

GEOLOGY OF MARS: NEW UNIVERSITY COURSE IN HUNGARY. F. Horvai^{1,2,3} A. Kereszturi^{1,3,4},
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Introduction: Planetary science related courses and other activities started at Eotvos Lorand University of Sciences recently, including student space probe design [1,2], atlas series publication [3], courses on climatic planetomorphology [4], and astrobiology [5]. Based on the lessons learned during these activities, a course titled “Geology of Mars” started in 2008, and its characteristics are summarized here.

The topics of the course followed the classical framework: internal structure, global topography, impact craters, chronology, volcanic and tectonic processes/features, erosional channels and valleys, past liquid water, polar caps, subsurface ice, sediments, environment reconstruction, atmosphere, climate, surface chemistry, landscape, global circulations, planetary evolution, and astrobiology.

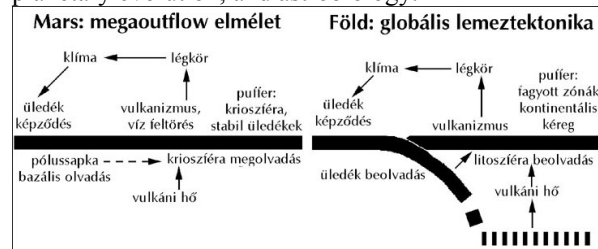


Fig. 1. Example image for the comparison of material circulation: MEGAOUTFLO on Mars (left) and global plate tectonism on Earth (right)

Several already known methods were used on a new way. The aim was to synthesize and harmonize them to enhance students' activity and participation:

- *Short presentations by the students* connected to the main topics of the course (Fig. 2).



Fig. 2. Student presentation on evaporation on Mars.

- *Comparison of geologic structures and processes (Fig. 1.)* with calculation of morphometric values were realized for resembling features on Mars and Earth (volume, size, slope angle etc.)
- *Student research:* two detailed work was compiled [6] during the course with the implementation of manuscripts based on them.

- *Poster production:* to summarize the lessons, a poster was compiled with figures on the ratios of Earth's and Mars's parameters. The common task helped the students to learn from each other and gave a framework to synthesize the knowledge.
- *Short lesson modules* to analyze possible connections (Table 1.) between Mars research and classical subjects at our University:

topics in the geology of Mars	example research area of Mars	related course at Eotvos University
tectonic, volcanic activity	timing and style of eruptions [7]	volcanology [8]
sediments and their formation	interior layered deposits [9]	stratigraphy, sedimentology [10,11]
water related erosional features	gullies [12], channels [13], networks [14]	fluvial geomorphology [15]
surface ice related processes	spectra of ices, adsorbed water [16,17]	glaciology [18]
subsurface ice and water	ice distribution [19]	subsurface water processes [20]
atmosphere	gas mixing and water vapor [21]	meteorology, boundary layer [22]
astrobiology	UV radiation, water activity, oxidants [23]	planetary science, geol. of Mars [24]

Table 1. Mars research topics and university courses

Conclusion: In this course the synthesis of three “logistic” aspects was also fruitful: the experience in Earth science education at university level, the astronomy related supplementary materials for teaching from the *Polaris Observatory*, and the visualization methods developed for the public by the *Karoly Nagy Astronomical Foundation*. The next step is to integrate more Mars related topics into different courses at university level in the future.

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