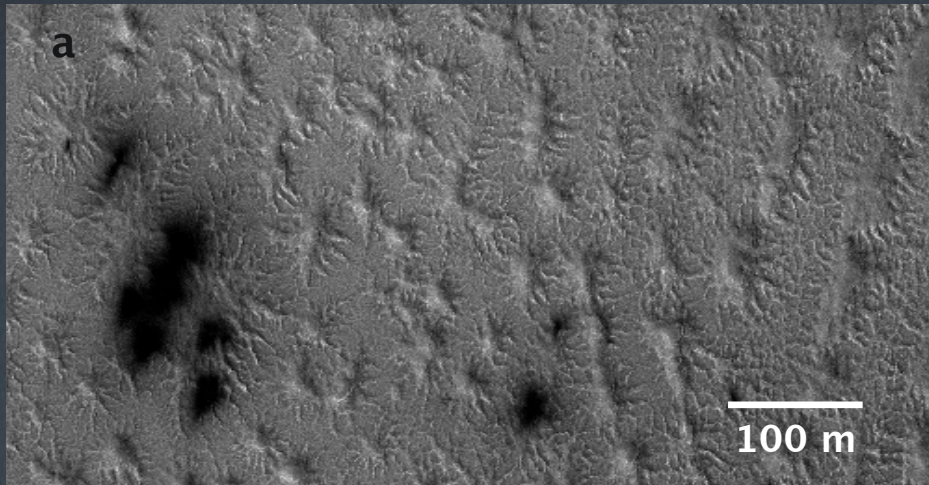


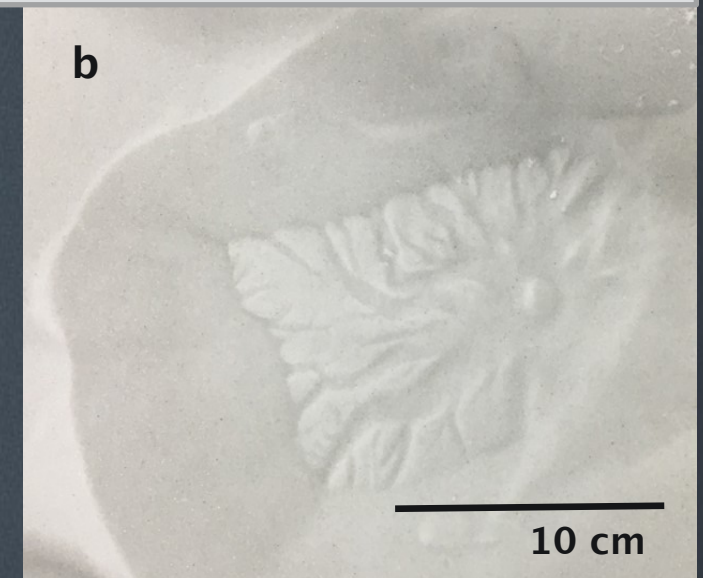
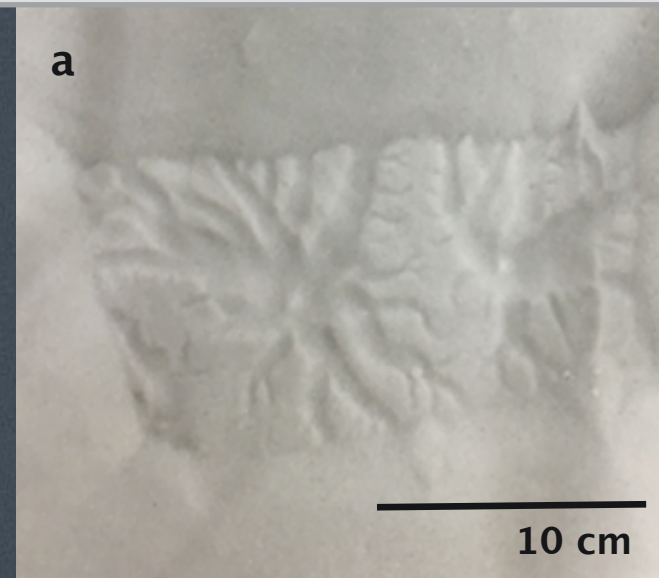
Martian Spiders Replicated in the Laboratory



Spiders are unusual branched features found around the south pole of Mars. They are like nothing seen on Earth and are often accompanied by fans and spots (a). Spiders are proposed to form in spring, when sunlight penetrates the Martian south polar seasonal CO₂ ice layer, causing it to change from ice to gas at its base and crack. Escaping gas then scours the terrain beneath, carving spider-like patterns and depositing material on top of the ice via a plume (b). However, although this suggested process is well-accepted, plumes have never been directly observed on Mars.



Experiments were performed at the Open University Mars Simulation Chamber (a) to investigate whether spider patterns could form by CO₂ changing from ice to gas under Mars pressure. Blocks of CO₂ ice with holes drilled in their centers were placed on sandy material and because this material was much warmer than the ice, it changed to gas at the base of the block. In each case, a plume moved material from beneath the ice (b).



When the block was lifted, branched spider-like patterns were observed. These experiments provide the first physical measurements of spider patterns being generated by pressurised CO₂ gas escaping through a central hole.