Sezim Ezgi Guvercin

Los Angeles, US guvercin@usc.edu +1(323) 545 7579

Professional Appointments

Post-Doctoral Scholar 2023-Present *Los Angeles, US*
University of Southern California
Supervisor: Prof. Sylvain Barbot

Post-Doctoral Scholar 2022-2023 *İstanbul, Turkey*
Boğaziçi University
Supervisor: Prof. Hayrullah Karabulut-Prof. Vadim Milyukov

Post-Doctoral Scholar 2019-2022 *Istanbul, Turkey*
Yıldız Technical University
Supervisor: Prof. Uğur Doğan

Education

Ph.D. Department of Geophysics Sep. 2019 *Istanbul, Turkey*
Boğaziçi University Kandilli Observatory and Earthquake Research Institute
Advisor: Prof. Ali Özgün Konca
Dissertation: Studying Seismotectonics of Eastern and Southern Anatolia Using Earthquake Mechanisms

M.Sc. Department of Geophysics July 2013 *Istanbul, Turkey*
Boğaziçi University Kandilli Observatory and Earthquake Research Institute
Advisor: Prof. Dr. Cemil Gürbüz
Thesis: 3D P Wave Velocity Structure of Marmara Region Using Local Earthquake Tomography

B.Sc. Department of Geophysical Engineering June 2008 *Istanbul, Turkey*
Istanbul University

Peer-Reviewed Publications

Guvercin S.E., Barbot, S., Zhang, L., Kokum M., Zabci C., Yang Z. Shallow creep and confined ruptures in frictionally unstable mica schist. Science Advances **12**, *eaef6076* (2026) https://doi.org/10.1126/sciadv.aef6076.

Liu M., Wang, B., **Guvercin S.E.**, Li Z., Wang T., Liu J., Ji L., Barbot S. Dynamic segmentation of the Sagaing fault. Science **392**, *6798* (2026) https://doi.org/10.1126/science.ady3237.

Guvercin S.E., Barbot S. Persistent rupture segmentation of the Main Marmara Fault. Communications Earth and Environment **6**, *1028*, (2025) https://doi.org/10.1038/s43247-025-03007-4.

Guvercin S.E., Barbot S., Zhang L., Yang Z., Seyler C., Platt J. Frictional properties of the Pelona-Orocopia-Rand schists in hydrothermal conditions and implications for seismicity in Southern California. Earth and Planetary Science Letters **669**, *119573* (2025) https://doi.org/10.1016/j.epsl.2025.119573.

Barbot S., **Guvercin S.E.**, Zhang L., Zhang H., Yang Z. Thermobaric activation of fault friction. Geophysical Research Letters **52**, *e2024GL112959* (2025) https://doi.org/10.1029/2024GL112959.

Karabulut, H., Bouchon, M., Bouin, M-P., Konca, A.O, Schmittbuhl, J., **Guvercin, S.E**, 2025. Slow Progressive Deformation of the Narli Pull-apart Basin, Where the Rupture Initiated, Preceding the 2023 Mw 7.8 Kahramanmaras, Turkey Earthquake. Geophysical Journal International **241**, *1680–1697* (2025) https://doi.org/10.1093/gji/ggaf108.

Guvercin S.E.. 2023 earthquake doublet in Türkiye reveals the complexities of the East Anatolian fault zone:

Insights from aftershock patterns and moment tensor solutions. Seismological Research Letters, special issue of February 2023 SE Turkiye Earthquakes **95(2A)**, *664–679* (2024) https://doi.org/10.1785/0220230317.

Özbey, V., Sengör, A. M. C., Henry, P., Özeren, M. S., Haines, A. J., Klein, E. C., Tarı, E., Zabcı, C., Chousianitis, K., **Güvercin, S. E.**, Öğretmen, N. Kinematics of the Kahramanmaraş triple junction and of Cyprus: evidence of shear partitioning. Bulletin de la Société Géologique de France **195**(1), *15* (2025) https://doi.org/10.1051/bsgf/202.

Karabulut H., **Guvercin S.E.**, Hollingsworth J., Konca A.Ö. Long silence on the East Anatolian Fault Zone (Southern Turkey) ends with devastating double earthquakes (6 February 2023) over a seismic gap: Implications for the seismic potential in the Eastern Mediterranean region. Geological Society of London **180(3)**, *jgs2023–021*, (2023) https://doi.org/10.1144/jgs2023-021.

Guvercin, S. E. 2023. Crustal structure along the East Anatolian Fault using local earthquake tomography. Turkish Journal of Earth Sciences, Aykut Barka special issue **32(3)**, *294-305* https://doi.org/10.55730/1300-0985.1845.

Guvercin, S. E., Karabulut, H., Konca, A.Ö., Ergintav, S., Dogan, U. Active seismotectonics of the East Anatolian Fault. Geophysical Journal International **230**, *50–69* (2022) https://doi.org/10.1093/gji/ggac045.

Karabulut, H., **Guvercin, S. E.**, Eskikoy, F., Konca, A.Ö., Ergintav, S. The moderate size 2019 September Mw5.8 Silivri earthquake unveils the complexity of the Main Marmara Fault shear zone. Geophysical Journal International **224(1)**, *377–388* (2021). https://doi.org/10.1093/gji/ggaa469.

Guvercin, S. E., Konca, A.Ö., Ozbakır, A. D., Ergintav, S., Karabulut, H. New focal mechanisms reveal fragmentation and active subduction of the Antalya slab in the Eastern Mediterranean. Tectonophysics **805**, *228792* (2021) https://doi.org/10.1016/j.tecto.2021.228792.

Konca, A.Ö., Karabulut, H., **Guvercin, S. E.**, Eskikoy, F., Ozarpaci, S., Ozdemir, A., Floyd, M., Ergintav, S., Dogan, U. From Interseismic Deformation With Near-Repeating Earthquakes to Co-Seismic Rupture: A Unified View of the 2020 Mw6.8 Sivrice (Elazig) Eastern Turkey Earthquake. Journal of Geophysical Research: Solid Earth **126(10)**, *e2021JB021830* (2021) https://doi.org/10.1029/2021JB021830.

Konca, A.Ö., **Guvercin, S. E.**, Ozarpaci, S., Ozdemir, A., Funning, G. J., Dogan, U., Ergintav, S., Floyd, M., Karabulut, H., Reilinger, R. Slip distribution of the 2017 Mw6.6 Bodrum-Kos earthquake: Resolving the ambiguity of fault geometry. Geophysical Journal International **219**, *911–923* (2019) https://doi.org/10.1093/gji/ggz332.

Geli, L., Henry, P., Grall, C., Tary, J. B., Lomax, A., Batsi, E., Riboulot, V., Cros, E., Gurbuz, C., **Isik, S. E.**, Sengor, A. M. C., le Pichon, X., Ruffine, L., Dupre, S., Thomas, Y., Kalafat, D., Bayrakci, G., Coutellier, Q., Regnier, T., Becel, A. 2018. Gas and seismicity within the Istanbul seismic gap. Scientific Reports, **8(1)**, *6819* (2018) https://doi.org/10.1038/s41598-018-23536-7.

Isık, S. E., Ozgun Konca, A., Karabulut, H. The seismic interactions and spatiotemporal evolution of seismicity following the October 23, 2011 Mw7.1 Van, Eastern Anatolia, earthquake. Tectonophysics **702**, *8–18* (2017) http://dx.doi.org/10.1016/j.tecto.2017.02.024.

In preparation:

Guvercin, S. E., Barbot, S. Linking earthquake physics to seismic hazard *Under review, Science Advances.*

Li, Z., Liu, M., **Guvercin, S.E.**, Wang, B., Zhou, J., Xu, Y., Zhang, Y., Barbot, S. Deep rupture of the Caracas earthquake by 1 coseismic embrittlement *Submitted to Nature.*

Liu, M., Wang, B., Wu, B., **Guvercin, S.E.**, Zhang, L., Yang, Z., Seyler, C.,Platt, J.,Barbot, S. A rock-centric framework for earthquake dynamics *Under review in Nature Cummunications.*

Grants & Funding

2026 **Grant Recipient**
Gordon and Betty Moore Foundation

Invited Talks

2025 **Guvercin, S. E.**, Rheological Controls on Rupture Segmentation: Insights from the Main Marmara and East Anatolian Faults. *California Institute of Technology, Los Angeles, USA*

2024 **Guvercin, S. E.**, Deformation of the East Anatolian Fault Zone at Timescales, Preseismic, Interseismic and Postseismic Observations. *Peking University, Beijing, China*

2024 **Guvercin, S. E.**, Deformation of the East Anatolian Fault Zone at Timescales, Preseismic, Interseismic and Postseismic Observations, Institute of Geology. *China Earthquake Administration, Beijng, China*

2024 **Guvercin, S. E.**, From Seismic Processes to Lithological Unconformities: Comparative insights into strike-slip faults. *Utah State University, USA*

2023 **Guvercin, S. E.**, Karabulut, H., Konca, A. O. A Brief History on the Discovery of the East Anatolian Fault *Bogazici University, Istanbul, Turkey*

2023 **Guvercin, S. E.**, Guvercin, S. E. A detailed analysis of seismotectonics of the East Anatolian Fault after 2023, Turkey doublet. *Eurasia Institute of Earth Sciences, Istanbul Technical University, Istanbul, Turkey*

Abstracts and Presentations (*Denotes oral presentation)

2024 **Guvercin S.E.**, Barbot S., Zhang L., Yang Z., Platt J., Seyler C., Wu B., Zhang H. Yao W. Frictional Properties and Seismic Implications of Pelona–Orocopia–Rand Schists in Southern California: Insights from High-Pressure, High-Temperature Experiments

2024 **Guvercin, S.E.**, Barbot, S., Lei Zhang, Zkang Yang, John Platt, Caroline Seyler, Baoning Wu, Hao Zhang. Frictional Properties and Seismic Implications of Pelona–Orocopia–Rand Schists in Southern California: Insights from High-Pressure, High-Temperature Experiments. SCEC, US

2024 **Guvercin, S.E.**, Barbot, S., Lei Zhang, Zkang Yang, John Platt, Caroline Seyler, Baoning Wu, Hao Zhang. Frictional Properties and Seismic Implications of Pelona–Orocopia–Rand Schists in Southern California: Insights from High-Pressure, High-Temperature Experiments. SCEC, US

2024 Milliner, C., Avouac, J.P., Lindsay, D., **Guvercin, S.E.**, Konca, A.O., Burgmann, R. 3D Near-field Surface Deformation, Stress and Friction of the 2023 Mw7.8 and Mw7.6 Kahramanmaras Earthquakes Measured by Radar and Optical Pixel Offsets. AGU, US

2024 Karabulut, H., Milyukov, V., **Guvercin, S.E.**, Ozarpaci, S. Investigation of the Active Deformation in the Caucasus Region from Seismic and Geodetic Observations. EGU, Austria

2023 **Guvercin, S.E.**, Konca, A.o., Karabulut, H., Eskikoy, F., Hollingsworth, J. Preliminary Seismic and Geodetic Observations of the Mw7.8 and Mw7.6 Earthquakes in Eastern Turkey. EGU, Austria

2023 **Guvercin, S.E.**, Pavlovich, M.A., Ozarpaci, S., Karabulut, H., Milyukov, V. Preliminary Results from Comprehensive Seismic and Geodetic Observations Around the Caucasus Region. EGU, Austria

2023 Konca, A.O., **Guvercin, S.E.**, Eskikoy, F. Source Model of the 2022 Mw6.0 Golyaka, Duzce (Western Turkey) Earthquake. EGU, Austria

2022 Yildiran, E., Konca, A. O., **Guvercin, S. E.**, Bekler, T., Karabulut, H. Stress Release Analysis of Earthquakes Near the Ayvacık Geothermal Reservoir, ATAG, Istanbul, Turkey

2021 ***Guvercin, S. E.**, Karabulut, H., Konca, A. O., Ergintav S., Doğan, U., Active Seismotectonics of the East Anatolian Fault, ATAG

2020 **Guvercin, S.E.**, Karabulut, H., Dogan, D., Çakır, Z., Ergintav, S., Zabcı, C., Ozdemir, A., Ozarpacı, S., Konca, A. o., Kokum, M. Present Seismotectonic Behavior of the EAF from Improved Seismicity Catalog and Earthquake Source Mechanism Solutions. EGU General Assembly, Vienna

2020 Konca, A. O., **Guvercin, S.E.**, Karabulut, H., Eskikoy, F., Ergintav, S. 2019 Mw5.8 Silivri Earthquake Reveals the Complexity of the Main Marmara Shear Zone. EGU General Assembly, Vienna

2019 Konca, A. O., **Guvercin, S.E.**, Karabulut, H., Turhan, F., Bekler, T. Analysis of an Unusual Seismic Activity of a Geothermal Reservoir in Ayvacık, Çanakkale, Northwestern Turkey. EGU General Assembly, Vienna

2019 **Guvercin, S.E**, Aksarı, D., Konca, A. o., Karabulut, H., ozbakır, A. D., Ergintav, S. An Integrated Study for the Seismotectonics of Eastern Mediterranean Region. EGU General Assembly, Vienna

2019 Akoglu A. M., Çeliker D., ozdemir A., Çakır Z., Jonsson S., Dogan U., Ergintav S., Konca A. o., **Isik S. E.**. Ongoing Postseismic Deformation of the Mw7.1, October 23, 2011 Van (Turkey) Earthquake from GPS and InSAR Time Series. AGU Fall Meeting, San Francisco

2019 ***Guvercin, S. E.**, Konca, A. Ö., Özbakır, A. D., Aksarı, D., Ergintav, S., Karabulut, H., On the interaction between Nubia-Anatolia plates: Segmentation, geometry and kinematics of an isolated slab. ATAG

2018 ***Guvercin, S. E.**, Aksarı, D., Konca, A. O., Karabulut, H., Ozbakır, A. D., Ergintav, S., Doğu Akdeniz Sismotektoniğinin Karakterize Edilmesine Yönelik Bütükleşik Bir Yaklaşım S. ATAG

2018 Konca, A. O., Çetin, S., Ozdemir, A., **Isik, S. E**, Dogan, U., Karabulut, H., Ergintav, S., Funning, G., Floyd, M., Reilinger R. The Geometry and Coseismic Slip of 2017 Mw6.6 Bodrum-Kos Earthquake Inferred from Geodetic, Seismic Data and Aftershocks. EGU General Assembly, Vienna

2016 **Isik, S.E.**, Konca, A. O., Karabulut, H. The Mechanisms and Spatiotemporal Behavior of the 2011 Mw7.1 Van, Eastern Turkey Earthquake Aftershocks. EGU General Assembly, EPSC2016-7478, Vienna

2016 **Isik, S.E.**, Konca, A. o., Karabulut, H. The Stress Transfer and Seismic Interaction Revealed by the Aftershocks of the 2011 Van Earthquake. AGU Fall Meeting, San Francisco

2012 **Guvercin, S.E.**, Gurbuz, C. Preliminary results from a local earthquake tomography study in the Marmara Region, Turkey. AGU Fall Meeting, San Francisco

2011 Gurbuz, C., Kalafat, D., Yılmazer, M., Tunç, S., **Guvercin, S.E.** Marmara Sea Bottom Observatory Project and Preliminary Results from First Observatories. EGU General Assembly, Vienna

2011 Gurbuz, C., Kalafat, D., Yılmazer, M., Tunç, S., **Guvercin, S.E.** Location of Marmara Sea Earthquakes Using Marmara Sea Bottom Observatory and Land Stations. Orferus Observatory Coordination Workshop, Lisbon

Projects Participated

2021-2024 **The Seismotectonics and kinematics of the Caucasus region based on comprehensive seismic and Geodetic Observations**
Research Project
Partners: IBB, BU, ITU
Project Manager: Prof. Dr. Hayrullah Karabulut
Partners: Turkey (BU, İTÜ, YTÜ)-Russia (Russian Academy of Sciences, Lomonosov Moscow State University, Sternberg Astronomical Institute)
Project Managers: Prof. Dr. Hayrullah Karabulut, Prof. Dr. Vadim Milyukov
Position: Research assistantship, Project coordinator
Position: Co-Research Leader

2021-2023 **Building a Database based on Earth Science Research for Determining the Regions Under the Risk of Hazard Around the City of Istanbul**
Research Project
Partners: IBB, BU, ITU
Project Manager: Prof. Dr. Hayrullah Karabulut
Position: Research Assistantship

2021-2022 **The Relationship Between the Mining Activity in Balya (Balıkesir- Turkey) with the Local Seismicity**
Research Project
Partners: BU, Balya Lead & Zinc Plant, ESAN
Project Manager: Doç. Dr. Ali Özgun Konca
Position: Research Assistantship

2019-2022 **Investigation of creep along the Hazar-Palu Segment of the East Anatolian Fault using multidisciplinary methods**
Research Project
Partners: IBB, BU, ITU
Project Manager: Prof. Dr. Hayrullah Karabulut
Position: Co-Research Leader

2019 **NAF-SAF Seed**
MISTI Research Project
Partners: USA (MIT), Turkey (BU)
Project Manager: Prof. Dr. Semih Ergintav, Dr. Michael Floyd
Position: Research Assistantship

2018 **MAREGAMI**
TUBITAK Bilateral Project with France
Partners: Turkey (ITU, KOERI), France (Ifremer, LDO, CEREGE, ISTERRE, LIENs)
Project Manager: Prof. Dr. Ziyadin Çakır, Dr. Louis Géli
Position: Research Assistantship

2011-2013 **Investigation of the Seismic Velocity Structure of Central and Western Marmara Region Using Local Earthquake Tomography**
BAP Research Project, 6509P
Project Manager: Prof. Dr. Cemil Gurbuz
Position: Research Assistantship

2010-2011 **Observation of Micro-Earthquake Activity Triggered by Geothermal Events**
Research Project
Partners: BU, Maren Maraş Electricity Production Industry and Trade Inc.
Project Manager: Prof. Dr. Cemil Gurbuz
Position: Research Assistantship

Teaching

2014-2019 **Research Assistant**
Bogazici University, Department of Geophysics, Istanbul, Turkey
TA of "Inversion Methods in Geophysics"
TA of "Wave Propagation"
TA of "Geophysical Signal Processing"

Service to the Community

2025 **Converner, EGU**
Active Tectonics and Geodynamics of the Eastern Mediterranean

2024 **Converner, EGU**
Active Tectonics and Geodynamics of the Eastern Mediterranean

2023 **Converner, EGU**
Active Tectonics and Geodynamics of the Eastern Mediterranean

2019-2024 **Peer reviewer**
Science
Nature Communications
Communications Earth Environment
Geophysical Research Letters
Tectonophysics
Seismica
Bulletin of the Seismological Society of America
Seismological Research Letters

Media Appearances

2025–2026 **International Media Coverage**
USC News; Phys.org; EurekAlert!; GEO France

2025 **Invited Television Interview**
NTV (Turkey): National interview on Marmara Fault rupture segmentation and Istanbul earthquake hazard

2025 **Invited National Science Magazine**
Herkese Bilim Teknoloji, Issue 506

2025 **National Newspaper Coverage**
Cumhuriyet: Column discussing segmented rupture scenarios of the Marmara Fault

Field experience and seismic instrumentation

A significant part of my research involves the use of advanced seismic instrumentation to capture high-resolution data from tectonically active regions such as mining areas, geothermal plants and the East Anatolian Fault. I have extensive experience in setting up and managing both permanent and portable seismic networks to monitor regional and local seismicity around fault systems, which is essential for detailed seismic hazard assessments. Additionally, I manage the processing and analysis of large seismic datasets, which are key to developing accurate models of fault behavior and seismic risk.

During my fieldwork in Southern California, I focused on sampling the Pelona-Orocopia-Rand (POR) schist, which was emplaced during the subduction of the Farallon Plate beneath the North American Plate. This region provides a critical link between subduction processes and the dynamics of major strike-slip faults like the San Andreas Fault. The POR schist offers valuable insights into how subduction-derived materials influence fault zone mechanics, particularly in the transition from brittle to ductile behavior.

Similarly, my work along the East Anatolian Fault in Turkey, a major plate boundary between the Anatolian and Arabian plates, allowed me to examine a wide variety of lithologies including sandstone, mudstone, dolomite, mica schist, and ophiolites. These rocks, remnants of ancient oceanic crust and sediments, are key to understanding the mechanics of strike-slip faults in a compressional tectonic regime. The combination of these experiences deepens my understanding of fault zone evolution, particularly in how subduction-related materials contribute to seismicity at plate boundaries.

2024-Mar. **Rock sampling**
Eastern Anatolia, Turkey
East Anatolian Fault Zone

2024-Feb. **Rock sampling**
Southern California, US
San Andreas Fault, Pelona-Orocopia-Rand Schist

2024-Dec. **Rock sampling**
Southern California, US
San Andreas Fault, Pelona-Orocopia-Rand Schist

2021-2022 **Monitoring mining seismicity**
Balıkesir, Turkey
Data collection, Seismic network maintenance

2019-2022 **Aftershock analysis of 2020, Mw6.8 Sivrice Earthquake**
Elazig, Puturge, Turkey
Configuring seismic arrays, Maintanance of broadband seismic instrumentation, Data collection

2010-2011 **Monitoring geothermal seismicity**
Aydin, Turkey
Configuring seismic arrays, Maintanance of broadband seismic instrumentation, Data collection

Laboratory Work

2024-Mar. **Triaxial hydrothermal experiments**
State Key Laboratory of the Earthquake Dynamics, Institute of Geology, China Earthquake Administration

2024-Jul. **Triaxial hydrothermal experiments**
State Key Laboratory of the Earthquake Dynamics, Institute of Geology, China Earthquake Administration