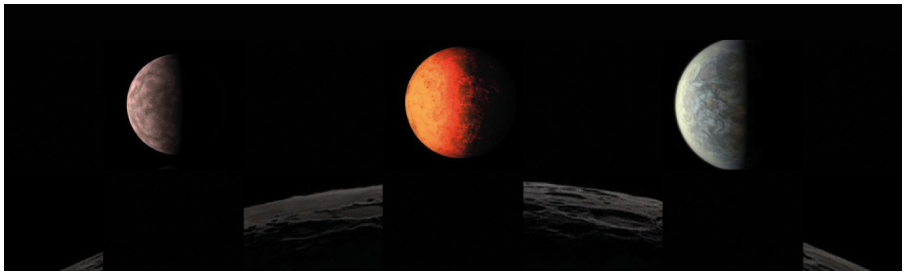

Contribution ID: **41** Type: **Poster**

Cartographic visualization of the Mars terraforming process

Friday 24 October 2025 18:00 (1 hour)

Current atmospheric conditions on Mars make it impossible for life forms known on Earth to exist. Scientific research indicates that by artificially enhancing the greenhouse effect, it is possible to change the climate of Mars so that it is similar to conditions on Earth.
Research conducted using energy balance simulations at high spatial and temporal resolution indicates that for a CO_2 atmosphere with a pressure of 10 kPa, surface temperatures suitable for plant growth occur when the artificial, greenhouse thermal-infrared grey opacity (tau) is ~0.39 optical depths. The results of the Mars terraforming process for various parameters of the simulation model indicate that for an atmosphere composed of CO_2 with a pressure of 50 kPa and a strong greenhouse effect (tau = 0.5), much of Mars would indeed become a "red planet"with a climate too hot for terrestrial life to exist there.
The authors of the article believe that the results are interesting for both scientists and science enthusiasts. To present the results in an interactive cartographic animation in a virtual reality environment, both standard GIS tools and the Unreal game engine were used. Based on their model of the terraforming process on Mars, the authors developed a methodology for cartographically presenting this process. This methodology considers spatial variations in altitude and climate on Mars as well as changes over time. The visualization shows the melting of Mars's polar ice caps, the formation of zones conducive to plant growth, and the progressive "reddening" of the Red Planet as greenhouse gas levels increase.

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Session Classification: Poster session