



HAL
open science

Lake Urmia Salt lake's sedimentation and water dynamics impacts on past environmental reconstruction

E. Gibert, Alina Tudryn, Ting Kong, Piotr Tucholka, Seyed-Hani Motavalli-Anbaran, Christelle Marlin, Mohammad Lankarani, Hesam Ahmady-Birgani

► To cite this version:

E. Gibert, Alina Tudryn, Ting Kong, Piotr Tucholka, Seyed-Hani Motavalli-Anbaran, et al.. Lake Urmia Salt lake's sedimentation and water dynamics impacts on past environmental reconstruction. 7ème édition du colloque "Climat et Impacts" 2022, Nov 2022, Gif-sur-Yvette, France. hal-03874535

HAL Id: hal-03874535

<https://cnrs.hal.science/hal-03874535>

Submitted on 28 Nov 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

7^{ème} édition

Colloque CLIMAT ET IMPACTS

23, 24 & 25 novembre 2022

Volume des résumés



Sessions

- 1/ Session blanche
- 2/ Interactions climat, tectonique et cycles biogéochimiques aux longues échelles de temps
- 3/ Le patrimoine naturel et culturel face au changement climatique
- 4/ Impacts du changement climatique sur les socio-éco systèmes
- 5/ Dynamique des glaciers et des pergélisols de hautes latitudes/altitudes : évolution récente et archives paléoenvironnementales et géoarchéologiques
- 6/ Interaction humain-environnement durant le Pleistocène récent et l'Holocène
- 7/ Impacts du changement climatique sur les eaux souterraines profondes
- 8/ Dynamique des changements climatiques et interactions avec les écosystèmes et sociétés humaines en régions tropicales et sub-tropicales au cours du Quaternaire
- 9/ Apport de la Géochronologie à la compréhension des variations climatiques et culturelles passées
- 10/ Interactions entre climat, environnement et biodiversité passée, présente et future : apport des données et modèles
- 11/ Événements climatiques extrêmes à différentes échelles de temps : fréquence, intensité et processus
- 12/ Élaboration et application de traceurs/proxies à l'océanographie et à la paléocéanographie

COMITÉ D'ORGANISATION :
Christine Matté Christine.Matte@lsce-ipsl.fr
Christophe Colin christophe.colin@universite-paris-saclay.fr

<https://premc.org/climat-impacts-2022/>

Lake Urmia Salt lake's sedimentation and water dynamics impacts on past environmental reconstruction

Elisabeth GIBERT-BRUNET ^{1, *}, Alina TUDRYN ¹, Ting KONG ¹, Piotr TUCHOLKA ^{1,2}, Seyed-Hani MOTAVALLI-ANBARAN ³, Christelle MARLIN ¹, Mohammad LANKARANI ⁴, Hesam AHMADY-BIRGANI ⁵

¹ University Paris-Saclay, UMR CNRS 8148-GEOPS, Bâtiment 504, 91405, Orsay, France (elisabeth.gibert@universite-paris-saclay.fr)

² Université de Varsovie, Département de Géographie, Zwirki i Wigury 93, 02-089 Warszawa, Poland

³ Institute of Geophysics, University of Tehran, Tehran, Iran

⁴ Faculty of Natural Resources, Urmia University, Urmia, Iran

⁵ School of Geology, University-College of Science, University of Tehran, Tehran, Iran

In recent decades, an overall decrease in surface water resources, even saline, especially in semi-arid and arid regions of the world, can be both a precursor to a decrease in groundwater recharge. This decrease comes either from the impact of climate change moving towards a different distribution of precipitation and evapotranspiration indices, and/or from the increasing footprint of anthropogenic activities both through inappropriate water use, extensive pumping, or even population increases in areas already under pressure for freshwater resources (e.g., Wurtsbaugh et al., 2017; Wang et al., 2018).

This is particularly pregnant in salt lake basins for which water resources are vital to hydro-ecosystems and the population. But these basins are not easy to study other than by modeling, due to their very complicated structures as well as the processes they undergo (saltwater intrusion, pollution, etc.), and considering the lacustrine sedimentary deposits (degradation) to which they may or may not be connected.

Here we present ongoing research on the Urmia Lake Basin (northern Iran) which is facing a drastic decrease of more than 8 m in its water level over the last 20 years, leading to soil salinization, increase in dust storms, decline in ecosystem services with the effect of losses in agricultural production and massive emigration of rural communities.

In order to understand the hydrogeological behavior of the lake under anthropogenic pressures (excessive pumping) and climate change, sedimentary sequences were recovered from the recently drained western part of Urmia Salt Lake, as well as surface and groundwater samples and geological samples from the entire Shahr Chay River Basin.

Using isotope geochemistry ($\delta^{18}\text{O}$, $\delta^2\text{H}$, $\delta^{13}\text{C}$ et A^{14}C), we propose a conceptual model of the lake functioning.

