

Call for Part-Time Researchers

Turkish Energy, Nuclear and Mineral Research Agency (TENMAK)

R&D Project:

“Unveiling the Arctic Energy Potential: Sustainable Development, Governance, and Türkiye’s Strategic Role”

The project aim is to assess the Arctic’s strategic importance for Türkiye in terms of environmental sustainability, energy security, and global governance.

TENMAK, under the Ministry of Energy and Natural Resources of the Republic of Türkiye, invites applications for six (6) part-time researchers to work to the following research themes.

Scientific Advisor:

Prof. Dr. Orhan İnce, Istanbul Technical University, Department of Environmental Engineering

Research Topics

1. Impacts of Arctic Developments on Türkiye’s Water–Food–Energy (WFE) Security

Rationale: The WFE nexus is a key vulnerability for Türkiye. Arctic climate shifts have profound implications for global energy systems, agriculture, and freshwater resources.

Expected Outputs: Development of a WFE-Nexus Security Index; scenario-based policy simulator.

Methodology: System dynamics modeling; multi-criteria decision analysis.

Timeline: 42 months.

Strategic Importance for Türkiye: Türkiye’s energy transit role, water scarcity, and rising food demand necessitate a comprehensive model linking Arctic impacts to national security. This project will provide a WFE-Security Index and policy simulator to support evidence-based decision-making and strengthen Türkiye’s international position.

2. The Role of Permafrost-Sourced CO₂/CH₄ Emissions in the Global Carbon Cycle and Implications for Türkiye’s Climate Policies

Rationale: Permafrost thaw releases CO₂ and CH₄, intensifying uncertainty in global carbon budgets.

Literature Gap: The impact of these emissions on Türkiye’s 2053 Net-Zero commitments remains unassessed.

Expected Outputs: Carbon-budget sensitivity analysis; policy recommendations.

Methodology: Emission inventory harmonization; Earth System modeling.

Timeline: 42 months.

Strategic Importance for Türkiye: Addressing permafrost-derived emissions ensures realistic climate pathways, informs carbon markets, green finance, and national energy strategy, and safeguards Türkiye's 2053 Net-Zero target.

3. Transboundary Effects of Arctic-Sourced Pollutants (BC, PAH, PCB, Microplastics) on Türkiye

Rationale: Arctic pollutants are transported via air and oceans, potentially reaching Türkiye.

Literature Gap: No existing risk maps or impact assessments for Türkiye.

Expected Outputs: Risk maps; transboundary pollution monitoring protocol.

Methodology: GEOS-Chem; FLEXPART; satellite remote sensing; receptor-based analysis.

Timeline: 42 months.

Strategic Importance for Türkiye: Exposure to Arctic-origin pollutants threatens agriculture, fisheries, air quality, and public health. This research will provide governance tools, strengthen environmental and food-safety policies, and support Türkiye's resilience.

4. Detection of Oil Spills in the Arctic Using Satellite Imagery and Artificial Intelligence

Rationale: New Arctic shipping routes increase oil-spill risk, demanding early detection systems.

Expected Outputs: AI-based oil-spill detection algorithm; remote sensing dataset library; policy recommendations.

Methodology: SAR and multispectral imagery; convolutional neural networks (CNNs); hybrid AI models; geospatial analysis.

Timeline: 42 months.

Strategic Importance for Türkiye: Secure maritime transport, fisheries, tourism, and energy logistics depend on robust monitoring of long-range pollution events. This research will equip Türkiye with AI-based detection systems that enhance national preparedness and contribute to international maritime safety frameworks.

Project Coordinator:

Prof. Dr. Matthias Finger, Istanbul Technical University, Department of Economics

5. Access to Arctic Energy Resources within Global Market Dynamics: Implications for Türkiye

Rationale: The integration of Arctic energy resources into global markets has strategic consequences in terms of price volatility and supply security. Türkiye, with its growing energy demand and role as a transit country, is directly affected by these developments.

Expected Outputs: Sensitivity analysis of global energy price fluctuations; “Arctic Energy Dependency Profile” report for Türkiye.

Methodology: Global energy trade scenario analysis; energy economic modeling; game theory-based market simulation.

Timeline: 42 months.

Strategic Importance for Türkiye: Türkiye’s energy supply security and price stability depend on the pace and conditions of Arctic energy resources entering the markets. This project will provide foresight and scenario-based policy options to strengthen Türkiye’s energy security policies.

6. Arctic communications and data infrastructures – between economics and geopolitics: implications for Türkiye

Rationale: Rapidly developing telecommunications infrastructures in the Arctic (notably satellite technologies and fiber optic cables) along with data generated from ships, airplanes, research stations, etc. create the equivalent of “Arctic data layer”. Some of these data will be commercially available, but most of these data will fall under geo-strategic and geo-political considerations. Many of these data are in the public interest (e.g., environmental data, safety data), as well as in the interest of non-Arctic states such as Türkiye.

Expected Outputs: A systematic understanding of data in and about the Arctic along with their governance; an understanding of data currently not accessible, yet in the public interest; decision support tool for accessing and developing Arctic data along the main interests of Türkiye in the Arctic (science, environment, energy, transport, etc.).

Methodology: Technology assessment, technology forecasting, scenario-based modelling

Timeline: 42 months.

Strategic Importance for Türkiye: Arctic data accessibility is of strategic and economic significance for Türkiye, including for positioning Türkiye as an actor of Arctic governance. The development of Arctic routes may redefine Türkiye’s geopolitical importance.

Eligibility Criteria:

- Completed Master's degree (MSc).
- Having passed doctoral candidacy/qualifying examination (**preferred**) or
- Postdoctoral Researcher
in one of the following fields (or closely related disciplines): *Environmental Science, Environmental Engineering and Management, Climate Science, Ecology, Geology, Atmospheric Sciences, Marine Sciences, Energy Policy, Environmental Law/Diplomacy, Sustainable Development, International Relations (Environmental/Climate Diplomacy), Geodesy and Photogrammetry Engineering, Remote Sensing and GIS, Computer Engineering (AI/ML), Data Science, Space Sciences,*
- Demonstrated academic research capacity (publications, fieldwork, or project experience).
- Strong skills in research methodology, data analysis, and academic writing.
- Ability and willingness to work part-time within the framework of TENMAK's research activities.

Application Procedure:

Applicants should submit a single PDF file containing:

1. Curriculum Vitae (CV) including proof of MSc completion, PhD passed doctoral candidacy/qualifying examination official letter, or PhD diploma.
2. A Statement of Interest (maximum 2 pages).

Compensation:

Successful candidates will receive a monthly salary of **35,000 TRY** (Turkish Lira), payable according to TENMAK's payroll policies.

Deadline and Contacts:

 **Application Deadline: 10 October 2025**

Research Topics	Responsible Leader
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5, 6	Prof.Dr. Matthias Finger Professor Emeritus, Ecole Polytechnique Fédérale Lausanne (EPFL) Professor, Istanbul Technical University (ITÜ) Emails: matthias.finger@epfl.ch, matthias.finger@sfr.fr; matthias.finger@ik.me Phones: +41.79.593.8700; +33.614.55.84.97; +90.538.243.0955