

## Venus: Surprising features sculpted in lava

Astronomers and geologists have long sought to penetrate the thick clouds shrouding Venus in the hope of discovering just how closely its geologic structures resemble those on Earth. Over the past two decades, several spacecraft have used radar and ultraviolet beams to view portions of the Venusian surface. But none offered the detailed resolution of the Magellan craft, which began mapping Venus last September and has so far surveyed 70 percent of the planet's surface.

Researchers have now unveiled the results of the first few months of Magellan's radar survey, which covered about 15 percent of the Venusian surface.

Analyses of these data reveal several novel geological features and confirm radar observations made by several U.S. and Soviet craft, says Magellan project scientist R. Stephen Saunders in Pasadena, Calif. He and his colleagues describe Magellan's early results in a collection of reports in the April 12 SCIENCE.

Among the striking findings: thousands of small volcanoes dotting the mostly flat Venusian landscape, mountainous volcanic structures several hundred kilometers in diameter, and evidence of massive outpourings of lava.

Magellan also found several unusually high elevations never before seen in images of the planet, Saunders says. In a region near Alpha Regio, 30° south of Venus' equator, the orbiter detected seven flattened domes up to 30 kilometers in diameter and rising nearly a kilometer in height. The steep sides of these domed hills indicate that they formed from a viscous lava, he notes.

A more liquid lava — common on Earth and believed to form the vast plains that make up 70 percent of the Venusian landscape — would spread out more evenly and would not likely build the steep, high-altitude hills, Saunders explains. In addition, he says, Venus' scorching surface temperatures may cause lava to cool more slowly than on Earth, perhaps accounting for Venus' relatively taller domes.

Saunders adds that a thick, viscous lava, typically rich in silica, usually indicates its underground predecessor — molten rock, or magma — has undergone considerable evolution, perhaps involving processes akin to those that created granite-like rock beneath Earth's continents. "The big question is, are we looking at [highly evolved] material like we find inside the Earth's continents, or are we maybe looking at some stage in the evolution of [more primitive] magma?"

Magellan also focused its radar-sharp eye on another giant structure, confirming that a 1983 Soviet craft had indeed observed the largest known caldera on Venus. Magellan images show that this

mammoth volcanic depression, lying in a region known as Sacajawea Patera, covers 300 kilometers in diameter and 1 to 2 kilometers deep — 10 times the area of any caldera on Earth. Saunders and his colleagues speculate that the caldera formed in a manner similar to those on Earth: When magma drained from an underground reservoir, the surface rock lost its support and collapsed to form a gaping depression.

Saunders emphasizes that the new findings represent just a taste of discoveries to come. "The purpose of this [mission] is to get a picture of the planet as a whole," he says, "and we haven't finished that job yet." During Magellan's second mapping cycle, the orbiter will complete a map of Venus' entire surface. That survey, scheduled to begin May 15, will include the south polar region — an area never before studied.

Contributors to the first wave of Magellan reports include researchers from Washington University in St. Louis;



NASA

*Captured by Magellan's radar, seven domed hills — each about 25 kilometers in diameter and with a maximum height of 750 meters — dominate the eastern edge of a Venusian region called Alpha Regio.*

Brown University in Providence, R.I.; the U.S. Geological Survey in Flagstaff, Ariz.; the Massachusetts Institute of Technology; Cornell University; University College London in England; Cambridge University in England; and the University of California, Los Angeles. — R. Cowen

## Federal report urges low-fat food for kids

Spare the fat, save the child. That's the message from a panel of health experts who have issued the first comprehensive report aimed at reducing blood cholesterol levels in U.S. children and teenagers. Released this week, the new recommendations from the federal National Cholesterol Education Program underscore a growing consensus that high-fat diets can cause fatty debris to deposit on artery walls — a process that can start in childhood and lead to heart attacks later.

"I cannot overemphasize the importance of the expert panel's work," said Claude Lenfant, director of the National Heart, Lung, and Blood Institute, during the report's unveiling at a conference in Washington, D.C. "Coronary heart disease is still the leading cause of death in the United States, killing over 500,000 Americans each year."

The panel views anything above 170 milligrams of cholesterol per deciliter (mg/dl) of blood as too high in children and adolescents. To reduce heart risk, panelists recommend preparing low-fat, low-cholesterol foods for all family members except children under age 2, who need more fat for proper growth.

Expanding on a dietary blueprint developed last year by another NCEP panel (SN: 3/3/90, p.132), the new report suggests that children get no more than 10 percent of their total calories from saturated fat; no more than 30 percent of their total calories from all fats; and less than 300 mg of cholesterol per day.

For most families, that means more emphasis on vegetables, lean red meats, skinless poultry, fish and low-fat dairy

products such as skim milk. To entice finicky eaters, panelists suggest serving a variety of food favorites prepared in a heart-healthy way, such as tacos made with lean meat.

The panel decided against recommending cholesterol blood tests for all children and teens. Panel chairman Ronald M. Lauer, a pediatrician with the University of Iowa in Iowa City, says such tests are not cost effective and can falsely indicate risk in certain children, causing needless anxiety.

However, the panel does recommend blood cholesterol tests for high-risk children and teenagers. This group includes those whose parents or grandparents developed coronary artery disease before age 55 and those whose parents have blood cholesterol levels of 240 mg/dl or more. Nearly 15 million of the nation's 60 million children and teenagers currently fall into this high-risk category, the panel estimates.

Scott M. Grundy, a cholesterol expert at the University of Texas' Southwestern Medical Center in Dallas, notes the report fails to stress the need for exercise, which can help regulate blood cholesterol levels in children and adults.

While emphasizing dietary strategies, the NCEP report states that physicians should consider cholesterol-reducing drugs for very high-risk children aged 10 or older whose levels of low-density lipoprotein cholesterol (the "bad" cholesterol) remain risky despite dietary therapy. If left untreated, such children may suffer heart attacks as early as their 20s, Lauer says. — K.A. Fackelmann