

Research Summary

Mineral Resources as Food in Vietnam and Japan Prehistory - A Comparative Study focusing in Salt Production.

The research work completed as the power point report "Mineral Food in the late Palaeolithic Hoabinhian Culture of Vietnam and Geophagia in Today Vietnam", which was presented in the Symposium for Salt Production held in Tokyo Nov 2009, as a part of the paper "Further Studies on Hoabinhian" presented at the IPPA conference, Hanoi, Dec. 2009 and as a paper "Mineral Resources and Salt using in Prehistory Vietnam in comparison with Japanese Prehistory" will be published in Vietnamese Journal " Khao Co hoc" .

First noted the use of geological minerals for food supplements happened in 1982, during my excavation at the Hoabinhian cave of Xom Trai, where thousands small stones with mineral cortexes were discovered. But a scientific project to study on those hoabinhian mineral stone started only since 2004 with my excavations at Xom Trai cave and Du Sang rockshelter (Vietnam). This tradition of eating minerals derived from soil or rocks is termed *geophagia*. It might be existed from Hoabinhian age and still continues being today amongst many populations in Vietnam.

The Japanese researchers showed many successful studies of salt production during Jomon and Yayoi ages. Those studies suggested the ways man could get the salt in Japanese prehistory, also in Vietnam. Comparing the ceramic in salt production in Japan I recognized that some of sharp bottom ceramic in Neolithic Quynh Van culture and so-called food shaped earthenware objects (*chac gom*) found in many other sites of Neolithic and Metal Age in Vietnam, which might be used for salt production. However, some questions are still open : The salt was produced almost since only about 6000 years ago, then what replaced salt in prehistory before man could produce it ? And whether mineral resources were used as salt in prehistory ? Our new study basing on analyzing chemical compositions of prehistoric mineral samples and on observations of ethnographical evidences brought many believed interpretations into salt/mineral resources using history.

Samples and their chemical Compositions : Seven mineral stone samples from palaeolithic Hoabinhian contexts (a) and two from ethnological context (e) have been chemically analyzed and revealed to contain important minerals for human nutrition such as potassium, calcium, iron, phosphorus and manganese

N	Sample	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	TiO ₂	CaO	MgO	K ₂ O	Na ₂ O	MnO	P ₂ O ₅	ZnO	N	C
1	05M4a	0,98	21,10	1,71	0,08	2,35	0,09	3,54	0,50	0,00	2,232	0,0099	0,38	0,08
2	05M5e	62,78	20,43	5,62	0,80	0,39	0,84	3,15	0,50	0,00	0,004	0,0099	0,21	0,07
3	05M7a	1,08	22,34	0,33	0,01	0,39	0,09	6,82	0,03	0,00	3,250	0,0082	0,27	0,059
4	05M8a	15,16	27,96	32,20	6,62	1,95	0,74	1,04	0,03	0,04	0,890	0,0178	0,25	0,10
5	05M11a	60,02	23,03	6,20	0,00	0,39	0,74	2,37	0,03	0,00	0,524	0,0029	0,17	0,00
6	09M1e		24,71	1,69	0,94	0,08	0,60	3,31		<0,005	0,50			
7	09M2a		20,77	53,80	7,71	1,13	0,14	0,33		0,14	3,40			

8	09M3a		24,78	21,01	1,88	2,83	1,06	0,86		0,09	1,96			
9	09M4a		11,92	8,78	0,83	0,18	0,33	6,75		0,08	0,75			

The human natural basic of saltic tasting in food : Until present, we have good evidences for the saltic food using as human habitation only since neolithic age. But, I believe that before human salt exploitation and production, the saltic taste in palaeolithic food is natural basic of human. It stemmed from animal ancestors of human. The needing minerals for animal life (incl. human) distributed ready in every natural vegetable and animal food and build the natural basic of saltic, saltic-like tasting habit of animal world. There are a lot of evidences of animal taking mineral food. The using mineral stones of Hoabinhian people could be confirm as resources for mineral request in palaeolithic of Vietnam.

The localities of mineral resources : The hoabinhian food environments of Xom Trai cave and Du Sang rockshelter show clearly the influences of local environment into nutrition of each people group. The difference between 5km radius catchment covering lime stone rock mountain in Du Sang site (60%) and in Xom Trai site (0,3%) allowed to explain the different mineral stone resources of each. The food exploited from the flora/fauna in high carbonate hard water area must differ to ones from non or lower carbonate hard water. It's leading the changes of micro nutrition in each group and also changes of prehistoric collected mineral resource. The Du Sang dwellers collected and used more stone with MgO and less Fe₂O₃, K₂O, P₂O₅ than Xom Trai ones.

Ethnological Studies of Geophagia : The mountainous Mang, Khang women take usually mineral source of moist but relative hard clay. Man dug secretly a small deep shelter into hill slope, where contain the mineral clay layer, used plant leaves covering to keep moist condition. When need, they come to the well and take clay to eat directly. In Red river delta, some today Viet people exploit white, fine and hard clay layers of old alluvium deposit in ca 2m deep wells. Before use, the clay are roasted (burn) under fresh leaves of tea (*camellia* sp.) to make the clay as cake with smock of burn leaves. Such clay cakes could be found today in local market. Man calls them as "brick cake". Men and women eat this clay cake daily.

Publication of the Results of Research Project:

<p>Verbal Presentation (Date, Venue, Name of Conference, Title of Presentation, Presenter, etc.)</p> <ul style="list-style-type: none">● Hanoi, 21-9-2009, Session Palaeolithic, Annual Meeting of VN-Archaeologist: "Non-Tool stones excavated in the Hoabinhian Context of Du Sang rockshelter and Xom Trai cave.", Nguyen Viet● Tokyo, 14-11-2009, Session Salt Production, Annual Conference of Southeast Asian Archaeologists of Japan:"Mineral Food in Late Palaeolithic Hoabinhian Culture of Vietnam", Nguyen Viet● Hanoi, 4-12-2009, Indo-Pacific Prehistory Association Conference : "Further Studies on Hoabinhian: Mineral food", Nguyen Viet● VTC Television of Vietnam Cable, Interview for a documentair film : Geophagy in Vietnam, January 2010.
<p>Thesis (Name of Journal and its Date, Title and Author of Thesis, etc.)</p> <ul style="list-style-type: none">* New Discoveries of Archaeology in Vietnam, 2009: "The non-tool stone artifacts used as mineral food in Hoabinhian Culture" by Nguyen Viet and Nguyen Ngoc Quang.* Journal of Geology, Series B, no 34(2009): "Geophagy in Vietnam : Manifestations, Causes and Research Orientations", by Vo Cong Nghiep, Duong Duc Kiem, Tran Tan Van, Nguyen Van Viet and Do Doan Hoang.
<p>Book (Publisher and Date of the Book, Title and Author of the Book, etc.)</p> <p>Global Publishing House, Hanoi, 2010. Geophagy in Vietnam.ed. by Nguyen Viet.</p>