MUD VOLCANISM AS MODEL FOR VARIOUS PLANETARY SURFACE PROCESSES. B. Bradak[1], A. Kereszturi[2], ([1]Department of Physical Geography, Eötvös Loránd University of Sciences, H-1117 Budapest, Pázmány sétány 1/C., Hungary, E-mail: brada@primposta.com [2]Department of Physical and Historical Geology, Pázmány sétány 1/C, Budapest, H-1117, Hungary, E-mail: krub@freemail.hu).

Introduction: In this work we review our current knowledge on the two basic kinds of mud volcanism on Earth and their possible application to planetary environments. Mud volcanic processes differs from magmatic volcanism but realize under such physical factors which are present in many planetary bodies.

Mud volcanism on the Earth: On the Earth we define two basic types of mud volcanism: the "macro scale" related to subduction zones and the "mezo or micro" scale related to local tectonic processes on far smaller scale (Fig. 1.) [1, 2]. The "macro scale" submarine giant blueschit mud volcanoes around subductuion zones and resulted from the diapiric rise of the quasi liquid or plastic matters released by the tectonic compression. Because of the relaive "low" temperature they are not connected with regular magmatism. The mezo or micro scale mud volcanism arises from compression in continental crust at anticlynes structures are associated with water, CH, and/or other gas phases [3].

Possible planetary analogies: Because of the tectonically compressed environment where gas and liquid release cause the diapiric rise of "mud" bodies without extremely high temperature, these are good models for several processes on the following planetary bodies: 1. Volcano build up by low viscosity lavas on Venus (the high atmospheric pressure inhibits the eruptive outbutst of venusian lavas based on some theories. The effusive release of lavas can be compared to tectinically released "mud-magma" bodies. 2. Subsurface water-clathrate decomposition can drive break up of liquified matters on Mars although this process does not taken account as regular volcanism. The plasticity of the fluidized debris and the H_2O and CO_2 release can be compared to the palstic mud bodies with gas phase CHs connected to them. Another group of possible analogies from Mars are the periglacial pingo-like and cryovolcanic-like structures.

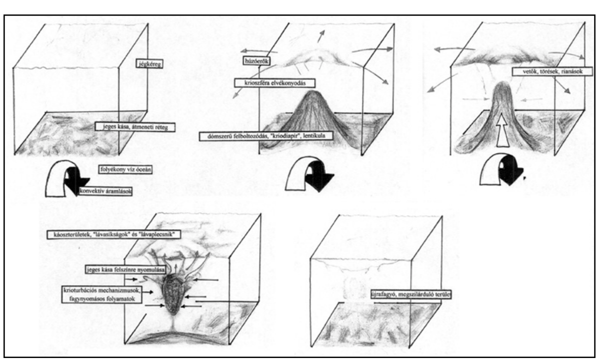

Fig. 2.: Theory of cryomagmatic intrusions and related tectonic structures on icy moons

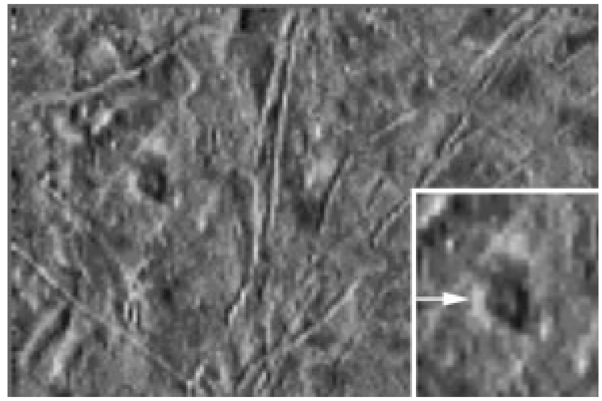

Fig. 3. Possible cryovolcanic dome on Europa

3. The pseudovolcanic cones on Mars possibly releated to phreatic outburst. In this case the plasicity of the "magma and lava" matters can be an analogy. 4. There are some possible cryo-like volcanoes on Mars where "cryoslurry" can be the base of the analogy. 5. Cryovolcanism on icy moons and diapiric model for the origin of the chaotic terrains on Europa (Fig. 2, 3.), 6. Origin of cantaloupe terrain and possible connection of explosive volcanism with insolation on Triton.

Laboratory tests: We made exteriments with various frozen mixtures of waterice, mud clasts and CO_2 gas simulating the reaction of clathrates with solid mud particle contamination. We measured the reaction of these under mechanical pressure and inflexion. Based on the already realized tests we experienced fluidification, effusion of "cryoslurry" from samples and the variations of the reactions to the same stresses according to the gas and solid contamination (Fig. 4.).

Conclusion: We already know that some aspects and versions of the mud volcanism can be interpreted as other kind of processes like cryoturbation, phrearic ourburst. But based on the physical processes involved in mud volcanism we can analyse with the same modell many processes as different realizations of mud volcanism. Now we are working with laboratory kísérlet for the analysis of various waterice, gas and solid particle mixtures for the analysis of them under different physocal an planetary environments.

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	Mezo- and macrotectonic mud volcanoes	Global tectonic mud volcanoes
Tectonic setting	passive margin, sinking enviroment, anticlyne fold formed by tectonic motion	between subduction zones and volcanic arcs
Mecha-nism	° liquid, gas CH release; ° **diapiric rise**; ° **tectonic pressure**;	° low T, high P fluidization of serpentine and sedi-ments; ° **diapiric rise**; ° **tectonic pressure**;
Origin of volcanic matter	° tectonically and CH driven hydrothermally brecciated mud, ° melange of sediments and diapir origin;	° in situ metamorphized matters serpentine; ° melange of tectonic and diapir origin
Out-break	**at fault zones**	**at fault zones**
Mud volcanite	brecciated, unsorted mud and clasts changeable viscosity	mud, clast,serpentine,
Morpho-logy	° heigh: 0 – 500 m ; ° diameter: ~1 m - ~2km;	° heigh: ~ 2 km ; ° diameter: ~ 30 km.;
Volcanic morpho-logy	° mud flows; ° volcanic mud breccia dispersion; ° CH gas and oil eruption; ° slope-slide, land– slide	° land – slide; ° fissures (meter deep); ° serpentine mud flows;
Location	° aerial; ° marine:-mud volcanic island ° submarine reef and volcanoes	below sea level
Example	*Piparo* (Trinidad), mud vol-canoes of the Azerbaijan region (*Dashgil, Lokbatan*), *mud volcanoes on Norris Geyser Basin* (Yellowstone· National Park), *Waimata Valley mud volcano* (New Zeland),	mud volcanoes at Mariana trench: *Conical Seamount, South Chamorro Seamount,*

Fig. 1. Possible classification of mud volcanoes

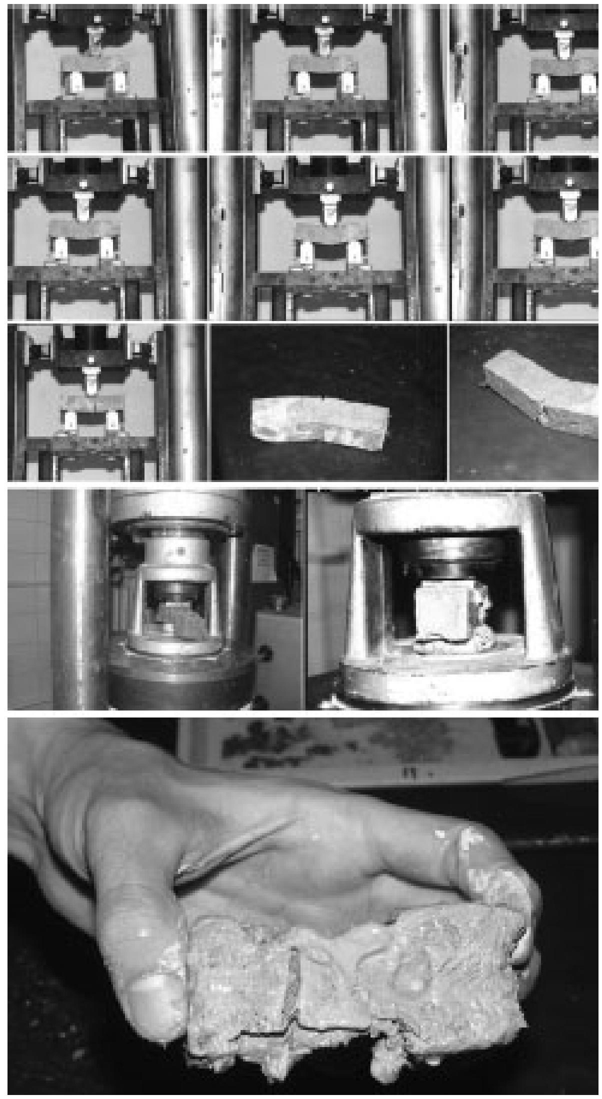

Fig. 4. Some images of the laboratory tests (flexure (top), compression (middle) and the result (bottom))

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