PLANETARY GEOLOGY EDUCATION ON THE STAGE: DYNAMICS OF PLANETARY MORPHOLOGY IN THEATRE PERFORMANCE. Zs. Bérczi[1], Sz. Bérczi[2], T. Terebessy[3]. [1]Élőkép Egyesület (Living Picture Company), H-1063 Budapest, Szív u. 3-5. Hungary, [2]Institute of Physics, Department of Material Physics, Eötvös University, Pázmány P. s. 1/a, Budapest, H-1117, Hungary; [3]Medence Csoport (Medence Group), H-1094, Pipa u. 4. Hungary. (zsofia_berczi@livingpicture.org)

Introduction: Dynamics of the theatre performance is an effective teaching mechanism. The Living Picture Company planned and produced a performance, where planetary surface dynamics was realized and planetary morphology processes were animated. Further development of this method may activate students to read (understand) and learn planetary surface geological processes. As in planetary robotics students learn more if they are involved in the activity with full hearth. Theatre performance is also such a possibility of the "field work", although in the scale of geological processes. Performance, however speed up these processes, as compared to the real geological time scales.

Instrumentation: The main elements of this planetary geology theatre is a projector above the stage (5-8 meters) and a flexible material sheet surface 20-30 centimeters above the stage. The projected images are static photographs, but they are made dynamic by the sheet surface moved by the body-motions of the actors below the sheet. They move according to the reconstructed program of a landscape dynamics which should be animated. That is the most interesting part for the movement actors/actresses and producer: how to move synchronously in order to realize a – speed up – geology process. Added light sources may also modify the final observations of the audience.

Realization of effects for elements of geological movements: First a static planetary stratum photograph (for example in the water surface) was projected on the surface. If a body part of an actor push the sheet up, a rising up mountain is animated if the mountain get different color of light. (If motion sensor is used, the rising points may get various programmed light effects automatically).

Motion by multiple layers of images: In the second step not only a static planetary stratum photograph is projected, but a swarm of lines or a grid. The surface landscape is animated by the motion but it becomes well visible by the line system.

Movie projected on static landscape: Further possibility was that a dynamic slowly changing pattern (moving clouds) was projected on the first static sheet, over the geological landscape. The morphology slowly changed, and slow changing (in desert cloud dynamics help surface morphology identifications) motions were realized in this way.

Fig. 1. Mountains at the bottom of the sea.

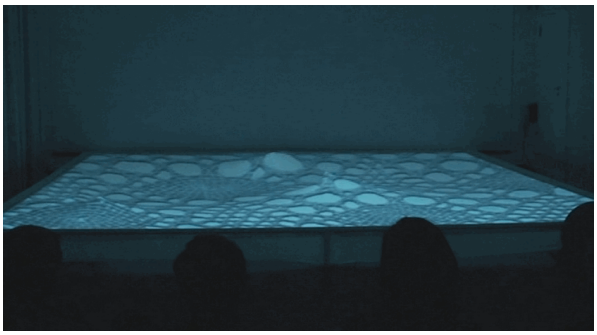

Fig. 2. Moving clouds in a pattern may enhance visibility of the surface morphology.

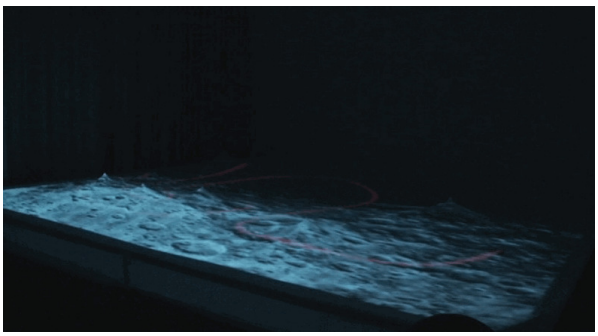

Fig. 3. Lunar Orbiter image on the stage.

Projection of various patterns with slow motion: If a lace-curtain was slowly moved in the second projected surface, dynamics of fountain, or gurgling, boiling, burning effects were realized. This was used later in volcanic, or water boiling effects.

Motion of the body below the sheet: The bulges of the sheet are formed by human body parts so they are in connected position. However simple instruments help to form distance and specific effects: rod, metallic ring, and even lights sources from below the sheet may produce new effects. This is a field of further developments.

Planetary geology forms and dynamics: The most attractive realization of planetary surfaces are if the satellite images themselves are used int he projected surface. However, the large scale planetary images, like a sin Fig. 3. the Lunar Orbiter photograph, may not be objects of dynamic changes, except one:

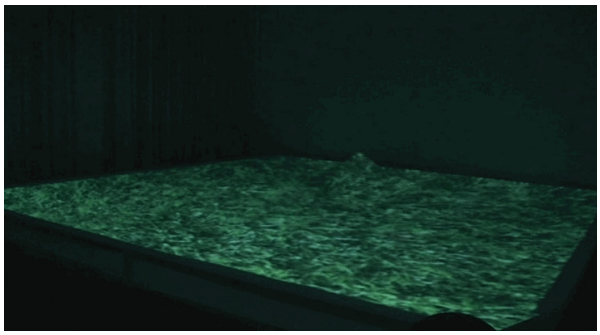

Fig. 4. A Venera like surface, but in green color. Yellow version is a more true coloring for Venus.

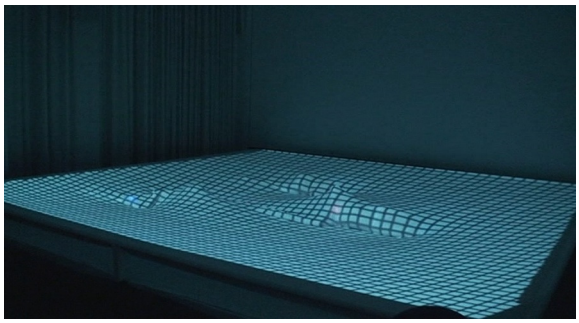

Fig. 5. The projected grid on the surface also gives better sensing of the surface morphology.

The new crater formation: It could be realized by light effects and sudden cavity production in the large scale planetary surface image (like as Fig. 3.). We know, that one such event had been observed by the Franciscant monks in Canterbury, England, 1178 June, as written in the chronicle of Fr. Gervers [1].

The sand dune motions: More or less parallel rolling of the bodies below the sheet together with the slow moving flow of a projected film can generate this process.

Summary: We directed a performance which exhibits various planetary geological processes, mainly connected to the surface morphology. The method is suitable further development, mainly by students. The complexity of the method may activate students to analyze, reconstruct and such way understand planetary surface geological processes. The theatre performance is a new type of planetary analog method, and contains various artistic aspects, too. However, art connection is also useful in teaching and learning. The speed of the changes is also a parameter which gives idea how to compare geological time scales.

The performance was on stage in Berlin, in 2008 with title: Living morphology (Fig. 6.).[2]

Fig. 6. Callisto type surface with great number of impact craters.

References: [1] C. Sagan (1980): Cosmos. Epis. IV. Random House, NY. [2] Zsófia Bérczi (2008): Living Morphology. Berlin, Collegium Hungaricum. [3] Planetary Morphology Theater: http://www.youtube.com/watch?v=9P7XgZv3t3Q