

Cansu Demir

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The University of Texas at Austin
Jackson School of Geosciences
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EDUCATION

Ph.D. in Geological Sciences

Aug 2018 - May/Aug 2024

The University of Texas at Austin

Austin, TX, USA

Topic: Groundwater-surface water dynamics in the coastal Arctic

Advisor: M. Bayani Cardenas

TOOLS: Phys. hydrogeology and geophysical field techniques, laboratory analyses (water isotopes-major ions), time series analyses via 1D-CNN/LSTM/Random Forest (on data acquired in the field & reanalysis products MERRA-2, GLDAS), and multi-physics numerical modeling of groundwater flow, salt-heat transport (via COMSOL)

M.Sc. in Environmental Engineering

Sept 2015 - Jul 2018

Middle East Technical University

Ankara, Turkey

Topic: Rehabilitation assessment of a depleted coastal aquifer

Advisor: Kahraman Unlu

TOOLS: Field observations, parameter estimation (PEST) and Water Budget Modeling via MODFLOW (GMS & ArcGIS)

Side Project: Indust. Specif. Guidebooks on Wastes: Thermal Power & Waste Accumulator Recyc. Plants
Collab.: Republic of Turkey, The Ministry of Environment and Urbanization

TOOLS: Site visits, interviews with business owners/managers and analysis of the waste generation data provided

B.Sc. in Environmental Engineering

Sept 2010 - Jun 2015

Middle East Technical University

Ankara, Turkey

PROFESSIONAL EXPERIENCE

Research/Teaching Assistant

2018 - today

The University of Texas at Austin

Austin, TX

Research/Teaching Assistant

2015 - 2018

Middle East Technical University

Ankara, Turkey

In-Prep

- 1 **Demir, C.**, Guimond, J., McClelland, J. W., Charette, M. A., Cardenas, M.B. Groundwater-surface water interactions at a coastal Arctic lagoon: Insights from seasonal hydraulic and thermal observations. In prep. (target journal: WRR)
- 2 **Demir, C.**, Guimond, J., McClelland, J. W., Charette, M. A., Cardenas, M.B. Terrestrial, oceanic and climatic factors governing seasonal coastal groundwater hydrology revealed by explainable machine learning techniques. In prep. (target journal: GRL)
- 3 Bristol, E.M., Behnke, M.I., Spencer, R.G.M., **Demir, C.**, Cardenas, M.B., Charette, M.A. and McClelland, J.W. Composition and biodegradability of dissolved organic matter in supra-permafrost groundwater and surface waters across seasons. In prep. In prep. (target journal: L&O)

Under-review

- 1 **Demir, C.**, McClelland, J. W., Bristol, E., Charette, M. A., M., Cardenas, M.B. Supra-permafrost aquifers of the Arctic coast and their groundwater, carbon and nitrogen fluxes. Science Advances, under review.
- 2 Wilson, S. J., Moody, A., McKenzie, T., Luijendijk, E., Cardenas, M. B., Sawyer, A. H., Wilson, A., Michael, H., Xu, B., Knee, K. L., Cho, H., Weinstein, Y., Paytan, A., Moosdorf, N., Chen-Tung, C., Beck, M., Lopez, C., Murgulet, D., Kim, G., Charette, M., Waska, H., Ibáñez, S. P., Chaillou, G., Oehler, T., Onodera, S. I., Saito, M., Rodellas, V., Dimova, N., Montiel, D., Dulai, H., Du, J., Petermann, E., Chen, X., Davis, K., Sugimoto, R., Wang, G., Li, H., Torres, A., **Demir, C.**, Bristol, E., Connolly, C. T., McClelland, J. W., Januario, B., Lamontagne, S., Kumar, B., Viswanadham, R., Sarma, V., Silva-Filho, E., Shiller, A., Lecher, A., Tamborski, J., Bokuniewicz, H., Rocha, C., Reckhardt, A., Böttcher, M. E., Shan, J., Stieglitz, T., Charbonnier, C., Anschutz, P., Terrones, L. M. H., Babu, S., Szymczycha, B., Chen, X., Jinzhou, D., Sadat-Noori, M., Niencheski, F., Null, K., Song, B., Anderson, I. C., Santos, I. Global subterranean estuaries control groundwater nutrient loading to the ocean. Limnology and Oceanography Letters. under review.

Published

- 1 Guimond, J., **Demir, C.**, Kurylyk, B. L., Walvoord, M. A., McClelland, J. W., Cardenas, M. B. Wind-modulated groundwater discharge along a microtidal Arctic coastline. Environmental Research Letters 18, 094042 (2023). [doi:10.1088/1748-9326/acf0d8](https://doi.org/10.1088/1748-9326/acf0d8)
- 2 **Demir, C.**, Fanta, D., Akıntuğ, B., Ünlü, K. Modeling coastal Güzeyurt (Morphou) aquifer in northern Cyprus for mitigation of groundwater depletion through managed aquifer recharge. Sustain. Water Resources Management 8, 96 (2022). [doi:10.1007/s40899-022-00683-4](https://doi.org/10.1007/s40899-022-00683-4)
- 3 Pedrazas, M.N., Cardenas, M.B., Hosain, A., **Demir, C.**, Ahmed, K. M., Akhter, S. H., Wang, L., Datta, S., Knappe, P. S. K. Application of electrical resistivity to map the stratigraphy and salinity of fluvio-deltaic aquifers: case studies from Bangladesh that reveal benefits and pitfalls. Hydrogeology Journal 29, 1601–1610 (2021). [doi:10.1007/s10040-021-02342-y](https://doi.org/10.1007/s10040-021-02342-y)
- 4 Pedrazas, M. N., Cardenas, M. B., **Demir, C.**, Watson, J. A., Connolly, C. T., McClelland, J. W. Absence of ice-bonded permafrost beneath an Arctic lagoon revealed by electrical geophysics. Science Advances 6, 43 (2020). eabb5083. [doi:10.1126/sciadv.abb5083](https://doi.org/10.1126/sciadv.abb5083)
- 5 **Demir, C.**, Yetiş, Ü., Ünlü, K. Identification of waste management strategies and waste generation factors for thermal power plant sector wastes in Turkey. Waste Management and Research 37, 3, 210-218 (2019). [doi:10.1177/0734242X18806995](https://doi.org/10.1177/0734242X18806995)

AWARDS RECEIVED

Richard Chuchla Dean's Discretionary Fellowship | Jackson School of Geosciences
Fulbright Scholarship | Turkish and U.S. Government

2021
2018-2020

Last updated: 01/14/24

AGU abstract-registration award The Permafrost Coastal Systems Network (PerCS-Net)	2020
Computational Res. Tech. fellowship TACC Summer Institute on Applied Parallel Programming	2020
Geological Society of America (GSA) Research Grant	2019
Marion W. DeFord Off-Campus Research Fellowship Jackson School of Geosciences	2019

PRESENTATIONS

- 1 **Demir, C.**, Guimond, J. A., Bristol, E., Bullock, E., Charette, M. A., McClelland, J. W., Cardenas, M. B. Seasonal Progression of Coastal Supra-permafrost Aquifers and Forces Driving Groundwater Flow. American Geophysical Union, Fall Meeting 2023 (Oral). ID: [C14B-04](#)
- 2 Guimond, J. A., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Walvoord, M. A., Kurylyk, B. L. Groundwater Salinity Dynamics and Drivers Along an Actively Degrading Arctic Coastline. American Geophysical Union, Fall Meeting 2023 (Oral). ID: [H13E-01](#)
- 3 Bullock, E. J., Schaal, I., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Charette, M. A., Mason, R., Huffman, W. and Inman, H. Groundwater Inputs of Mercury to Arctic Coastal Lagoons. International Symposium on Arctic Research (ISAR-7), March 2023.
- 4 Bullock, E. J., Schaal, I., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Charette, M. A., Mason, R., Huffman, W. and Inman, H. Mercury dynamics and associations in Arctic coastal groundwater. ACS, August 2023.
- 5 **Demir, C.**, Guimond, J., Bristol, E., Bullock, E., Schaal, I., Henderson, P., Charette, M. A., McClelland, J. W., Cardenas, M. B. Seasonal Dynamics of Groundwater Flow and Transport in the Nearshore Arctic. American Geophysical Union, Fall Meeting 2022 (Poster).ID: [C42C-1037](#)
- 6 Guimond, J., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Walvoord, M. A., Kurylyk, B. Groundwater Salinity Dynamics and Drivers Along an Actively Degrading Arctic Coastline. American Geophysical Union, Fall Meeting 2022 (Oral).ID: [C35A-08](#)
- 7 Bristol, E. M., **Demir, C.**, Schaal, I., Cardenas, M. B., Charette, M. A., McClelland, J. W. Dissolved Organic Matter in an Arctic Subterranean Estuary. American Geophysical Union, Fall Meeting 2022 (Poster).ID: [C42C-1031](#)
- 8 Bristol, E.M., Sanders, A., **Demir, C.**, Cardenas, M.B., Charette, M.A., McClelland, J.W. Dissolved Organic Matter and Nutrients Across an Arctic Subterranean Estuary. LTER All Scientists Meeting 2022.
- 9 Bullock, E. J., Schaal, I., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Charette, M. A., Mason, R., Huffman, W. and Inman, H. Groundwater input of mercury to Arctic coastal lagoons, Ocean Sciences Meeting 2022.
- 10 Schaal, I., Bullock, E., **Demir, C.**, Cardenas, M. B., McClelland, J. W., Charette, M. A. Distribution and Dynamics of Trace Metals from Groundwater Discharging into an Arctic Coastal Lagoon. Ocean Sciences Meeting 2022.
- 11 **Demir, C.**, Cardenas, M. B., McKinney, S., Nguyen, W., Bristol, E., Bullock, E., Sanders, A., Schaal, I., Charette, M., McClelland, J. Groundwater Flow and Transport in a Coastal Aquifer in the Arctic. American Geophysical Union, Fall Meeting 2021 (Oral). ID: [C44A-0](#)
- 12 Nguyen, W., Cardenas, M. B., Datta, S., Kwak, K., Varner, T., **Demir, C.**, Pedrazas, M., Knappett, P. Groundwater-surface water interactions in seasonally and tidally flooded riverbanks: numerical modeling of the Meghna River, Bangladesh. American Geophysical Union, Fall Meeting 2021 (eLightning). ID: [H35A-01](#)
- 13 **Demir, C.**, Cardenas, M. B., Pedrazas, M. N., McClelland, J. W., Charette, M. A. Nearshore Submarine Groundwater Discharge to an Arctic Lagoon. American Geophysical Union, Fall Meeting 2020 (eLightning). ID: [B120-04](#)
- 14 **Demir, C.**, Cardenas, M. B., McClelland, J. W., Pedrazas, M. N. Groundwater Discharge in the Lagoons of Alaskan Beaufort Sea. American Geophysical Union, Fall Meeting 2019 (Poster). ID: [C13E-1362D](#)
- 15 Rechner, A. F., He, C., Cabraal, S. A., Baiocchi, J., **Demir, C.**, Denham, A., Edgington, A., Ferrari, B., Fisher, C., Goldfarb, E. J., Jones, B., Manlove, H., McCormick, E. L., Pedrazas, M. A., Restrepo Acevedo, A. M., Roumelis, C., Smith-Salgado, C., Trcka, J., Beal, L. K., Southard, P., Ferencz, S. B., Li, L., Perkins, G., Roback, R. C., O'Connor, M., Matheny, A. M. Groundwater and surface water interactions in the Valles Caldera Watershed, New Mexico: an evaluation of water chemistry sensitivity to precipitation variability. American Geophysical Union, Fall Meeting 2019 (Poster). ID: [H13N-1916](#)
- 16 **Demir, C.**, Yetiş, Ü., Ünlü, K. Identification of Waste Management Strategies and Waste Generation Factors for Thermal Power Plant Sector Wastes in Turkey. Eurasia Waste Management Symposium 2018 (Oral). Istanbul, Turkey.
- 17 **Demir, C.**, Fanta, D., Akintug, B., Unlu, K. Conceptual and Numerical Modeling of Guzelyurt Aquifer, Turkish Republic of Northern Cyprus (TRNC). International Symposium on GIS Applications in Geography & Geosciences 2017 (Oral). Canakkale, Turkey.

INVITED SEMINARS

Applied Ocean Physics and Engineering | Woods Hole Oceanographic Institution

Nov 2023

TEACHING EXPERIENCE

Teaching Assistant Introduction to Physical and Chemical Hydrogeology (TA rating: 4.5/5)	SP 2021, 23
Teaching Assistant Groundwater Hydrology (TA rating: 5/5)	SP 2021
Teaching Assistant Transport Processes in Environmental Engineering	SP 2016, 17, 18
Teaching Assistant Environmental Microbiology Laboratory	SP 2016, 17, 18
Teaching Assistant Environmental Management	Fall 2017
Teaching Assistant Environmental Modeling Laboratory	Fall 2017
Teaching Assistant Unit Operations and Processes of Water Treatment	Fall 2016

UNIVERSITY SERVICE and MENTORSHIP

Co-organizer and Host - Arctic Coastal Observations, Research, and Networking ([ACORN](#)) seminar series
The Permafrost Coastal Systems Network
Fall 2022 - present

Graduate student mentor - Peer Mentor Support Program
Jackson School of Geosciences
Fall 2022

Life and career mentor for new graduates - Mentoring Programs for METU Students and Graduates
Middle East Technical University
2022 - 2023

Co-organizer and Host - Water, Climate and Environment Departmental Seminar Series
Jackson School of Geosciences
Fall 2021 - Spring 2022

WORKSHOPS

Arctic Coasts Workshop
Changes, Impacts and Solutions - Working Towards a Resilient Future
Location: University of Colorado Boulder
Oct 9-11, 2023
Boulder, CO

Belonging, accessibility, justice, equity, diversity, and inclusion (BAJEDI) Workshop
Led by Polar Science Early Career Community Office (PSECCO)
Oct 3, 2023
Online

International Arctic Coastal Network retreat
Led by the University of Alaska Fairbanks
Oct 16-21, 2022
Mystic, CT

TACC Summer Institute Series on Applied Parallel Programming
By Texas Advanced Computing Center
July 2, 9, 16, 23, 2020
Online

PROFESSIONAL ASSOCIATIONS

Member American Geophysical Union (AGU)	2019 - present
Member Association of Polar Early Career Scientists (APECS)	2021 - present
Member Permafrost Coastal Systems Network (PerCS-Net)	2019 - present
Member The Arctic Research Consortium of the United States (ARCUS)	2019 - present
Member Permafrost Young Researchers Network (PYNR)	2019 - present

Last updated: 01/14/24

FIELD EXPERIENCE and TRAINING

Aug 2021, June - Jul - Oct 2022, Jul 2023

Simpson Lagoon, Prudhoe Bay, AK, USA

Coastal hydrogeology field techniques

May 2022

Port Aransas, TX

Small boat and cold weather survival training

Nov 2020-2021

Lake Travis, Austin, TX

Lake mixing dynamics

Jan 2020

Meghna River, Dhaka, Bangladesh

River-bank hydrogeology field techniques

Aug 2019

Kaktovik Lagoon, Barter Island, AK

Coastal hydrogeology field techniques

May 2019

Valles Caldera, NM and Austin, TX

General hydrogeology field techniques

COMPUTER SKILLS

Microsoft Office	Aquifer Hydraulic Prop: Aqtesolv
COMSOL	Python
ArcGIS	L ^A T _E X
GMS (MODFLOW/PEST)	R
MATLAB	Git
Bash	Statistical time series tools: TFN
ML tools: 1D-CNN, Random Forest & LSTM	Adobe Illustrator
WebSite desing: HTML & CSS	ERI Inversion software: AGI EarthImager& Res2dinv

FIELD and LABORATORY SKILLS

Installment of piezometers for groundwater monitoring
 Operating with pressure transducers (CTDs by Solinst & InSitu)
 Temperature sensors (Hobo/TrodX)
 pCO₂ sensors (Pro-Oceanus)
 Multi-parameter sensors (YSI)
 Topographical surveys with robotic total stations (Trimble)
 Electrical Resistivity Surveys (SuperSting R8)
 Ex-situ estimation of hydraulic conductivity (KSat, Hyprop)
 In-situ estimation of hydraulic conductivity (Slug tests)
 Preparation of water samples for analysis (dilution, standard preparation)