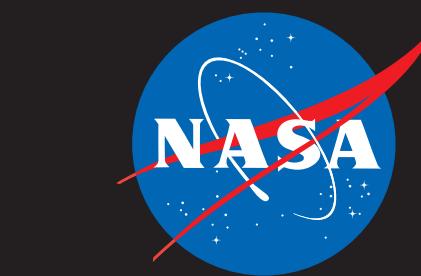


Planetary Lake Lander

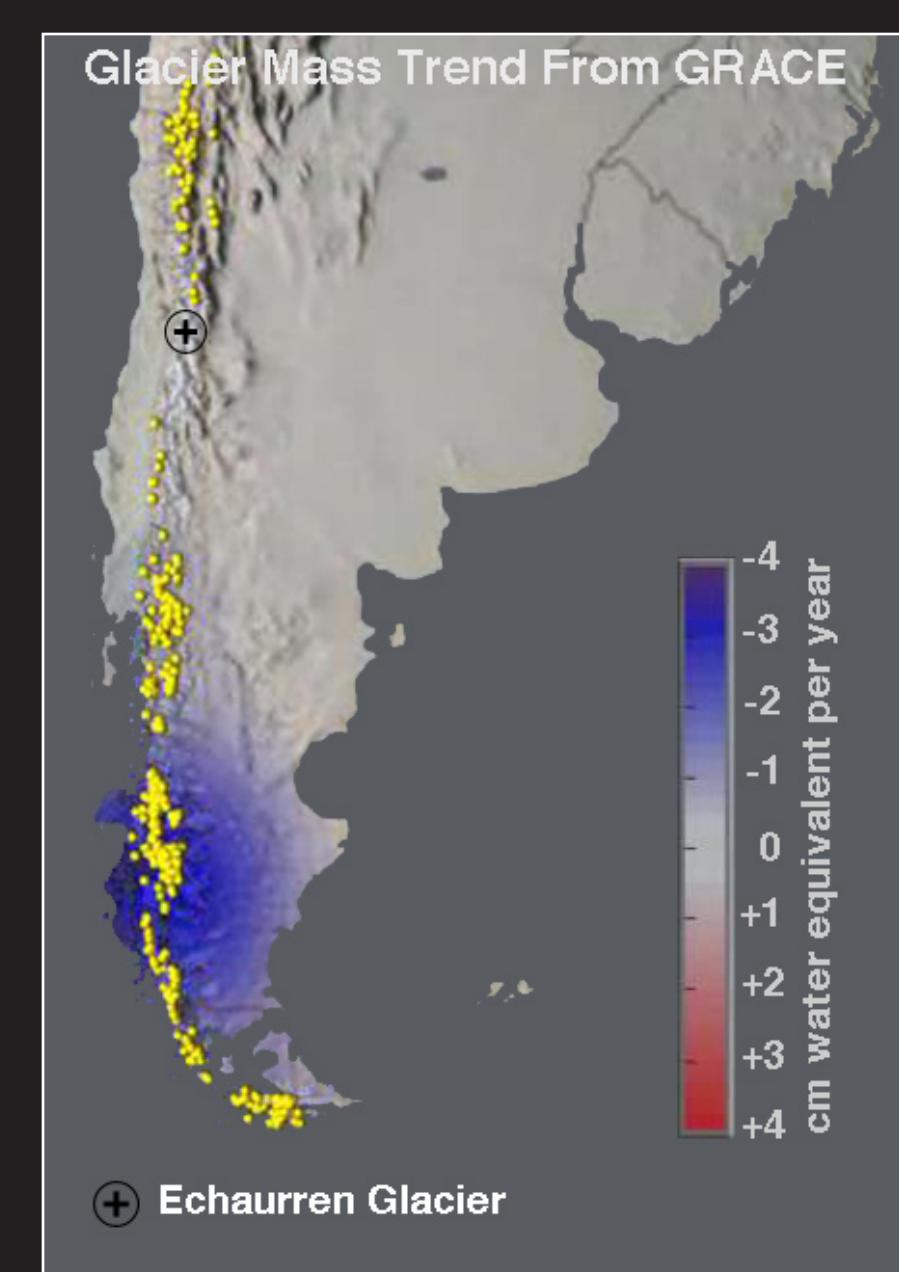
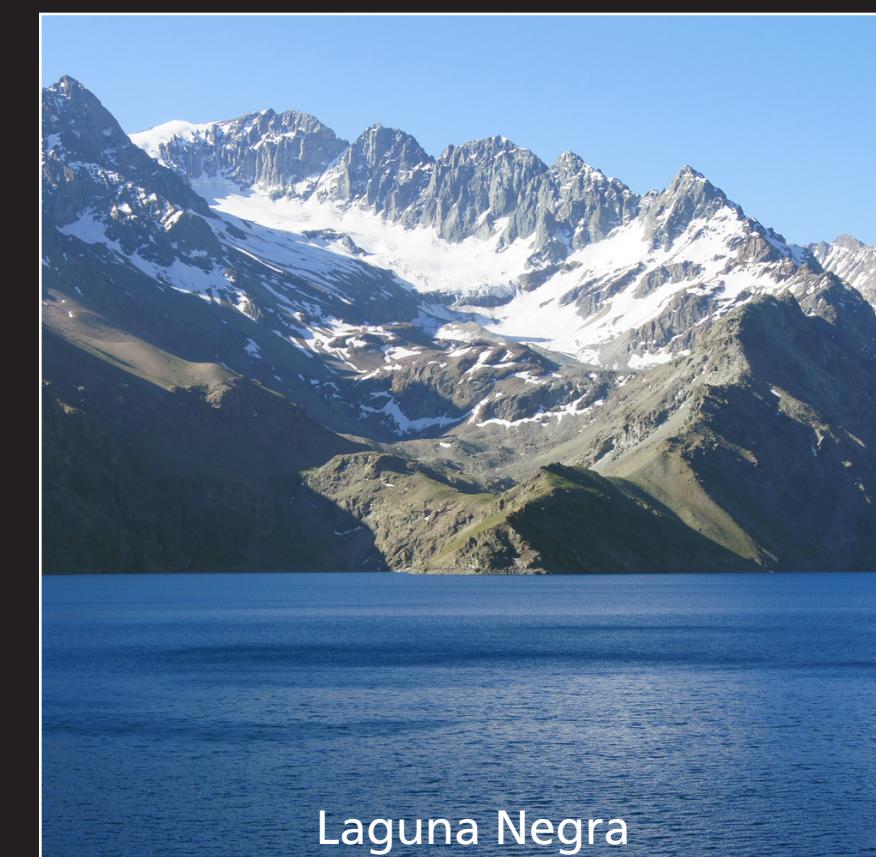
funded by NASA ASTEP



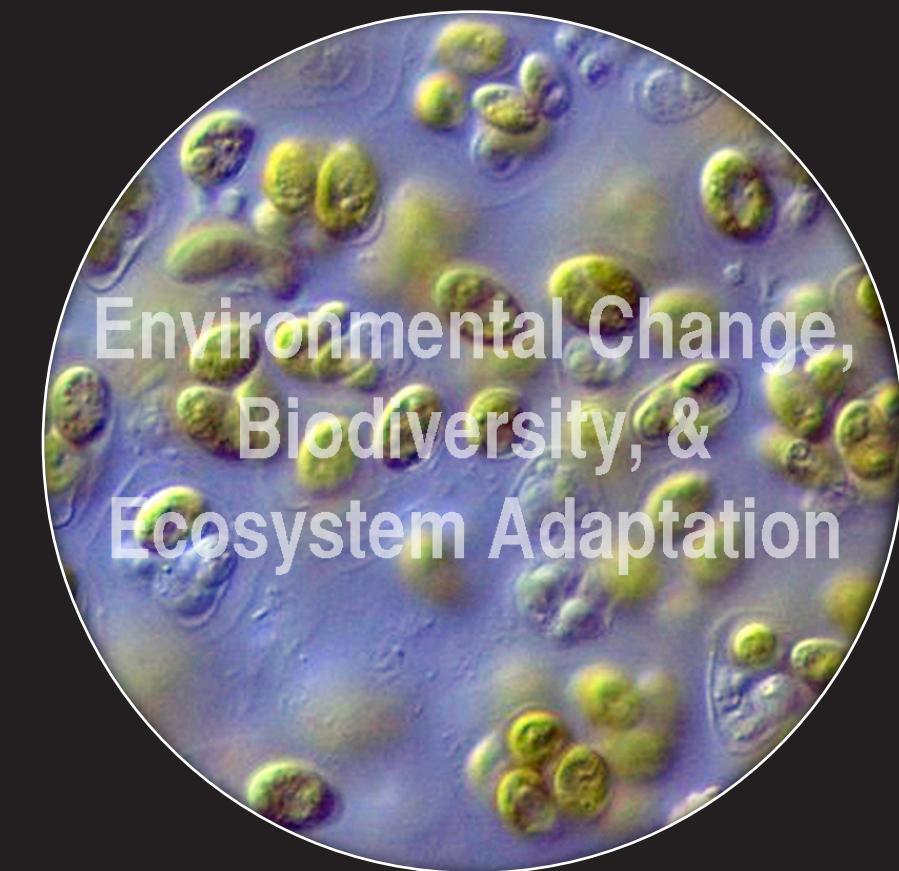
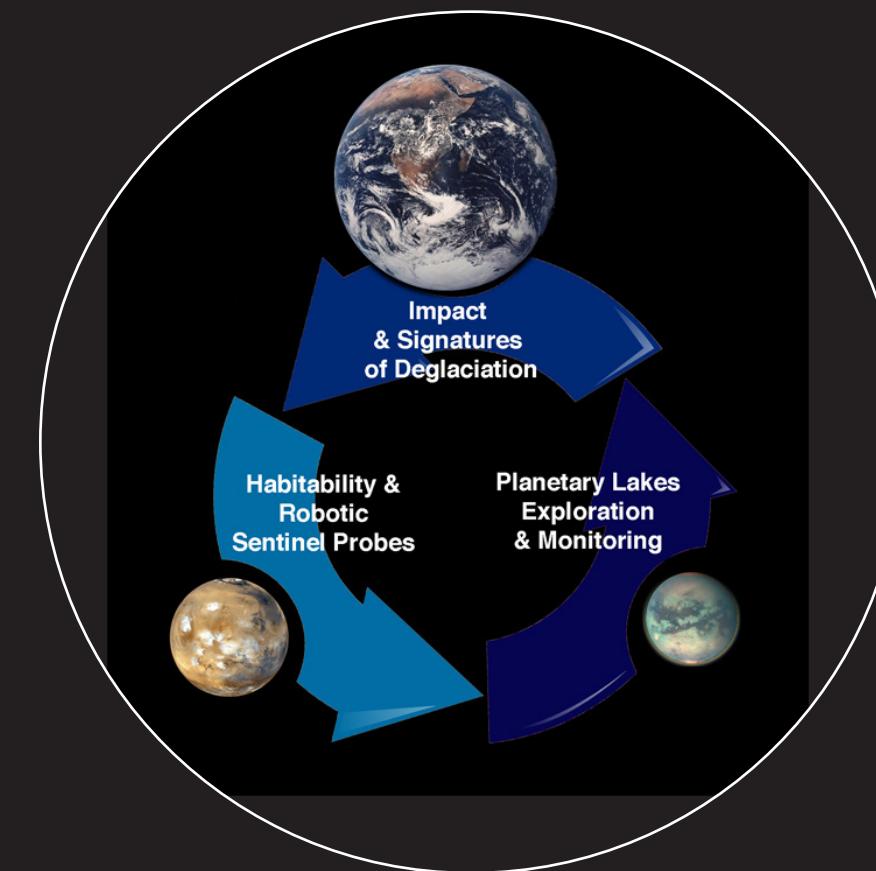
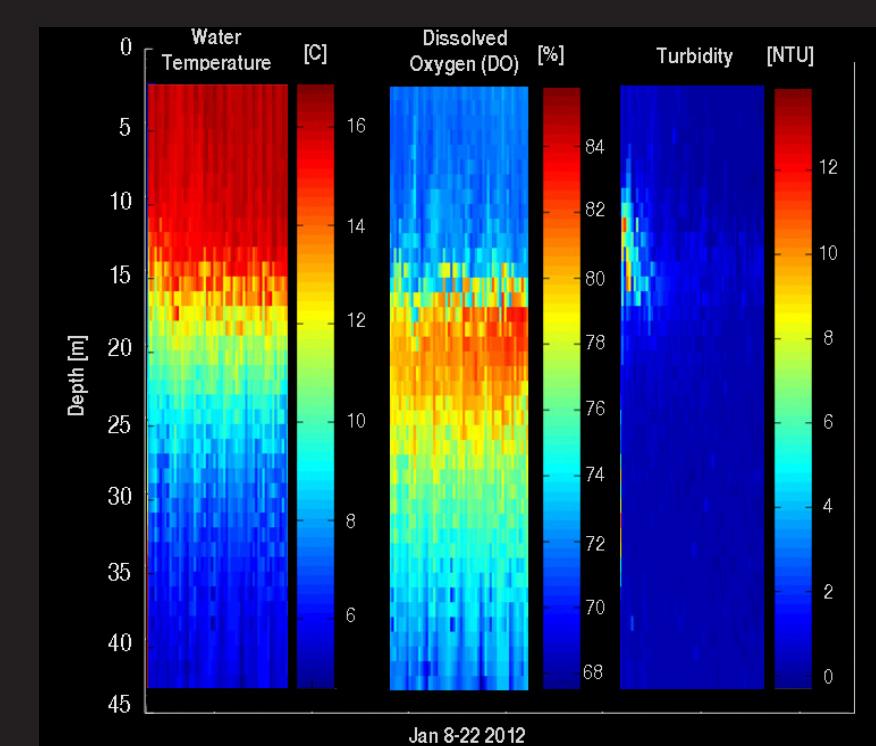
The Planetary Lake Lander project (PLL) is developing an autonomous, adaptive, lake lander to gain operational experience that will help us better understand the technology, systems, payload, and exploration strategies necessary to explore the lakes and seas of Titan. The field tests are taking place at Laguna Negra (33.38S/70.07W) in the Chilean Andes, where rising temperatures are leading to accelerated melting of ice and glacier retreat. While testing technology for the exploration of Titan, PLL also provides an opportunity to collect data about the impact of environmental change on lake habitats and ecosystems in a region of Earth less documented than the poles or the Himalayas. In the process, PLL also brings new insights into Mars habitability and life potential during comparable geological periods early in Mars history and later, during high-obliquity cycles, when snow precipitation, glaciers, and glacial lake formation were possible.



Artist's depiction of the PLL landing on Titan. Image credit: Danielle Futselaar

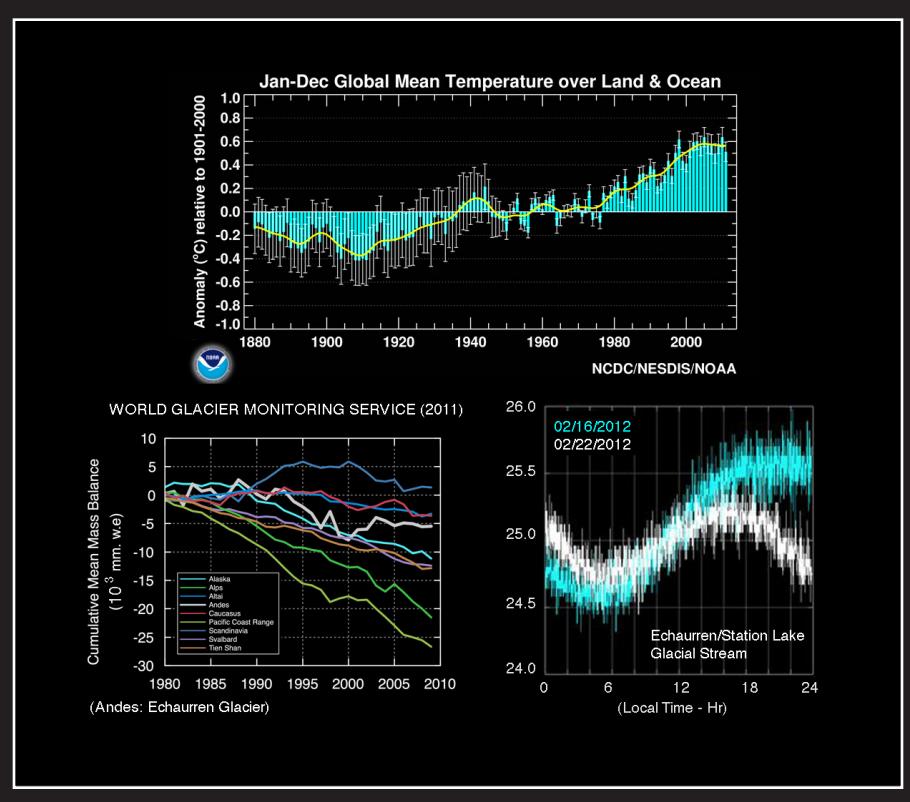


The Echaurren Glacier (4,500-3,500 m asl) and Laguna Negra are located in the Central Andes of Chile (33.38S and 70.08W). The glacial watershed is 65 km². It is one of the main freshwater resources for nearly 6 million Chileans and is disappearing quickly. Highly variable interannual melting rates bring fluctuations in the turbidity where meltstreams enter the lake. The ecosystem responses to this change are studied by the Planetary Lake Lander project.



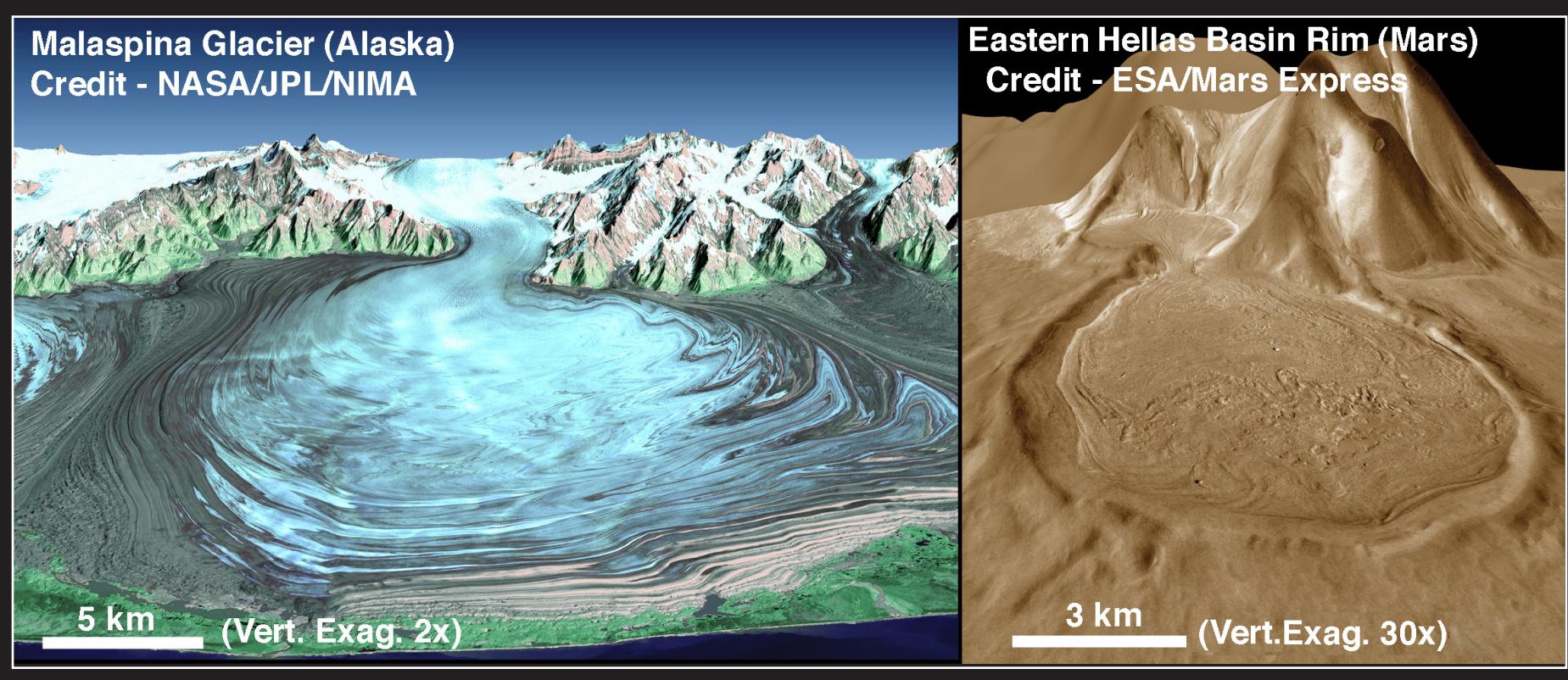
PLANETARY LAKE LANDER (PLL)
PLL is a lake profiler equipped with a multiparameter sonde. It collects data about water temperature, turbidity, total dissolved solids, salinity, pH, dissolved oxygen, conductivity, chlorophyll, and blue and green algae along various depths. PLL is also equipped with a meteorological station and a suite of sensors that provide information on the changing status of Laguna Negra. What distinguishes PLL from standard profilers is its ability to sense the changes in the lake and make decisions on how, and when, to collect mission critical data without human supervision. Its adaptive profiling will ultimately allow PLL to autonomously select the profiling frequency and depths as a function of the type of environmental change its system recognizes. In doing so, PLL helps monitoring the impact of climate change on glacial lakes more closely on our planet, and prepares future robotic missions to the lakes of Titan. PLL represents a step toward the development of autonomous planetary sentinel robots.

EARTH SCIENCES



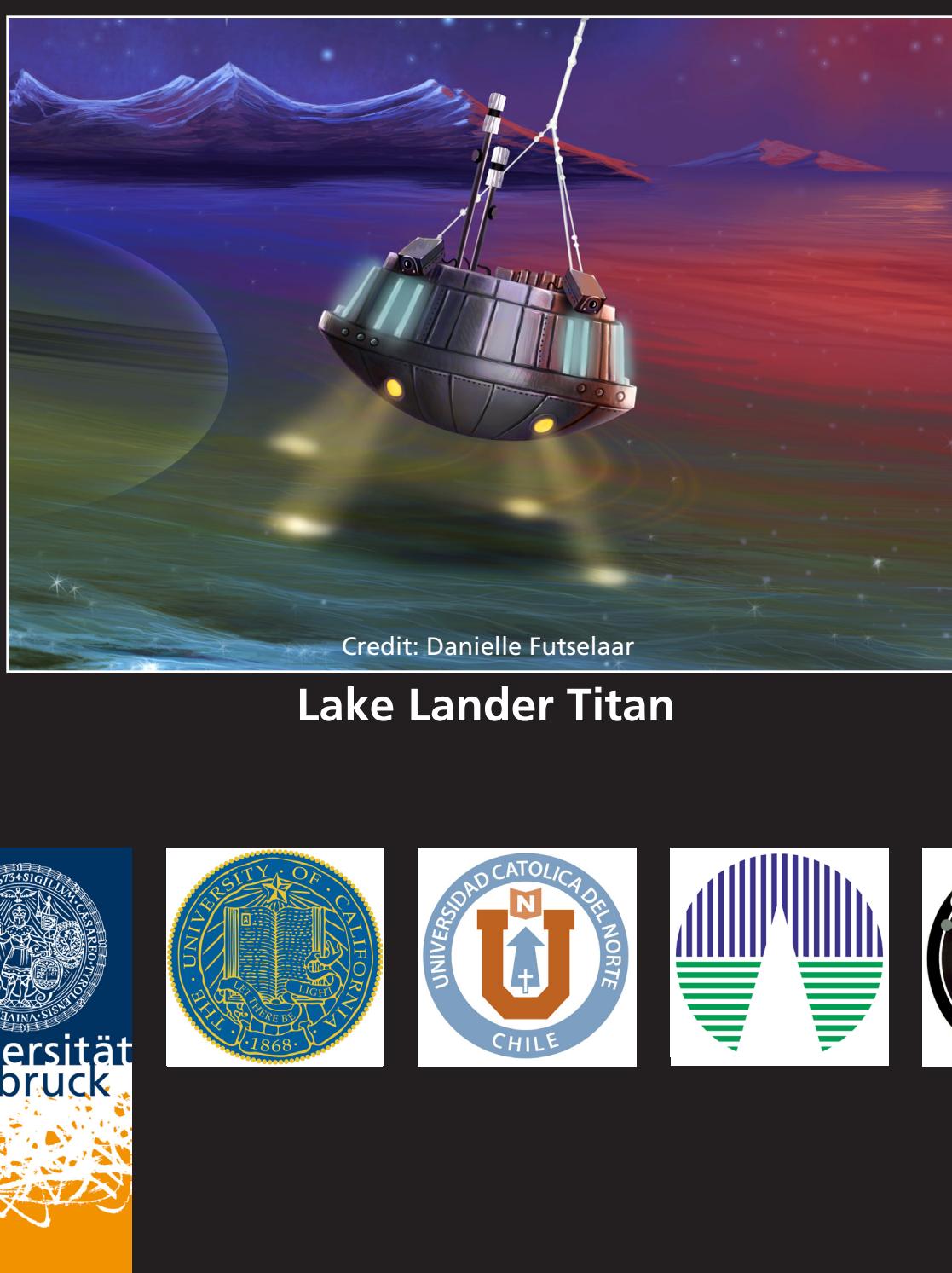
Rapid Environmental Change

PLANETARY SCIENCES



Glaciers on Earth & Mars

EXPLORATION



Lake Lander Titan

ASTROBIOLOGY



Planetary Lakes and Life Habitats

