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Geophagy in Manipur: Cultural Practices and Medical Geology Perspectives

Laishram Sunil Singh

Department of Geology, Waikhom Mani Girls` College, Thoubal, Okram , Manipur, India
Email: *linus2k[at]gmail.com*

Abstract: ***Geophagy, the practice of consuming earth or soil, is a widespread phenomenon observed in various parts of the world. Geophagy is the habit of consuming clay soil. Though it is globally practiced, the safety of those involved is yet to be fully established. It is thought to be highly prevalent in pregnant women because of its antinausea or therapeutic effects. This practice is also thought to be provoked by some nutritional needs, but in modern society its etiology is obscure. The mineralogical and chemical compositions of clay may vary from one region to another and even in all form of rocks clay constitutes. In Manipur, a state in northeastern India, geophagy had been traditionally practiced, especially among rural and tribal communities. This research paper explores the historical, cultural, and social aspects of geophagy in Manipur, while also addressing its health implications and the need for awareness and public health intervention.***

Keywords: Ngaikhong, geophagy, toxicity, clay, review

1. Introduction

Geophagy or Geophagia, derived from the Greek words "geo" (earth) and "phagein" (to eat), is a form of pica involving the consumption of soil or clay. While often regarded as abnormal behavior, geophagy has historical roots in many cultures and is sometimes considered a traditional remedy.

Geophagia, the habit of deliberate consumption of earthy material (Dominy et al., 2004), has been reported to be in existence as early as the fourth century. The practice of geophagia has been reported in several countries across continents including Africa (South Africa, Cameroon, Democratic Republic of Congo, Nigeria, Swaziland, Tanzania and Uganda), Asia (China, India, Philippines, and Thailand) and the Americas (Ngole et al., 2010; Bonglaisin et al., 2011). Several reasons have been advanced to justify geophagial behavior; some of which are cultural, others medicinal and nutritional (Carretero, 2002; Ekosse et al., 2010).

1.1 Geology of the Study Area:

Geologically, the study area belongs to Tertiary Group. The rock exposed in this area can be divided into two groups of rocks namely Disang Group and Barail Group. The Indo–Myanmar Ranges (IMR) is thought to be the northern elongation of the Indonesian island

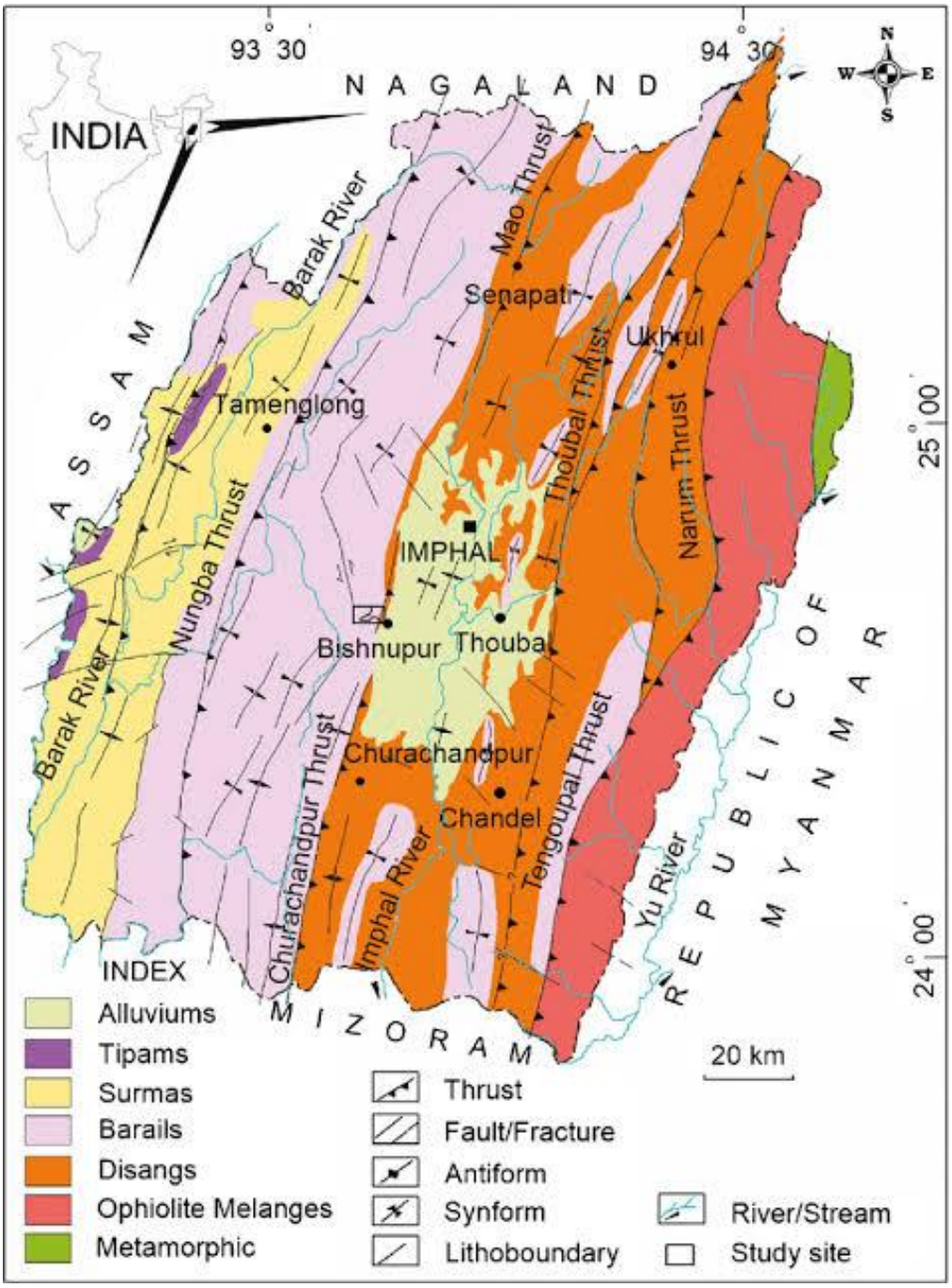

Figure 1: Geological map of Manipur (northeast India) .

The geological succession (modified after Soibam 2000) of the Study area is given in the table 1. below:

Table 1: Geological/Stratigraphic Succession of the Study Area

Group	Formation	Age	Lithology
Alluviums	Younger	Recent	Dark grey to black clay, silt and sandy deposits.
	Older	Pleistocene	Clay, sand, gravel, pebble and boulder deposits.
		Unconformity	
Tipam	Tipam sandstone	Late Miocene	Greenish to blue, moderate to coarse ferruginous sandstone with sandy shale, clay. Molásse deposits.
Surma	BokaBil (~ 1400m)	Late Miocene to Late Oligocene	Shale, sandy shale, siltstone, ferruginous sandstone massive to false-bedded ferruginous sandstone.
	Bhuban (~ 1400 m)		Alternations of sandstone and shale with more argillaceous horizons in the middle and minor conglomerate. Transitional characters from Flysch to molásse sediments.
		Unconformity	
Barail	Renji (800 m) sediments	Late Oligocene to Late Eocene	Massive to thickly bedded sandstone. Flysch.
	Jenam (~ 1200 m)		Massive to thickly bedded sandstone with carbonaceous shale horizons. Flysch sediments.
	Laisong (~ 1200 m)		Intercalation of bedded sandstone with relatively thin siltstone and shale. Conglomerate horizon in upper part. Characterised by abundant trace fossils and less invertebrate/plant/leaf fossils. Flysch sediments.
Disang	Upper Disang (~ 2000 m)	Late Eocene to Late Cretaceous	Intercalations of shale with relatively thin siltstone and sandstone showing rhythmites. Characterised by presence of certain pelecypods, gastropods, microfossils and few trace fossils. Flysch sediments.
	LowerDisang (~ 2000 m)		Dark grey to black, splintery shale with virtually no vertebrate and trace fossil evidence. Flysch sediments.
		Unconformity	
	Ukhrul limestone	Late Cretaceous	Limestone, chert, conglomerate characterised by abundant microfossils – foraminifers and radiolarians.
		Unconformity	
Ophiolite Mélange Zone		Cretaceous/older	Basic and ultrabasic rocks
		Unconformity	
Metamorphic Complex		Pre-Mesozoic	
		Unconformity	
Basement Complex		Pre-Mesozoic/older	

The Main source of edible clay (Ngaikhong) Relevance to Geophagy (Table 2) are found in the Recent Alluvium and there is Possible secondary sources in the Older Alluvium. But Barail , Surma and Disang Group are not used/suitable for geophagy.

Table 2: Stratigraphic Succession of the Study Area Relevance to Geophagy

Stratigraphic Unit	Age	Lithology	Relevance to Geophagy
Recent Alluvium	Holocene	Silt, clay, sand, organic matter	**Main source of edible clay (Ngaikhong)**
Older Alluvium	Late Pleistocene	Compact sandy clay, mottled clay	Possible secondary sources
Barail Group	Oligocene	Shale, sandstone	Not used for geophagy
Surma Group	Miocene	Alternating sandstone and shale	Not geophagic
Disang Group	Eocene	Dark grey shale, slates	Not suitable for geophagy

In Manipur, geophagy continues to exist in various forms, particularly among women and children in rural areas.

1.2 Historical and Cultural Background

Manipuri society, deeply rooted in indigenous beliefs and rituals, integrates the human connection to earth in various forms. Earth is seen not only as a physical sustenance but as a spiritual and emotional anchor. Practices like Lai Haraoba and other indigenous rituals highlight the symbolic significance of soil and clay.

1.3 Understanding "Ngaikhong"

"Ngaikhong" is a Meitei word that describes a complex emotional state characterized by intense longing or missing

someone deeply. It is commonly used in romantic, familial, and spiritual contexts. The expression of "ngaikhong" often manifests physically, including behaviors such as crying, withdrawing from social life, or, in some cases, eating earth substances as a symbolic act of emotional suffering.

Ngaikhong is a soft, edible white or grey clay found naturally in riverbanks, wetlands, and lowland soils in Manipur. It is part of a traditional practice called geophagy, which means eating earth materials like soil or clay. Ngaikhong is found in areas near Loktak Lake, the Imphal River, and other alluvial regions. It is collected from shallow clay-rich soil layers, cleaned, dried

1.4 Geological Composition of Ngaikhong

Between 2018 and 2022, the Department of Earth Sciences at Manipur University conducted geological field surveys to study Ngaikhong, a traditional edible clay used in Manipur. The research focused on clay composition, distribution, and cultural practices associated with its use. The major finding are as follows

1.4.1 Clay Type and Formation

The clay is predominantly kaolinite-rich alluvial clay formed by the weathering of feldspar-rich rocks. It is typically located 0.5 to 1.5 meters below the organic topsoil.

1.4.2 Physical Properties

Ngaikhong clay is soft, white to pale gray in color (sometimes with a yellowish tint due to iron oxides), and has a smooth texture. It is odorless with a slightly alkaline taste.

1.4.3 Geochemical Results

Mineralogical Content:
Kaolinite ($Al_2Si_2O_5(OH)_4$) – primary clay mineral
Quartz – minor silicate component
Montmorillonite – in some samples

Table 3: Chemical Composition (approx.):.

Element	Approx. Range	Role
Aluminum (Al)	10–15%	Gastroprotective
Iron (Fe)	1–3%	Nutritional mineral
Magnesium (Mg)	<1%	Trace mineral
Calcium (Ca)	<1%	Bone health
pH	6.5–7.5	Mildly acidic to neutral

Note: Samples collected post-monsoon sometimes showed higher iron and organic matter; drying before consumption is recommended.

Trace elements such as lead, arsenic, and cadmium may be present in small amounts, especially in clays collected from polluted sources. However, most rural Ngaikhong samples are within safe limits. Proper drying and storage are essential to avoid contamination.

1.5 Geophagy as an Emotional Expression

In Manipur, anecdotal and ethnographic evidence suggests that individuals, particularly women, may engage in geophagy as a response to emotional turmoil. This includes longing for a loved one, grief over a loss, or the hormonal and emotional changes during pregnancy. In these contexts, eating clay or soil becomes an embodied metaphor for the emotional weight they carry.

1) Geophagy in Pregnancy

One of the most common contexts for geophagy in Manipur is among pregnant women. It is believed that the cravings for soil or clay during pregnancy are natural and are sometimes attributed to the baby's desires or the mother's unexpressed emotional needs. In such cases, geophagy is not only accepted but sometimes even encouraged, provided the soil consumed is considered "clean" or "sacred."

2) Gender and Social Perception

The practice of geophagy is gendered, being more prevalent among women, particularly those in rural or traditional households. While it can be viewed through a medical lens as a response to iron deficiency, in many Manipuri narratives, it is portrayed as a poetic or tragic symbol of "ngaikhong." Stories and folk songs often recount heroines consuming earth as a way of expressing heartbreak or undying devotion.

3) Symbolism In Literature and Performance Arts

Manipuri literature, Shumang Leela (courtyard theatre), and folk music frequently depict geophagy as a poignant gesture of emotional depth. These depictions reinforce the cultural understanding that eating soil is more than a physical act—it is a symbolic communication of longing, sorrow, and unresolved love.

4) Medicinal and Spiritual Interpretations

Traditional healers (Maibas and Maibis) sometimes prescribe specific types of clay for emotional and spiritual healing. In these instances, geophagy serves both medicinal and ritualistic purposes, believed to absorb negative energies or restore emotional balance.

2. Conclusion

The practice of geophagy in Manipur, when viewed through the lens of "ngaikhong," reveals a deeply embedded cultural and emotional dimension. It transcends the biomedical perspective and enters the realm of symbolic action, reflecting a society where emotional expression and natural elements are intimately connected. Future research should aim to document personal narratives and explore the psychological and cultural implications further.

The Holocene alluvium (Recent Alluvium) is the key geological formation providing edible geophagic clays in Manipur. Through the lens of medical geology, it is crucial to distinguish safe vs. unsafe clay deposits based on geochemistry, location, and treatment before consumption

Medical geology plays a vital role in understanding and solving health problems caused by natural elements in the environment. By identifying toxic substances, managing nutrient deficiencies, ensuring water and air safety, and protecting animals and humans, it bridges the gap between Earth science and medicine. It is especially important in regions where natural geological conditions pose risks to public health, and helps create healthier, safer communities.

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