

Memorial to Aral İbrahim Okay

1953–2023

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Professor Aral İ. Okay passed away on 12 November 2023. He was a field geologist and petrologist of worldwide renown, with particular expertise in the formation and tectonic significance of rocks formed deep in the Earth's crust, and was a leading authority on the geology of the eastern Mediterranean and Black Sea region. He was a true scholar whose intellect and curiosity ranged widely across geologic disciplines.

Aral Okay was born in Istanbul, the oldest of three boys. His father was a geology professor at Istanbul University and a pioneer in the field of palynology and had a significant influence on Aral's choice of career. His mother was a philosophy graduate from Istanbul University and an authority on the Turkish language and national education. Following Aral's secondary education in Istanbul, he won a scholarship from the Mineral Research and Exploration Institute in Ankara to study geology at University College London (UCL), where he began his B.S. in 1973. At UCL, he discovered his passion for geological fieldwork (his field mapping project was on the island of Islay in the Scottish Hebrides), and he left UCL with an outstanding first-class degree. This positioned him to move to Christ's College Cambridge, where he undertook a Ph.D. in the Department of Mineralogy and Petrology (1976–1980), studying the origin and distribution of blueschists—metamorphic rocks formed under conditions of very high pressures and low temperatures that are well exposed in northwest Turkey. His initial papers on the high-pressure rocks in Turkey, published from 1978 to 1986, established him as a world-class petrologist and brought the remarkable metamorphic geology of Turkey to the attention of the international community. Much of Aral's subsequent research was rooted in the significance of these rocks not only in Turkey but also across Eurasia and beyond.

Between 1980 and 1983, Aral worked as a geologist at the Mineral Research and Exploration Institute in Ankara. Those years were spent mostly in the field doing basic geological mapping in the eastern Pontides, the Taurides, and southeastern Anatolia, thus laying the basis for Aral's

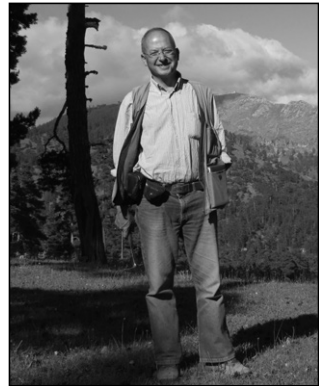


Photo from Istanbul Technical University archives.

trademark scientific approach: integrating extensive fieldwork with his in-depth knowledge of the literature and with the application of advanced analytical techniques. In 1983, he joined the Department of Geological Engineering in the Faculty of Mining at Istanbul Technical University (ITU), where he was promoted to full professor in 1992 and remained until his retirement in 2021, rising to head the Division of Solid Earth Sciences at the Eurasia Institute of Earth Sciences. Aral became a much-loved and respected lecturer, teaching courses as wide ranging as physical geology, structural geology, tectonics, geological mapping, subsurface geology, active tectonics, metamorphic petrology, mineralogy, and the regional geology of Turkey. He supervised eight Ph.D. graduate students at ITU, all studying field-based projects.

Aral spent long periods in the field making careful observations about all aspects of the geology, including metamorphic petrology, structural geology, sedimentology, and (bio)stratigraphy. With this broad view, he and his colleagues reinterpreted the tectonic evolution of Turkey during the 1980s and 1990s, with particular focus on the northern (Pontide) belt and the Sea of Marmara, including the structure of the North Anatolian fault in that region. In the early 2000s, he began integrating low-temperature thermochronology into his tectonic investigations, initially in the North Anatolian fault zone of northwest Turkey and later in the Arabia-Eurasia collision zone of southeast Turkey. Despite an increasing focus on the tectonics (including neotectonics) of Turkey, Aral continued his research on high-pressure metamorphic rocks and made important discoveries of blueschists and eclogites in western and central Anatolia. For example, his research recognized the importance of the mineral assemblage jadeite + chloritoid + glaucophane + lawsonite in the blueschists of the Tavşanlı Zone, indicative of a particularly low geothermal gradient (ca. 5 °C/km). This was a major contribution to metamorphic petrology and the understanding of subduction thermal gradients from the geologic record.

Throughout his research career, Aral emphasized the essential role of fieldwork in understanding the broader processes of plate tectonics. He wrote 11 geological field guides based on 47 years of field geology, visiting nearly every corner of Turkey. His field-based approach was enhanced by his observations and analysis at the micro-scale. For example, one of his key contributions was his discovery of microdiamond inclusions in the Dabie Shan orogen of China. Fieldwork and subsequent analytical research on Dabie Shan (1998–2000), at the time a poorly known mountain range, led to a series of high-impact papers published between 1989 and 1995 on what is arguably the largest ultra-high-pressure (UHP) metamorphic terrain on Earth. His research in this area recognized the presence of the very high-pressure mineral coesite in the continental crust and defined a mechanism for the exhumation of UHP rocks.

Extensive field experience produced in Aral a deep understanding of geological relationships at a crustal scale. Such skill was instrumental during his long collaboration with the Turkish Petroleum Corporation (TPAO), working in contexts as varied as the Karakaya subduction/accretion complex, the Lycian nappes, and the Menderes, Strandja, and Pulur massifs. When the Turkish Scientific Research Council (TÜBİTAK) launched a national geology-geophysics program in the late 1990s, Aral's knowledge of geological field relationships proved invaluable in the interpretation of the newly acquired seismic lines across the North Anatolian fault in the Sea of Marmara and land-offshore correlations.

Aral was a gifted scientist in synthesizing diverse strands of geological information to unravel the complexities of Tethyan tectonics as revealed in Turkey and across Eurasia from western Europe to the Caucasus. His energy and enthusiasm made him tireless in disseminating his research findings; he authored more than 180 articles in peer-reviewed journals and book chapters that have attracted over 20,000 citations, evidence that his influence on our understanding of tectonic processes at active continental margins was, and is, global.

Aral received numerous awards in Turkey, including the TÜBİTAK Incentive Award (1986), the Sedat Simavi Science Award (1992), and the TÜBİTAK Science Award (2002). He was elect-

ed as a full member of the Turkish Academy of Sciences (TÜBA) in 1996. He was appointed president of the Annual Geological Congress of Turkey in 2002 and of the International Symposium on the Geology of the Black Sea Region in 2006. He traveled widely overseas during his career with lengthy study visits to leading U.S. and European universities. He was a guest researcher at Ruhr Universität Bochum (Germany), supported by an Alexander von Humboldt scholarship (1994–1995), and at the University of California Santa Barbara (USA) on a Fulbright Scholarship (2005–2006). He spent seven months (2020–2021) at the Freie University in Berlin. He was elected an honorary member of the Mineralogical Society of America in 2009, and in 2019, received the Georg Forster Award from the Alexander von Humboldt Foundation in Germany for his lifetime scientific contributions.

Aral Okay is survived by his widow, Nilgün, a professor of geology at ITU, and two daughters, Nilüfer and Yasemin. He will be sorely missed by family, friends, colleagues, and former students and fondly remembered for his essential humility and humanity, his kindness to friends and students alike, his sense of humor that made him ideal company in the field, and his breadth of knowledge across many areas of science.

He left behind an unfinished book on Anatolian geology; we hope that this can be completed by colleagues as a fitting academic tribute to his memory. Many international scholars, including three of the authors of this Memorial, were patiently introduced to the geology of Turkey by Aral, who never criticized us for our oversimplifications. It is a source of considerable regret that now that we have understood a little of the beautiful and complex geology of his country, we cannot continue our discussions with him. His lasting legacy will be in the work of the many researchers he has influenced worldwide and the inspiration of his kindness as a colleague and teacher.

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