	Soil area	pH	Conductivity	C %	N Kg/H	P Kg/H	K Kg/H	SO_4^{--} Kg/H	Zn mg/Kg	Fe mg/Kg	Mn mg/Kg	Bo mg/Kg
1	Inside Jaljali land	6.11	0.52	0.37	195.5	20.10	250.25	17.16	0.30	1.72	1..60	0.17
2	Out of Jaljali land	5.79	0.18	0.43	177.0	13.13	316.00	17.96	0.23	1.56	1.46	0.23
3	Deference	0.32	0.34	-0.06	18.5	6.97	-65.75	-0.80	0.07	0.16	0.14	-0.06

Sagittarian dominated hydrophytes in Jaljali crater lake. frog, mixed hydrophytes *Cynodon dactylon, Polygonum aviculare, ect.* Wasp and Millipede were also seen in *Cynodon dactylon* dominated dense grass land. A hydrophyte,"*Juncus gerardii"densly present* in stagnant water, beside which, water current continuously flows. There are 4-5 water springs as a pit, Jaljali crate lake water is used in agro forestry, by local people. While at some distance, there is a *Sorea robusta dominated dense* forest along *Tectona grandis, Madhuca indica, Cassia nilotica, Mengifera indica etc*

There is a difference of vegetation in between biodiversity of stagnant water *i.e.* identified as *Spirogyra, Volvox, Ulotrix* Mosses; *Riccia, Marchantia, Pellia, Porella, Sphagnum, Polytrichum* etc In Pteridophyta, *Rhynia, Psilotun, Offioglossum, Lycopodium, selaginella, Equisetum, Marsillia, Pteris* are found. In herbs, *Cyanodon dectelon, Convolvulus arvensis, Desmodium trifolium, Zornia diphyilla, Sporobolus diander, Hyptis ovulensis, Eugenia, Euphorbia hirta, Oxalis purpuria, Erriocaulon, Borreria hispida etc*. are found.

The topography of any place is depended upon its geological development and the vegetation. Soft soil of Jaljali is on a crater of volcano erupted about 10 million years before. After cooling, it filled with rain water, and delicate hydrophytes and zooplanktons. Their fossils layered with sandy soil brought by wind and leaching of nearby land. These natural processes continued up to now in a cycle, resulting in soil so soft, that scientists may enjoy a walk on a swinging land, *i.e.* earth surface oscillates with walking feet

There is Nitrogen deficiency, since author collected an insectivorous plant *Drosera rotundifolia L*, an insectivore adaptation is for fulfillment of N_2. Table2-4 representing soil analysis indicates that in all Mainpat Plateau, the soil is nitrogen deficit. Since, it is made up of volcano, and nitrogen is basically gas, therefore it evaporated and soil grows *Drosera* like (Sun dew, insect eating) plant. Biodiversity of Jaljali is very rich, since all common sweet water algae and fishes, frogs etc zooplanktons, hydrophytes, halophytes, and mud to dry grass land biodiversity is present, but it is famous for swinging geophysics in Jaljali crater land and applied as tourism.

Conclusion

1. Since, Mainpat plateau is made up of a log past volcano eruption and Jaljali is the crater of volcano. Its north (upper) end has a large "Crater Lake" flowing parallel to west fencing to south ward as a Jaljali rivulet.

2. Jaljali crater land has a swinging area, where people jump to make earth swinging. It is measured maximum swing up to 1.85 Cm. and maximum duration of swing is 4.6 seconds. Although, it varies spot to spot, no. of men jumping for swing, and recording skill.

3. Spongy topography in volcanic crater along with flowing crater lake and filled by fossilized biodiversity results such geophysics of swinging Jaljali by simple jump.

4. Crater Lake flows continue a rivulet which is applied for irrigation in agriculture.

5. Swinging Land Jaljali is a tourist place of CG State tourism. People come to enjoy the swing.

This is pioneer study on Jaljali, therefore comparative study on swinging property may not be discussed with respect to other authors findings, but this study is significant for understanding of swinging characteristics and origin and development of Jaljali swinging land.

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