MOHAMMAD HAGHIRI

Ph.D STUDENT

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RESEARCH INTERESTS

Hydrogeology; Climate Change; Water Table; landscape analysis and evolution; Karst Aquifer; Isotope Analysis, Rainwater Harvesting.

ACADEMIC POSITIONS

Ph.D Student – Department of Earth and Environmental Sciences, University of Illinois Chicago 2023 – Present

Research topic: I am passionate about advancing my studies in Hydrology and Hydrogeology. My current project focuses on predicting groundwater resources and assessing the impact of climate variables using the Water Table Model (WTM) to understand present and future changes in terrestrial water tables.

Supervisor: Professor Kerry Lee Callaghan.

EDUCATION

Ph.D. Earth and Environmental Sciences – University of Illinois Chicago 2023-present

***Research topic*:** Use the Water Table Model (WTM) to predict climate-induced changes to the water table for years 2100, 2300, and 3000 at a global scale.

***Project Summary*:** This research project utilizes the Water Table Model (WTM) to forecast climate-induced changes at global scale water table levels by the years 2100, 2300 and 3000 focusing on the implications for water resource management and climate change adaptation. Employing historical data from TerraClimate and future projections from CMIP6, the WTM simulates potential shifts in groundwater levels based on variables such as precipitation, evaporation rates, and temperature changes. By validating the model with current observations and applying it to future scenarios, this study aims to identify significant regional variations in water table dynamics, enhancing our understanding of water availability and informing strategic responses to future environmental challenges.

Advisor: Professor Kerry Lee Callaghan. 2022

M.Sc. Hydrogeology – University of Tehran.

Research topic: Hydrochemical and isotopic analysis for characterizing the karst aquifers at Hashtgerd Basin, North of Iran.

***Project Summary*:** This research project examines the hydrodynamics, hydrochemistry, and isotopes of karst aquifers in Hashtgerd Basin, northern Iran, crucial for the region's drinking water supply. The study, focusing on various water sources including springs, qanats, and wells, identifies the primary water types as calcium and magnesium-bicarbonate. Isotopic patterns indicate minimal evaporation effects, and hydrograph analysis suggests short residence times for water in the karst systems. The findings underscore the need for careful water resource management to prevent adverse effects on the karst aquifers from nearby drilling activities.

Advisor: Professor Morteza Mozafari.

B.Sc. Geology – Kharazmi University 2020

Research topic: Remote Sensing and Field Visit for Small Scale Runoff Harvesting for Agricultural Water Consumption Management, Case Study at Kariyan, Hormozgan, Iran.

***Project Summary*:** This study evaluates the feasibility of constructing a runoff water reservoir in Kariyan village, Hormozgan, Iran, to mitigate local water scarcity. Using remote sensing and field analysis, it assesses key factors like rainfall, evaporation, and geography to determine the reservoir's effectiveness in managing agricultural water consumption. The findings provide a model for similar arid regions, offering strategies to improve water management and sustainability.

Advisor: Professor Mohammad Reza Asef.

ADDITIONAL QUALIFICATIONS

ICDL (International Computer Driving License) Certificate (C1), Tehran University 2017

ArcGIS Software (C2), Tehran University 2018

Python Language (C1), Tehran University 2019

PUBLICATIONS

JOURNAL ARTICLES:

Haghiri, M., Raeisi, N., Azizi, R. et al. 2024. Evaluation of karst aquifer development and karst water resource potential using fuzzy logic model (FAHP) and analysis hierarchy process (AHP): a case study, North of Iran. Carbonates Evaporites 39, 11 (2024). https://doi.org/10.1007/s13146-024-00925-w.

Haghiri, M., Asef, M.R. Remote sensing and field visit for small scale runoff harvesting for agricultural water consumption management, case study at Kariyan, Hormozgan, Iran. Environ Earth Sci 83, 416 (2024). https://doi.org/10.1007/s12665-024-11734-8

Haghiri, M., Mozafari, M. Delineate the hydrogeology of karst aquifers at the Hashtgerd Basin (north Iran) using a combination of geologic, hydrodynamical, hydrochemical and isotopic investigations. (accepted at Hydrogeology Journal).

Haghiri, M., Asef. M.R. Analysis of Comparative Advantage and Engineering Status of Freshwater Reservoirs across the Provinces in Iran. Iranian Journal of Engineering Geology, 2021. http://www.jiraeg.ir/article_137494.html.

Habibi. S, Mozafari, M. Fijani. E, **Haghiri, M**., Determination of hydraulic conductivity and transferability of Hashtgerd Plain aquifer based on grain measurement and experimental formulas. The 41st National Geosciences Congress, 2023.

TEACHING AND OTHER EXPERIENCE

TA: Global Environmental Change – Department of Earth Science, University of Illinois Chicago. 2024

I prepared and independently presented labs. graded student labs and problem sets, held office hours, and assisted on a weekend field trip.

TA: Hydrology and Hydrogeology - Department of Earth Science, University of Illinois Chicago.
assisted in student instruction and grading of work during a high intensity 1-day field camp in northern Chicago. 2023

TA: Hydrogeology – Department of Earth Science, University of Tehran. 2021
I helped Student labs, held office hours, and graded student submissions and I was head of field trip for this course.

TA: Physical Geology – Department of Earth Science, Kharazmi University. 2019
I graded student labs and problem sets.

FUNDING, ACHIEVEMENTS AND AWARDS

Department of Earth Sciences, University of Illinois Chicago 2023

Department of Earth Science, University of Tehran. 2021

Department of Earth Science, University of Tehran. 2020

Department of Geology, Kharazmi University. 2019

Geological Society of Iran 2018
Undergraduate student research grant

Geological Society of Iran 2017
Undergraduate student research grant

PROFESSIONAL DEVELOPMENT

Teaching Assistant and Research Assistant at University of Illinois Chicago. 2023

Teaching Assistant and Research Assistant at University of Tehran. 2021

Teaching Assistant and Research Assistant at Kharazmi University. 2019

COMMUNITY BUILDING AND VOLUNTEER WORK

Reviewer – Journal of Water Resources Management; Hydrogeology Journal; Journal of Carbonate and evaporated.