1) Landforms on Mars thought to have been influenced by magma-cryosphere interactions (MCI).

2) A series of laboratory experiments to investigate the range of thermal and physical processes which take place during MCI were conducted.

3) Three key heat-transfer mechanisms were identified.

4) Experimental data demonstrated that resultant surface morphology was highly dependent upon the heat-transfer mechanism/s which caused the cryosphere analogue to melt. In addition, for collapse to occur there must be a loss of support from below.

Grain-Supported Experiments
- Polygonal morphology
- Collapse morphology

Ice-Supported Experiments
- Conduction and convection
- Steam advection

In grain-supported experiments surface morphology formed due to the 10% reduction in volume when ice changes phase to liquid water.

In ice-supported experiments surface collapse occurred. The morphology of this collapse structure was dependent upon the dominant heat-transfer mechanism during the experiment.

5) Our experimental observations provide insight into the range of plausible heat-transfer processes operating as an intrusion is emplaced within the cryosphere and cools with time. A key parameter for sill-like intrusions is likely to be the ratio of the horizontal extent of the intrusion to the depth of its top below the surface.

Conclusions:
- If conduction and convection are the dominant heat-transfer mechanisms and steam advection is only minimally active at the surface then the area of surface modification may extend to significantly greater horizontal distances than the size of the intrusion and may exhibit a greater range of textures. Image: ESA/DLR/FU Berlin (G. Neukum).
- If the influence of a steam advection zone extends to the surface, any surface disruption or subsidence will be similar in size to that of the heat-source. Image: ESA/DLR/FU Berlin (G. Neukum).