

LAKE VOSTOK: A CURIOSITY OR A FOCUS FOR INTERDISCIPLINARY STUDY?

Science Objectives

This preliminary science plan is based on a synthesis of working group reports. The overarching goal of the science plan is to understand the history and dynamics of the Lake Vostok as the culmination of a unique suite of geological and glaciological factors. These factors may have produced an unusual ecological niche isolated from major external inputs. The system structure may be uniquely developed due to stratification of gas hydrates. Specific scientific targets to accomplish this goal include:

- determine the geologic origin of Lake Vostok within the framework of an improved understanding of the East Antarctic continent as related to boundary conditions for a Lake Vostok ecosystem;
- develop an improved understanding of the glaciological history of the lake including the flux of water, sediment, nutrients and microbes into a Lake Vostok ecosystem;
- characterize the structure of the lake's water column, to evaluate the possibility of density driven circulation associated with melting/freezing processes or geothermal heat, the potential presence of stratified gas hydrates, and the origin and cycling of organic carbon;
- establish the structure and functional diversity of any Lake Vostok biota, an isolated ecosystem which may be an analogue for planetary environments;
- recover and identify extant microbial communities and a paleoenvironmental record extending beyond the available ice core record by sampling the stratigraphic record of gas hydrates and sediments deposited within the Lake;
- ensure the development of appropriate technologies to support the proposed experiments without contaminating the Lake.