

Measuring the pulse of Mars

martian plate tectonics ?

Scientists do not know yet if there are still convection movements in the martian mantel which could generate martian tectonics... and thus a seismic activity.

SEIS should help to confirm or not the hypothesis of still active plate tectonics on Mars



Meteorites are probably at the origin of seismic signals !

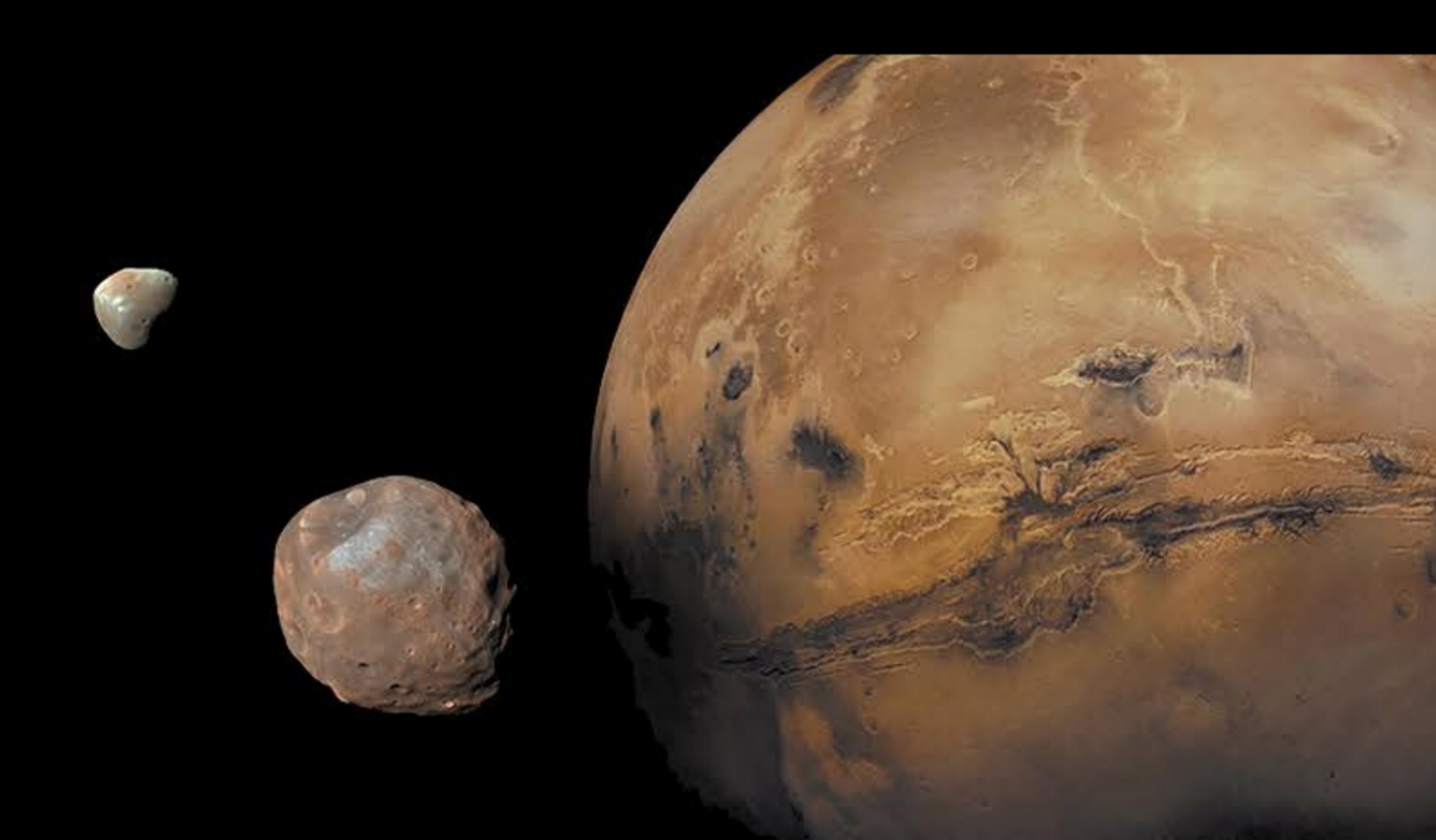
Indeed, scientists predict 4 to 6 big meteorites falls yearly. As those meteorites would not be completely destroyed while entering the martian atmosphere, they could generate seismic waves.

Probes orbiting around Mars are designed to detect those impacts traces!



One km-high sand columns are generated by sand storms due to violent winds!

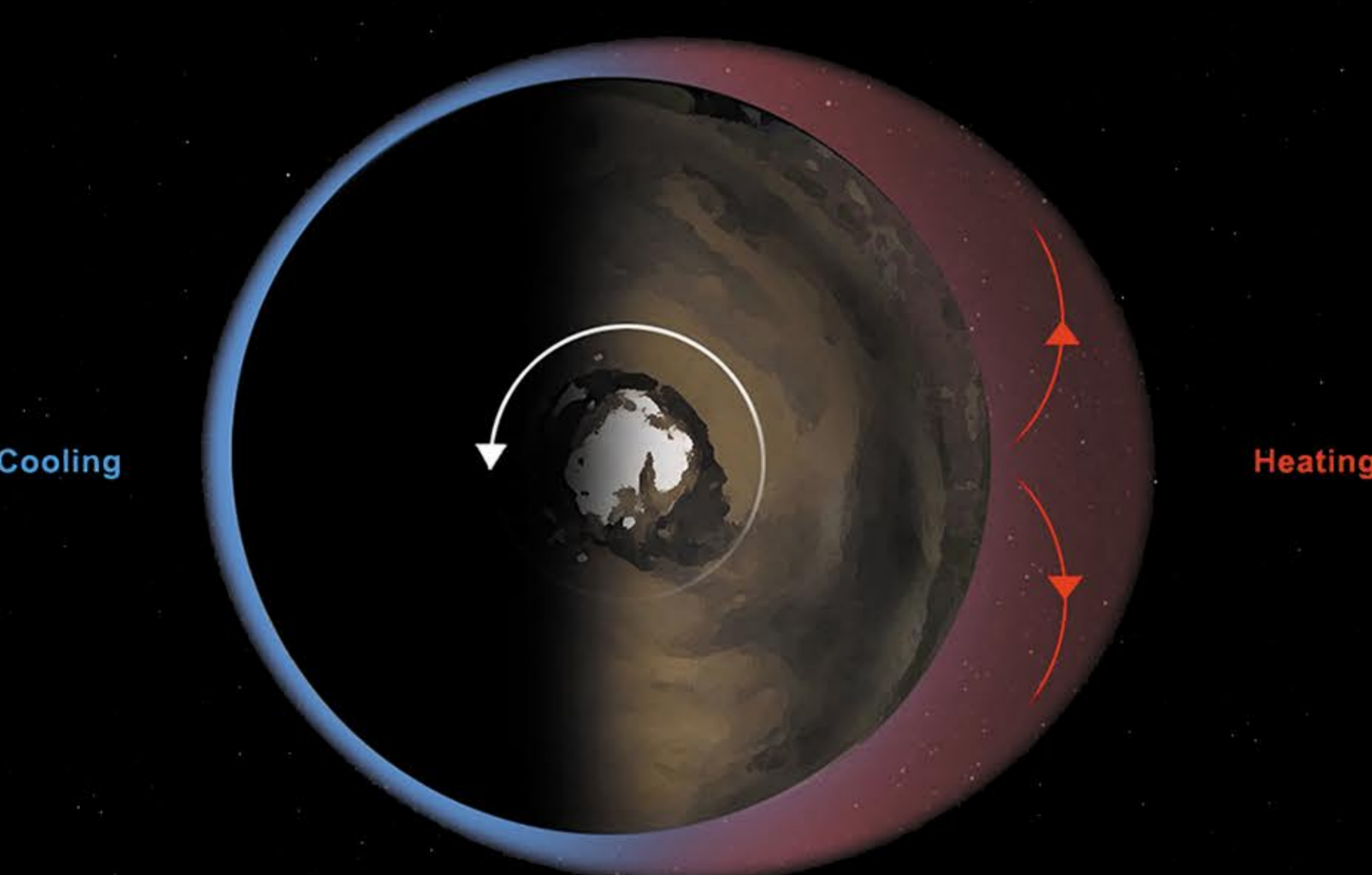
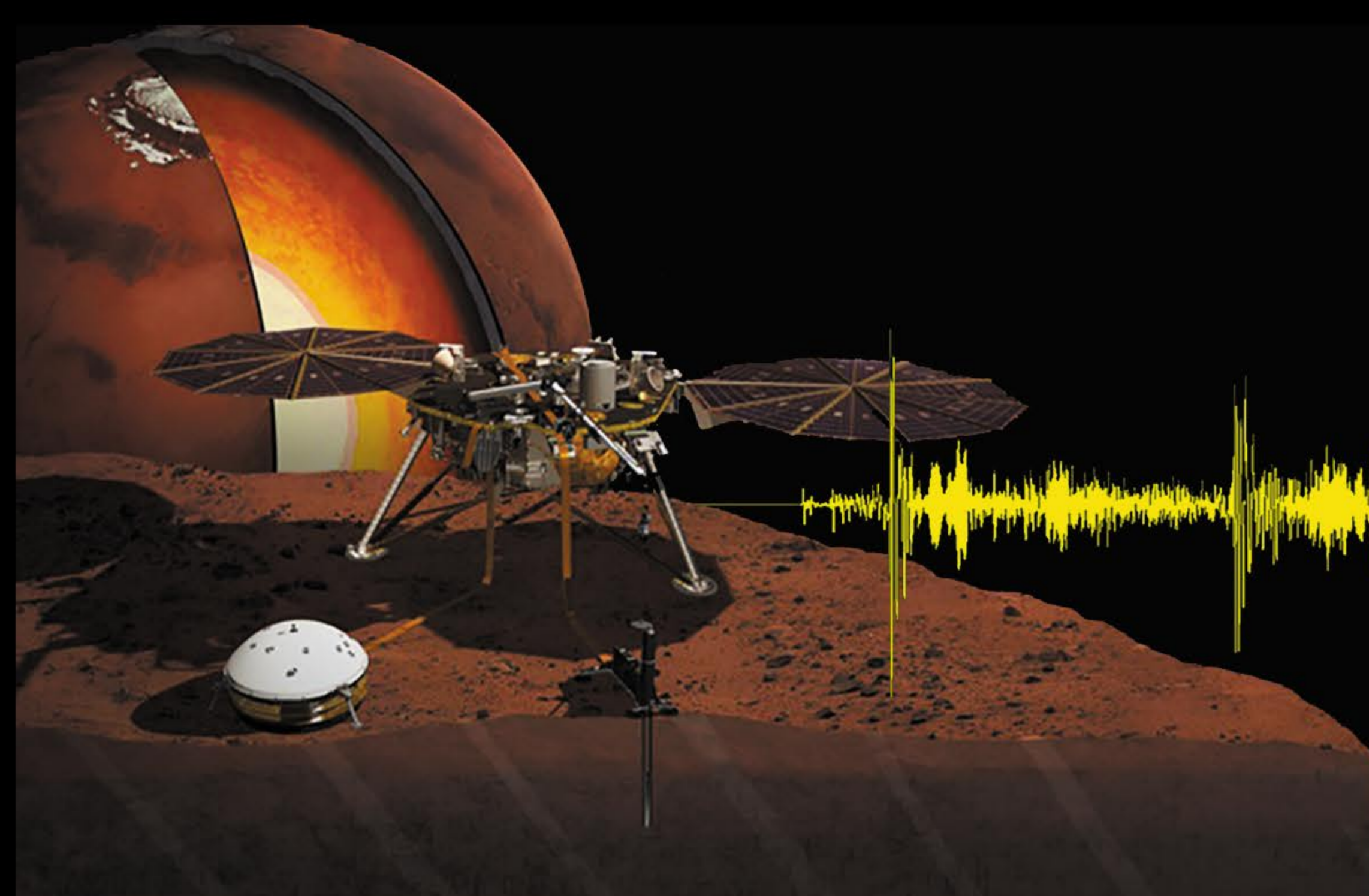
Those giant swirls generate a drop-in pressure detected by the seismometer and registered by the station's cameras.



Phobos et Deimos tides ?

The two natural satellites of Mars generate ground movements also known as martian tides.

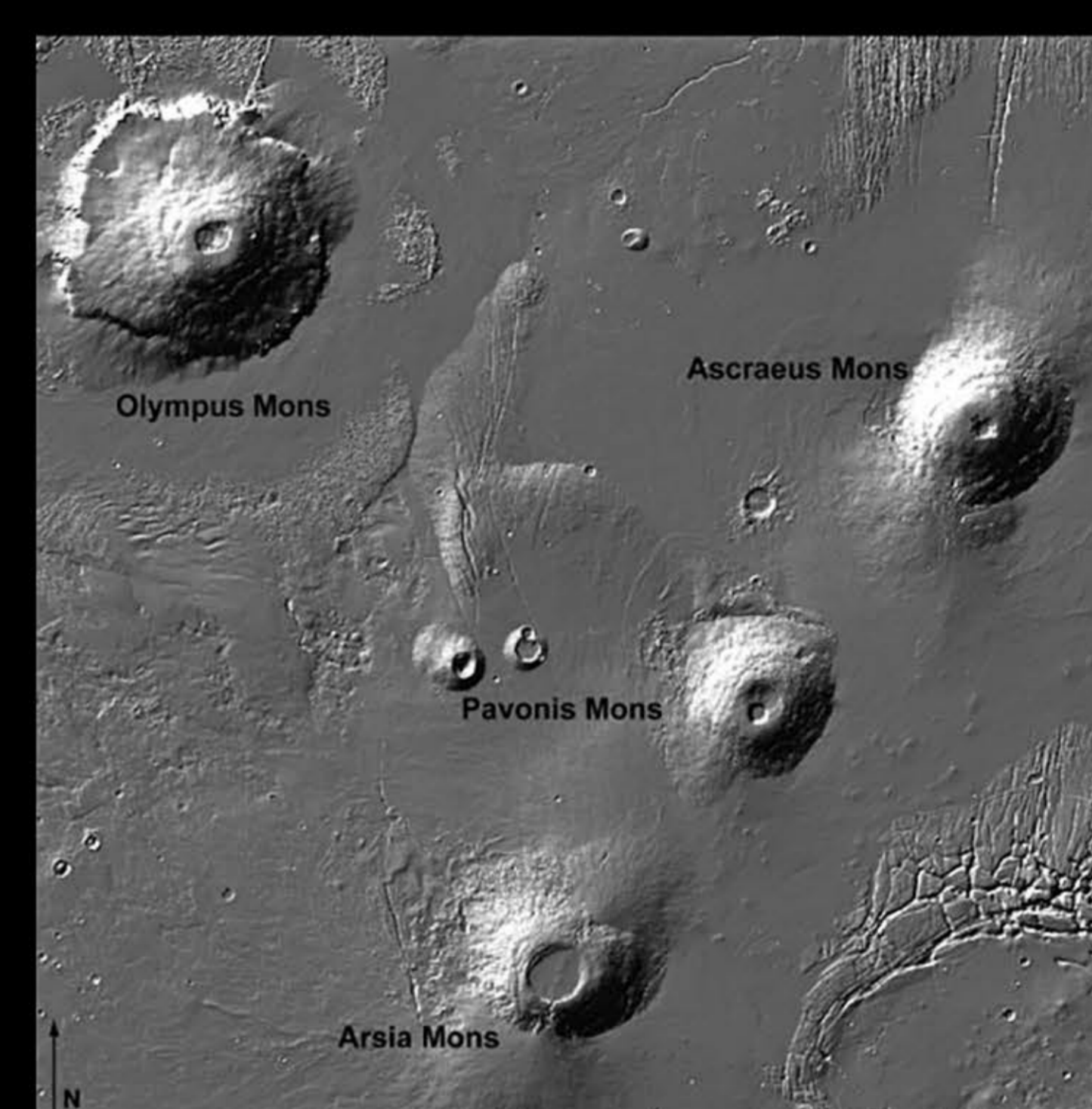
A similar phenomenon exists on Earth: terrestrial tides that are never felt! Those big ground movements will be also detected by SEIS!



Thermal cracking

On Earth, there are polar seisms due to the wide variation of temperature between day and night.

A similar phenomenon exists on Moon and is expected to be also present on Mars.



The thermoelastic cooling

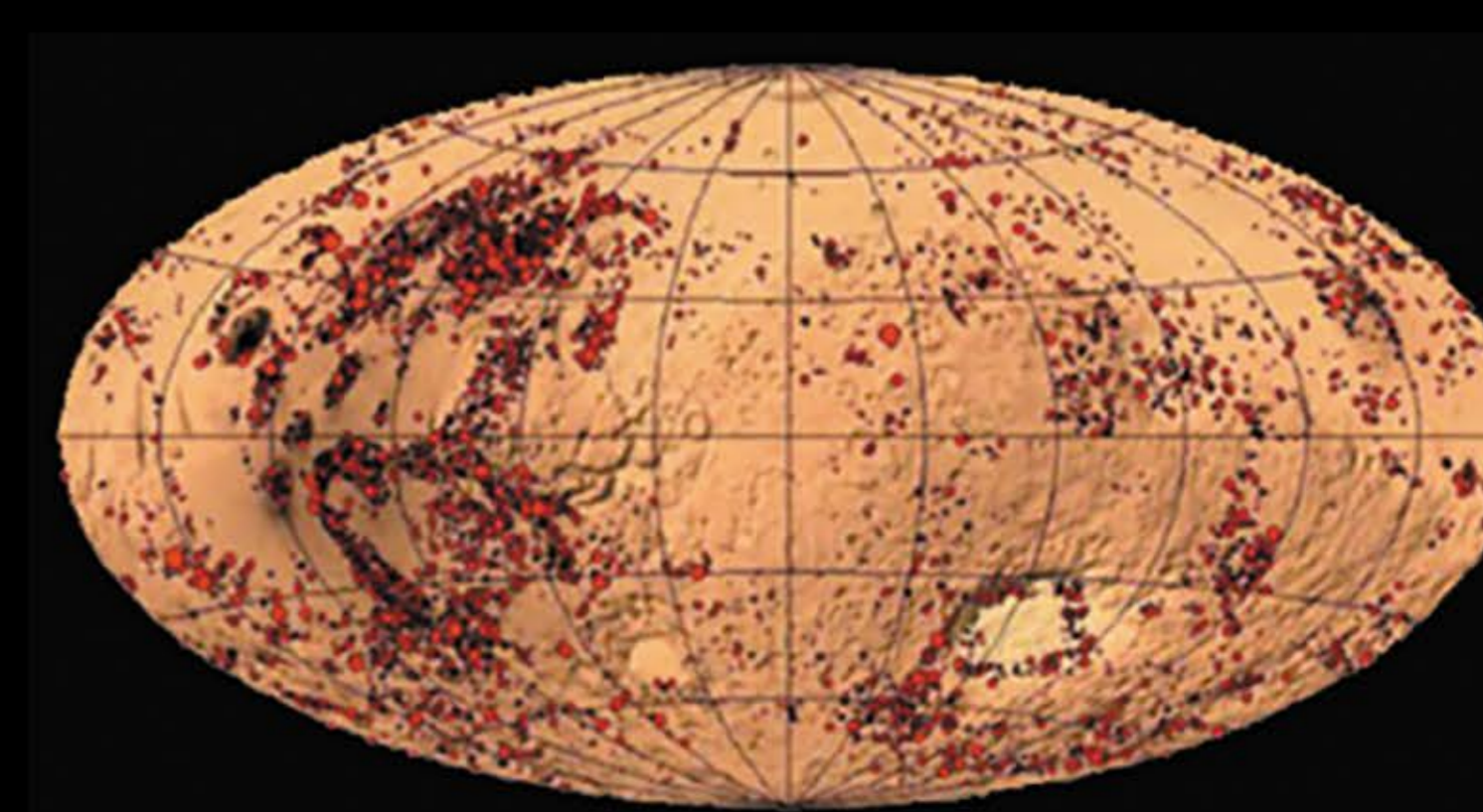
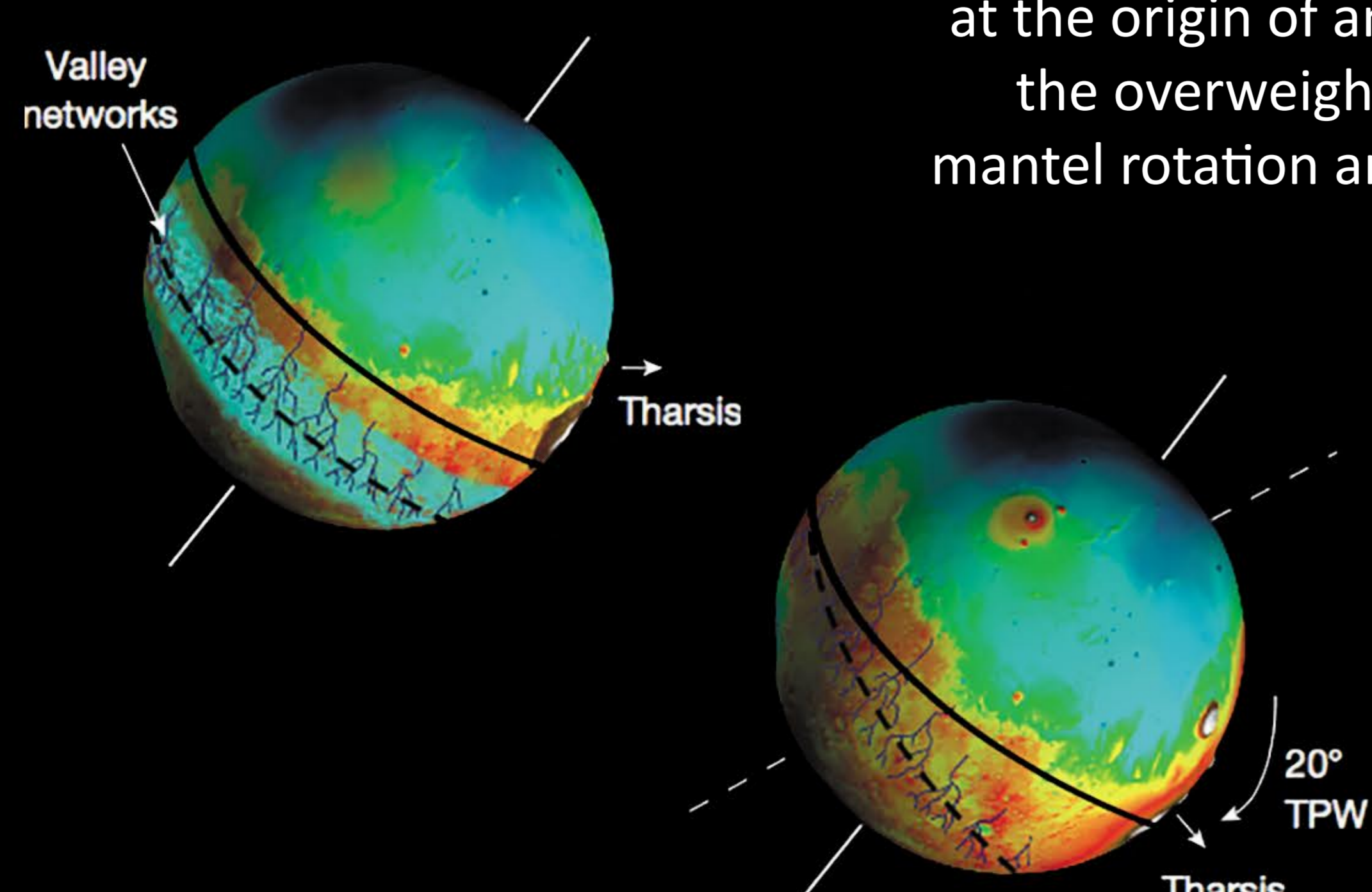
A volcanic activity was still present on Mars only 100 millions years ago. Mars would still be far from having completed its cool down .

The cooling of the lithosphere must thus be still important and generate a seismic activity.

Scientists predict that they generate about 50 seisms per year with a magnitude higher than 3.

The formation and then the dramatic growth of the Tharsis dome, due to an intense volcanic activity during several hundreds of years may be the cause of masses distribution modification. This phenomenon could be at the origin of today seismic noises.

Indeed mass accumulation in the dome was at the origin of an isostatic adjustment and the overweight generated a crust and mantel rotation around the core of about 20 degrees!



Simulation of what would be a seismic-activity map on Mars during a terrestrial year
Source: Knapmeyer et al., 2006

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Co-funded by the
Erasmus+ Programme
of the European Union



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