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Subglacial lakes from the Antarctic

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Subglacial lakes are the ones with an ice layer on the surface. The ice layer can be as thick as many kilometers long.

It is believed that the water from the lake stays liquid due to the geotermal activity, the pressure and the heat from the ice friccion.

Fig 1. Map of the Antarctic, subglacial rivers and lakes location

Nowadays, it is know that exists more than 150 subglacial lakes under the Antarctic ice layer spread all over the continent.

Ice thickness provides different characteristics to the lake. These characteristics will condition the ecosystem in different ways, as there would be some lakes with photoautotrophic psychrophiles or other with chemolithoautotroph as the primary producers.

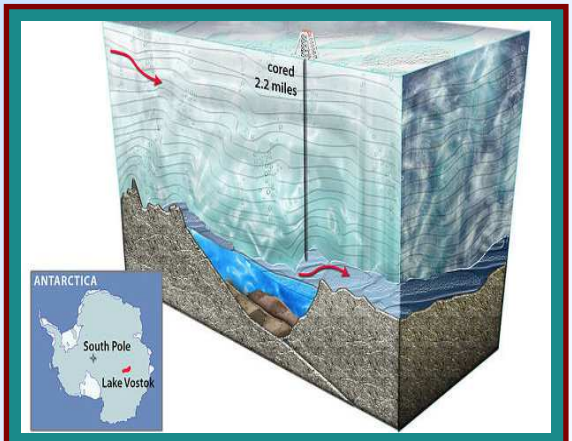

Fig 2. Cross-section from Vostok lake

Table1. Microbial diversity of different lakes

Microbial diversity	Additional information
Vida lake	
Proteobacteria	Two species of *Gammaproteobacteria* as the most abundant (*Psychrobacter sp* & *Marinobacter* sp)
	Abundant *Epsilonproteobacteria*. The cultivated species most closely related to the other species found was *Sulfurovum sp* with an identity of 95%.
Lentisphaera	Abundant group, without previously cultivated species.
Firmicutes	
Spirochaeta	One species with an identity of 97% with *Sphaerochaeta sp*
Bacteroidetes	
Varrucomicrobia	
TM7	
Actinobaacteria	
Vostok lake	
β-proteobacteria	Four *Acidovorax* sequences and a *Comamonas* sequence
α-proteobacteria	An *Afipia* sequence
Actinomyces	A similar sequence to other *Actinomyces* from glacial ice

Table 2. Additional information of different lakes

Lake	Vida lake	Vostok lake
Ice thickness	800 to 970 m	3750 to 4150 m
Temperature	-13,4ºC	~ -3ºC
Isolation time	2800 years	Between 10^5 and 10^6 years
Oxygen	Anoxic	Between 700 and 1200 mg/L
Salinity	18,8%	Diversity of opinions (<1 -12%)
Light	Aphotic	Aphotic

Conclusions:

- There are a lot of difficulties to sample these environments due to:
  - -The environment conditions (ex: weather)
  - -Hight probability of introduce contamination during field work
- Divergent opinions about protocols and methods
- Wide range of adaptations to this environment, from energy source to morfologic, fisiologic or biochemistry modifications, that makes possible to live in those places.
- A hight interest in preparing new expeditions to some moons from our Solar system, in order to find life under the ice layer. For instance, in Europe or Enceladus.

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