

Italian Subglacial Lakes Initiatives

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Subglacial Lakes Introduction

About 70 subglacial lakes have been so far detected all over Antarctica (Siegert M.J., Dowdeswell J.A., Gorman M.R. and McIntyre N.F.. 1996. An inventory of Antarctic subglacial lakes. *Antarct. Sci.* 8(3), 281-286.) Subglacial lakes are of relevant interest both for the understanding of the thermal conditions at the ice-bed interface (dry or wet) and ice flow régime, and for the possibility of the presence of “life” in the lake water, an extreme environment since long time separated from the surface. Subglacial lakes could be also an archive of the past climate evolution. They could have been formed before the ice sheet formation; in this case sediments below the lakes could be of relevant interest for the climatic and environmental conditions before the Antarctic ice development.

Subglacial lakes at Dome C Region

Over the area of the Aurora Subglacial Basin (from Dome C to about 200 km towards SW), about 30 lakes were detected (Siegert et al., 1996). During the 1999-2000 Italian Antarctic expedition (I. E. Tabacco, personal communication) other 20 lakes were detected in the same area. Their minimum length varies from 2 to about 40 km. In fig 1 (Tabacco, unpublished data, see attach file) the old and the new discovered lakes are located. No lakes were detected over the area towards Vostok (obviously apart from Lake Vostok). It is apparent from fig. 2 that the Dome C area presents an unusual concentration of subglacial lakes; therefore it will be very important to study them in order to understand the reason of such a great number of lakes, and to better understand the ice flow of the region. The study of the subglacial lakes could be developed into four phases.

Phase 1

- Altimetry analysis in order to link surface anomalies with the subglacial lakes.
- Radar survey in order to define the extended boundary of the detected lakes and to discover others.
- Radar survey in order to control or confirm the lakes absence over the area towards Vostok

Phase 2

- Geophysical survey (seismic, magnetic and gravimetric) in order to detect water and sub-lake sediments thickness.

Phase 3

- Ice flow and lake modelling. Tectonic and geological models.

Phase 4

- Selection of one of the lakes to be used as a test site for drilling and for water and sediments recovery, in the mainframe of the SCAR project.

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