Exploring Volcanoes on Mars

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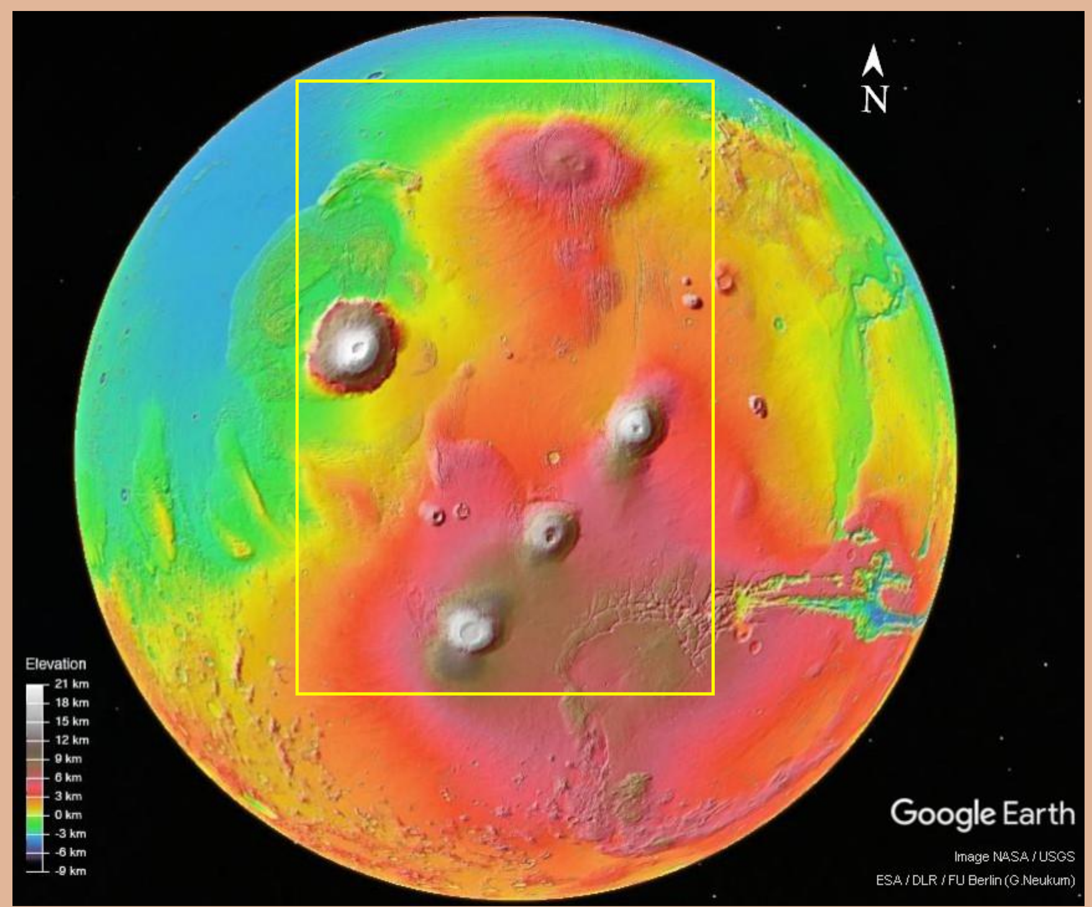
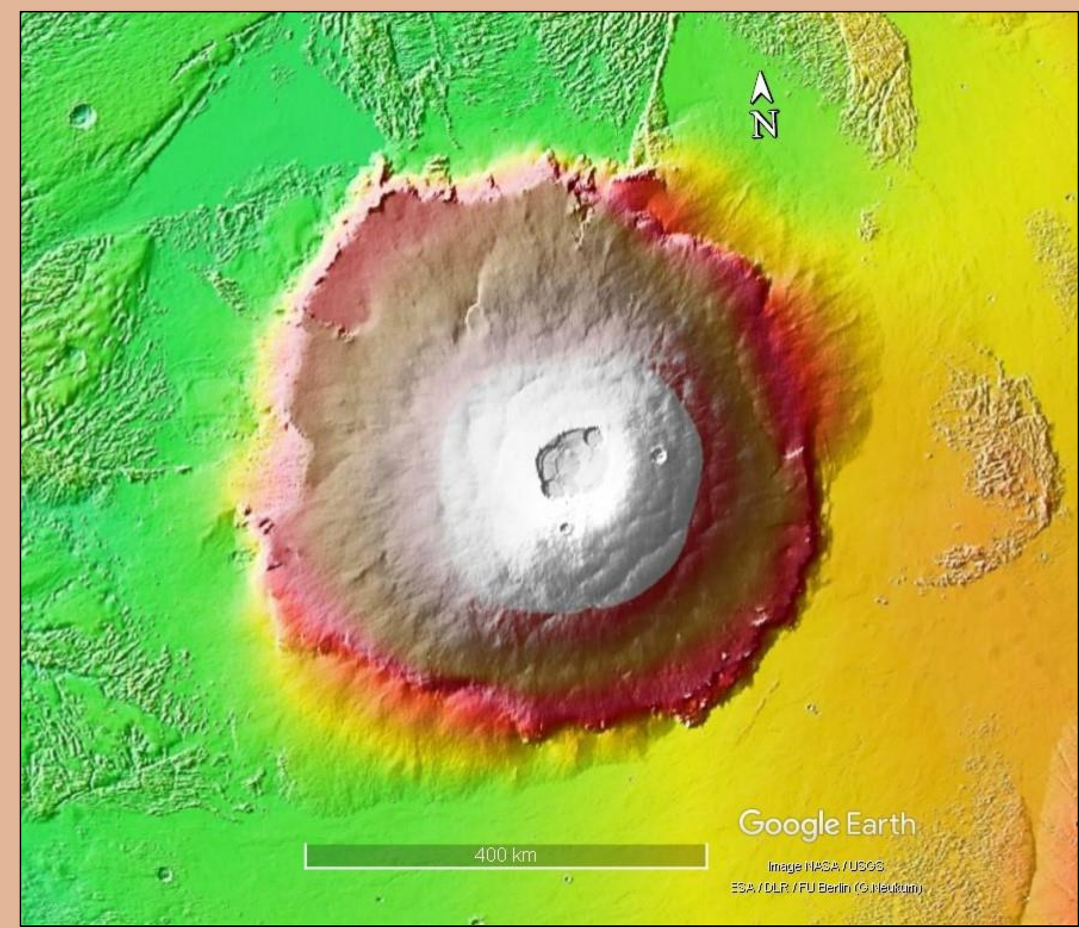
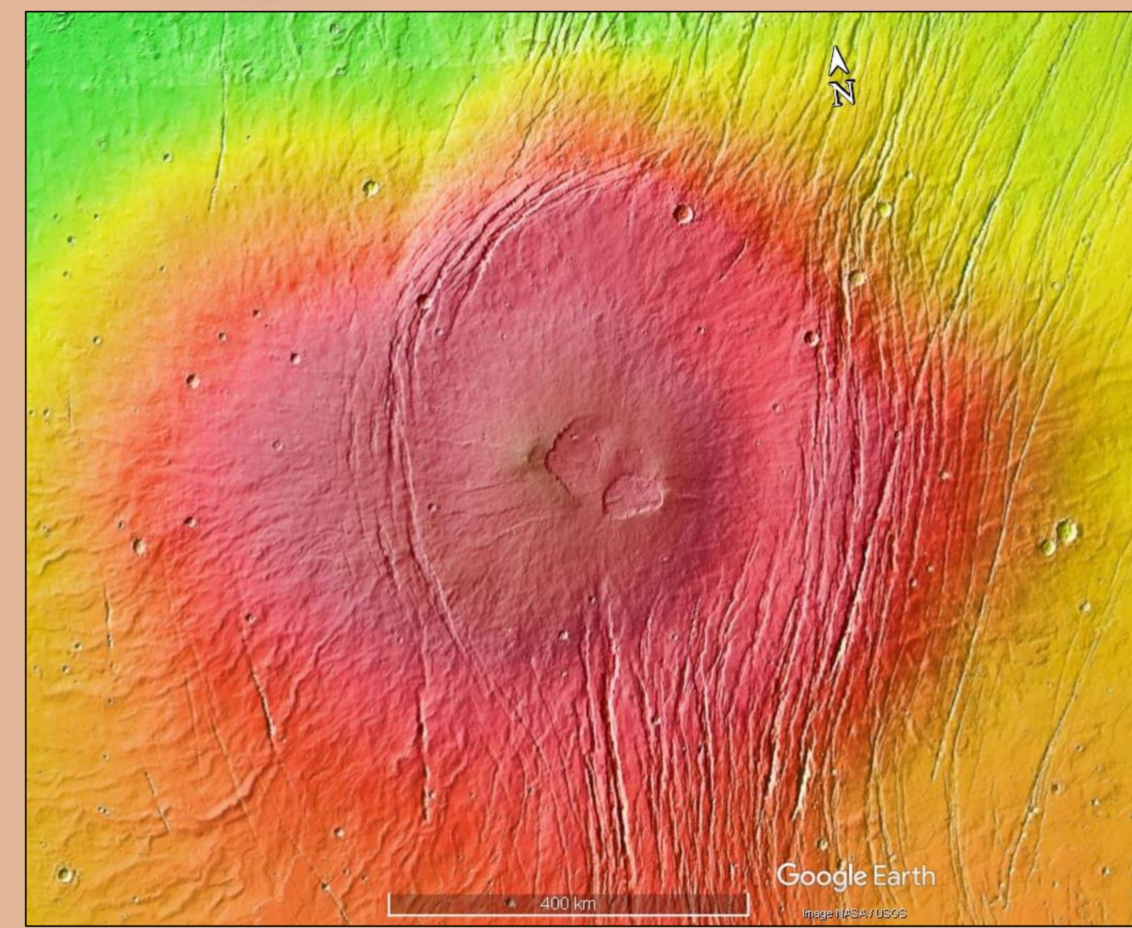


The surface of the planet Mars is covered in **ancient volcanoes**, and though they are no longer active, we can still observe their structures on images from **satellites** orbiting Mars.
The **Tharsis region** on Mars contains the majority of these volcanoes, and looking around on the surface, one of these volcanoes look very different from the others.



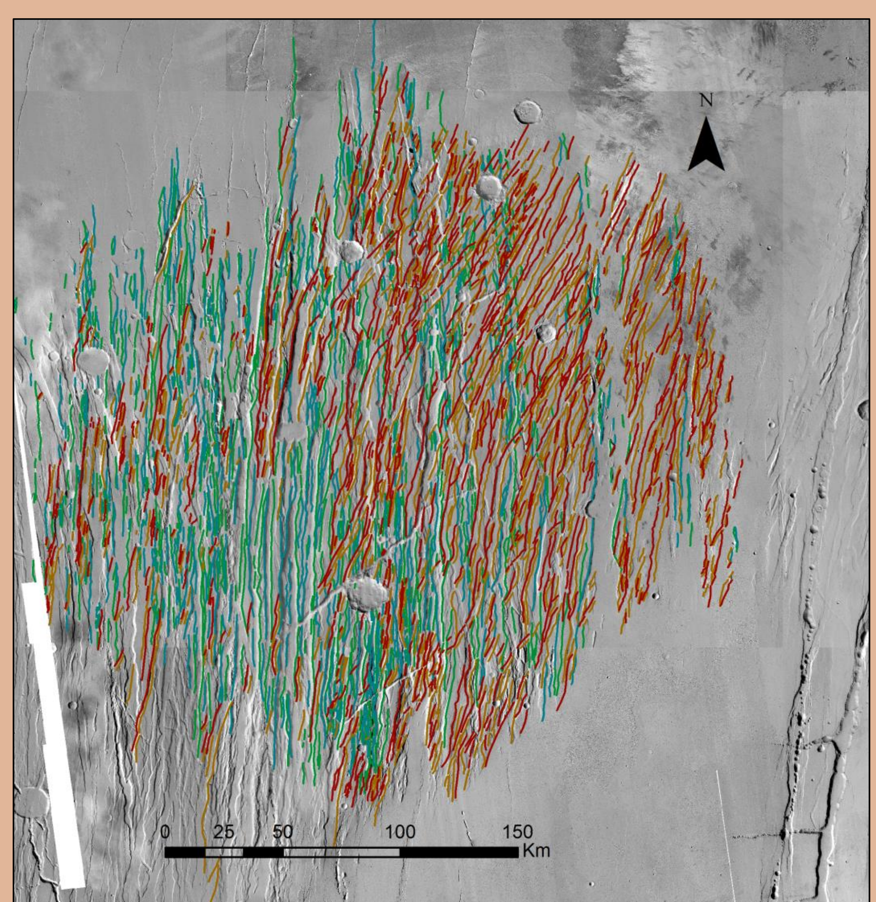
This is the **Olympus Mons** volcano on Mars. Even though it is the largest volcano in the Solar System, with a height of 22 km and a diameter of 600 km, its overall structure, which is similar to a **large pointed shield**, is the norm on mars, and is fairly similar in shape to all other Martian volcanoes.



This is the **Alba Mons** volcano on Mars. It has a height of 6.8 km and a diameter of 1600 km. Compared to Olympus Mons and the other Martian volcanoes, the structure of this volcano is much **flatter and spread** out, and has a lot of faults associated with it, on the surrounding planetary surface.

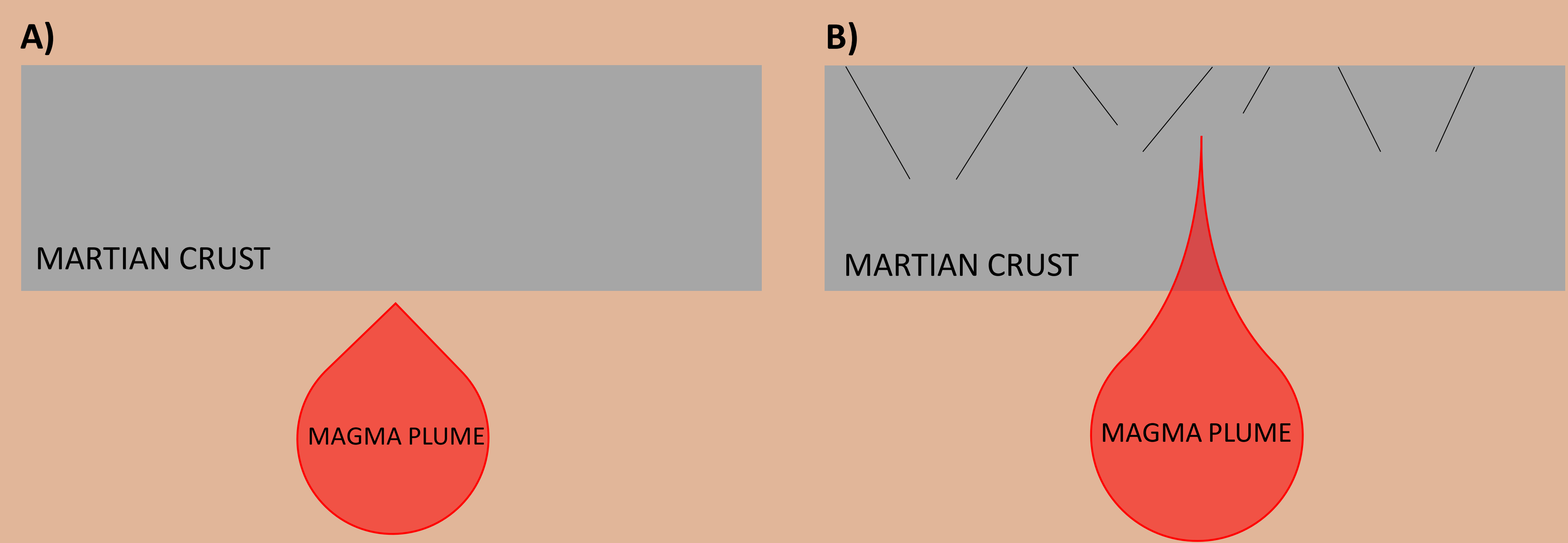
Why do these two volcanoes look so different from each other? I propose that it is because of the properties of the underlying rocks. In my PhD project, I will be investigating this hypothesis using the following steps:

Step 1: Getting "real life" information from the surface



The first step is to map all the surface structures on and around the two volcanoes Olympus Mons and Alba Mons, on images received from satellites orbiting Mars. When this is fully completed, it will provide me with a **real-life** example of a **mapped and analysed surface** to compare my computer modelling results to. The figure above shows an example of some mapped faults.

Step 2: Recreating the mapped surface with computer modelling



The figure above shows A) a section of the Martian crust with an underlying magma plume, and B) rising magma plume, moving up through the crust to form a volcano, and deforming the surface of Mars with faults.

The second step is to make a computer model of the two volcanoes. Each model will consist of a **layer of the Martian crust**, where a volcano growth will be simulated. The parameters of the crust, such as **density and thickness** of the rocks will be varying, to try and determine what parameters are defining the two volcanoes.

Step 3: Comparison

The final step will hopefully produce a **computer model** that shows similar surface deformation, as the **real-life** pattern and sizes of faults mapped in Step 1 for the two volcanoes. This will tell me what range of values that are most appropriate for the Martian crust, for the two volcanoes.

These **parameters** (such as density, thickness and hardness values) will be helpful for a further understanding of how Mars was created and developed and can aid in understanding other terrestrial planets in our Solar System, such as Mercury and Venus.

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