POLAR 2018

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Abstract Proceedings

Open Science Conference

19 – 23 June 2018

Davos, Switzerland

IASC

A SCAR and IASC Event

SCAR

These abstract proceedings were produced based on the program for the POLAR2018 SCAR/IASC Open Science Conference, updated until 25 May 2018. All changes after that date (presenting authors, oral and poster contributions cancelled after that date, changes from poster to oral presentation, additional co-authors) are not reflected in these proceedings. The final version of the abstracts is available in the online program on http://www.professionalabstracts.com/POLAR2018/iPlanner

ISBN 978-0-948277-54-2

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Tue_112_BE-1_949
Chronosequence of Active Bacterial Community from an Alpine Ice Cave

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Investigation of glacial habitats became a priority due to the impact of climate changes on the dynamics of Polar and alpine glaciers. Our study focused on cave ice microbiome unraveled the diversity of total and active bacterial communities from the 13,000 years old ice chronosequence of Scarisoara Ice Cave, Romania. Vertical ice coring of the perennial ice block was carried out, reaching a record depth of 25.3 m. Radiocarbon dating of the ice core indicated a linear chronosequence up to 13,000 years B.P.
16 melted ice samples from every 1,000 years interval were filtered and used for total DNA and RNA extraction and geochemical analyses. Chemical parameters revealed large variations for the last 5 centuries followed by a stable period, and significant changes in the 5000 years B.P. ice layer. Bacterial diversity based on 16S rRNA gene MiSeq Illumina sequencing of both gDNA and cDNA is currently underway. Correlation with the chemistry of the ice substrate will unravel the microbial resilience, highlighting the active community composition in this habitat for the last 13,000 years. Total and viable microbial content of each sample was quantified by qPCR and LIVE/DEAD staining, indicating a correlation with age and organic content of the ice.
This report of the oldest cave ice chronosequence could contribute to identifying biomarkers of climate and environmental changes.
Acknowledgments: This work was supported by the UEFISCDI H2020 ERANET-LAC ELAC2014/DCC0178 joint project.