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**US team poised to access and sample Subglacial Lake Whillans: One of the last unexplored frontiers on the planet**

In the remaining weeks of January four dozen US scientists, drillers, and support staff are in a race against time to access Subglacial Lake Whillans before the end of this Antarctic field season. The WISSARD (Whillans Ice Stream Subglacial Access Research Drilling) project will investigate one of the last unexplored aquatic environments on Earth. The WISSARD team of researchers from eight US universities and two collaborating international institutions will use specialized tools to cleanly sample subglacial lake water and sediments, survey the lake floor with video, and characterize biological, chemical and physical properties of the lake and its surroundings.

The samples and data will be used to address questions pertaining to subglacial biology, climate history, and modern ice sheet behavior. Specific questions include: (1) Does microbial life exist in a subglacial lake environment and, if yes, what is the metabolic and phylogenetic diversity of subglacial life? (2) Did the Antarctic ice sheet shrink in the recent past and expose the study area? (3) Can subglacial lakes influence rapid retreat of the Antarctic ice sheet in the future?

The WISSARD microbiology group, led by Prof. John Priscu (Montana State University), will use sophisticated chemical and genetic analyses to see if microbial life can survive beneath the Antarctic ice sheet. Subglacial Lake Whillans is part of a vast Antarctic subglacial aquatic system, comparable in size to the area of the USA. Discovery of life in this isolated environment will help scientists understand the limits of life on Earth and inform the search for life on other planets. Priscu notes that “this is one of the last unexplored frontiers on our planet—understanding the functional role of subglacial organisms will provide us with new information on the role of the Antarctic in the Earth system.”

Geologic investigations of WISSARD samples, led by Prof. Ross Powell (Northern Illinois University), aim to verify if the West Antarctic ice sheet retreated past Lake Whillans during previous periods of warm climate. Since the lake basin itself is actually located more than 2,000 feet below sea level, WISSARD geologists will be

looking for evidence of marine microfossils and isotopic tracers of seawater that may be still present in sediment cores. Powell explains “sediments on the lake floor not only act as the main nutrient source for subglacial microbial communities, but they are also the library that holds records of past changes in the lake and perhaps even older actions of the West Antarctic Ice Sheet”.

Subglacial Lake Whillans provides a unique window into the waterworks of the ice sheet, which are of great interest to the WISSARD glaciology team. Studies of other glaciers have shown that subglacial water acts as lubricant enabling fast ice sliding. However, it has been difficult to investigate Antarctic water drainage systems because they are hidden under thick, cold ice. “Many Antarctic subglacial lakes, including Lake Whillans, experience floods during which hundreds of billions of gallons of water drain into, or out of, a single lake basin. Since subglacial water is the ultimate lubricant for ice motion, these floods may cause large parts of the ice sheet to move faster towards the ocean.” said Prof. Slawek Tulaczyk (University of California, Santa Cruz), who is leading the WISSARD glaciological field team.

To enable clean access into Subglacial Lake Whillans a team of engineers and technicians, directed by Dr. Frank Rack (University of Nebraska - Lincoln) spent nearly two years building a new hot-water drill capable of melting through 2,500 feet of ice in just a few days. It can blast a pressurized hot water jet at up to fifty gallons a minute, a rate equivalent to eight hundred 8-ounce glasses per minute. The drill is connected to a truck-sized water filter that will remove cells and particles larger than eight one-millionths of an inch, and kill any remaining cells with a powerful dose of germicidal UV radiation. All drill parts and scientific tools entering the borehole are pre-cleaned with hydrogen peroxide and, finally, go through a microbe-killing UV chamber. Laboratory tests in the US in concert with Antarctic field tests have shown that this system can reduce the number of viable cells by many orders of magnitude. Such cleaning will ensure that we remain stewards of this remote environment while at the same time protecting the integrity of the precious samples that we hope to obtain from the subglacial environment.

The WISSARD drill, along with fuel, field laboratories, workshops, computerized control centers, and scientific instrumentation as well as a deck and crane to support field operations, arrived at the Lake on January 12, 2013 after an arduous journey from the US McMurdo Station on the Victoria Land coast of Antarctica. In a feat of ultimate ‘ice road trucking’, these hundreds of thousands of pounds of cargo were brought to the site on giant sleds dragged for two weeks behind powerful tractors. The traverse route paralleled the first half of the famous trek that Scott’s expedition took to the South Pole in 1911. Members of his team would have been awed by the fact that barely over one century after their hard journey, transportation of hundreds of tons of equipment has become almost a routine, though still not trivial, task.

WISSARD drillers and scientists are now waiting for a benevolent weather window to enable them to rejoin their equipment at the drill site. They will fly out of McMurdo Station on ski-equipped airplanes operated for Antarctic research support by the US Air National Guard and Kenn Borek Air. On site, and at the station, the WISSARD team is supported by many dedicated individuals working as part of the Antarctic Support Contractor, managed by Lockheed-Martin.

The core funding for the WISSARD project comes from the National Science Foundation - Office of Polar Programs (NSF-OPP; http://www.nsf.gov/dir/index.jsp?org=OPP), with additional funds for instrument development provided by the National Aeronautics and Space Administration - Cryospheric Sciences Program (NASA-CSP; http://ice.nasa.gov/), National Oceanic and Atmospheric Administration (NOAA; http://www.noaa.gov/), as well as the Gordon and Betty Moore Foundation (http://www.moore.org/).

**For more information see the WISSARD website, www.wissard.org or contact:**

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