

Obituary Prof. Dr. Ercan Özcan

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Ercan Özcan in the field in Thrace in 2007

Prof. Ercan Özcan, an internationally well-known Turkish micropaleontologist and a long-standing member of the editorial board of the Turkish Journal of Earth Sciences died in İstanbul on 15th December 2022 at the age 61. Ercan Özcan was born in 1961 and graduated from the Department of Geological Engineering of the Middle East Technical University in 1985. He completed his MSc thesis in the same department in 1986 and his PhD in 1994 under the supervision of Demir Altiner. His PhD thesis was on the stratigraphy and micropaleontology of the Upper Cretaceous sequence of the Arabian Platform in the Adıyaman-Kahta region in southeast Anatolia. Ercan Özcan worked in the geology departments of the Niğde University between 1995 and 2000 and of the

Akdeniz University (Antalya) between 2000 and 2004 as assistant and associate professor. In 2004, he transferred to İstanbul Technical University, where he worked as associate and full professor until his death in 2022. He left behind his wife Güliz and his son Ata.

Throughout his academic career, Ercan Özcan studied the paleontology and biostratigraphy of the Cretaceous and Cenozoic large benthic foraminifera, particularly orthofragmines, a group of Late Paleocene-Eocene foraminifera, and became an internationally recognized expert in this field. Together with György Less, they developed morphometric-statistical methods instead of typology for the characterization of orthofragmines (Özcan et al., 2007a, b; Less et al., 2007), which allows

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for a more precise biostratigraphy. This method requires preparation of oriented thin sections from individual foraminifera. Ercan was infamous for spending hours in an outcrop collecting individual foraminifera, sometimes scraping them from hard rock with a nail, and then spending more hours in the laboratory producing numerous oriented thin sections for statistical analysis.

Ercan's studies were not restricted only to Turkey but in pursuit of his research interests, he worked in the field in Tunisia, India, Pakistan, Oman, and Jamaica. Just before his death, he published an important atlas on the Tethyan orthophragmines (Özcan et al., 2022). Up until a few days before his death, he was working on an atlas of Tethyan Oligo-Miocene large benthic foraminifera.

Ercan Özcan's studies covered the whole of Turkey. He worked in the Cretaceous of the Arabian Platform in southeast Anatolia (Özcan, 1993, 1994, 1995), in the Late Cretaceous-Cenozoic stratigraphy and paleontology of the Central Anatolian basins (Özcan and Özkan-Altiner, 1997; Özcan et al., 2001, 2020a; Özcan, 2002; Çolakoğlu and Özcan, 2003; Okay et al., 2020; Yücel et al., 2023), in the Taurides (Özcan et al., 2009, 2019a; Rodelli et al., 2018), in the Pontides (Özcan et al., 2012, 2019b, 2020; Erdem et al., 2021) and in the Eastern Anatolia (Özcan et al., 2010a). Probably his most important geological study was on the biostratigraphy of the hydro-carbon-bearing Cenozoic Thrace Basin. Although there were many previous studies on the Thrace Basin, its biostratigraphy was poorly constrained. A solid biostratigraphic frame for the Thrace Basin was established based largely on the large benthic foraminifera (Özcan et al., 2010, 2018a; Okay et al., 2010; Less et al., 2011; Yücel 2020). Ercan Özcan's studies also extended outside Turkey; he worked and published on the biostratigraphy and paleontology of the Cretaceous-Cenozoic sequences in Egypt (Özcan

et al., 2014), in Oman (Özcan et al., 2016a, 2019c, 2022; Abbasi et al., 2022), in Tunisia (Ben İsmail-Lattrache et al., 2014), in the Pakistan and India Himalayas (Özcan et al., 2015, 2016b,c, 2018b,c, 2019c,d; Malarkodi et al., 2017; Ali et al., 2018; Less et al., 2018; Pereira et al., 2022) and in the Caribbean (Özcan et al., 2019e, Mitchell et al., 2022). He was truly an international expert on the Cretaceous-Cenozoic large benthic foraminifera.

His crowning achievement was the publication of Atlas of Tethyan orthophragmines with his students in the year of his death (Özcan et al., 2022). The Atlas is based on enormous material collected over 15 years throughout the World; it contains characterization of both families (Discocyclinidae and Orbitoclypeidae), of their five genera, 61 species, 25 of them constituting evolutionary lineages with 92 chronosubspecies. It provides basic knowledge on the morphostructure, principles of taxonomy, systematics, phylogeny, biostratigraphy, and paleobiogeography of Tethyan orthophragmines, and is illustrated with large number of high-quality photos and drawings.

Ercan Özcan was dedicated to his work and spent freely his time and money in pursuit of his research interests¹. In 2018, he was struck by cancer and underwent heavy doses of chemotherapy, but he was still working in the hospital on manuscripts; after a remission, the cancer came back in 2022. During those difficult years, he went to the field whenever he had the opportunity, and in 2022, the year of his death, he published seven international papers.

As a person, Ercan was hard-working, productive, candid, generous, and had a good sense of humor; it was great fun to be with him in the field. He has left a big void among his colleagues and friends.

Selected publications of Ercan Özcan cited in the text

Abbasi IA, Özcan E, El-Ghali MAK, Hersi OS, Al Harthy A et al. (2022). Mixed deltaic and carbonate deposition in a tectonically restricted basin: An example from the lower and middle members of the Eocene Musawa Formation, Abat Basin, south-eastern Oman Mountains. *Geological Journal* 57: 4242–4261.

Ali N, Özcan E, Yücel AO, Hanif M, Hashmi SI et al. (2018). Bartonian orthophragminids with new endemic species from the Pirkoh and Drazinda formations in the Sulaiman Range, Indus Basin, Pakistan. *Geodinamica Acta* 30: 31-62.

Ben İsmail-Lattrache K, Özcan E, Boukhalfa K, Saraswati PK, Soussi M et al. (2014). Early Bartonian orthophragminids (foraminiferida) from Reineche Limestone, north African platform, Tunisia: taxonomy and paleobiogeographic implications. *Geodinamica Acta* 26: 94-121.

Çolakoğlu S, Özcan E (2003). Orthophragminid foraminiferal assemblages from Ilerdian-Early Cuisian reference-section (Sakarya section, Haymana-Polatlı Basin, Central Anatolia-Turkey). *Rivista Italiana di Paleontologia e Stratigrafia* 109: 45-61.

¹ In 2002, Aral Okay was working in the southern Thrace Basin and had found a few localities with large benthic foraminifera. Ercan, who was in Antalya at that time, asked Aral about these localities, and travelled 800 km in the autumn of 2002 with his car to Şarköy in southern Thrace to collect foraminifera. Very few scientists in Turkey would spend their own money and free time for their research interests.

- Erdem ME, Özcan E, Yücel AO, Okay AI, Erbay S et al. (2021) Late Campanian larger benthic foraminifera from the Zekeriyaköy Formation (İstanbul, NW Turkey): taxonomy, stratigraphy and palaeogeography. *Turkish Journal of Earth Sciences* 30: 1-21.
- Less Gy, Özcan E, Báldi-Beke M, Kollányi K (2007). Thanetian and early Ypresian orthophragmines (Foraminifera: Discocyclinidae and Orbitoclypeidae) from the central Western Tethys (Turkey, Italy and Bulgaria) and revised taxonomy and biostratigraphy. *Rivista Italiana di Paleontologia e Stratigrafia* 113: 419-448.
- Less Gy, Özcan E, Okay AI (2011). Larger foraminiferal stratigraphy and paleoenvironments of the Middle Eocene to Lower Oligocene shallow-marine units in the northern and eastern parts of the Thrace Basin, NW Turkey. *Turkish Journal of Earth Sciences* 20: 793-845.
- Less Gy, Frijia G, Özcan E, Saraswati PK, Parente M et al. (2018). Nummulitids, lepidocyclinids and Sr-isotope data from the Oligocene of Kutch (western India) with chronostratigraphic and paleobiogeographic evaluations. *Geodinamica Acta* 30: 183-211.
- Malarkodi N, Özcan E, Venkataraman D, Somappa SC, Gowda SP et al. (2017). *Lepidorbitoides* (Foraminifera) from the lower Maastrichtian Kallankuruchchi Formation, Cauvery Basin, India: morphometry and paleobiogeography. *Cretaceous Research* 77: 143-157.
- Mitchell SF, Robinson E, Özcan E, Jiang MM, Robinson N (2022). A larger benthic foraminiferal zonation for the Eocene of the Caribbean and central American region. *Carnets Geologie* 22: 409-565.
- Okay AI, Özcan E, Cavazza W, Okay N, Less Gy (2010). Upper Eocene olistostromes, two contrasting basement types and the initiation of the southern Thrace Basin, NW Turkey. *Turkish Journal of Earth Sciences* 19: 1-25.
- Okay AI, Zattin M, Özcan E, Sunal G (2020). Uplift of Anatolia. *Turkish Journal of Earth Sciences* 29: 696-713.
- Özcan E (1993). Late Cretaceous benthic foraminiferal proliferation on the Arabian platform: taxonomic remarks on the genus *Orbitoides* d'ORBIGNY, 1848. *Geological Journal* 28: 309-317.
- Özcan E (1994). *Demirina meridionalis* n. gen. n. sp. A new Cenomanian agglutinated foraminifer from southeastern Turkey. *Revue de Paleobiologie* 13: 1-7.
- Özcan E (1995). Evaluation of the nepionic chamber arrangement in *Lepidorbitoides bisambergensis* (JAEGER, 1914), Early Maastrichtian, SE Turkey. *Revue de Paleobiologie* 14: 195-208.
- Özcan E, Özkan-Altner S (1997). Late Campanian- Maastrichtian evolution of orbitoidal foraminifera in Haymana Basin succession. (Ankara, Central Turkey). *Revue de Paleobiologie* 16: 271-290.
- Özcan E, Sirel E, Özkan-Altner S, Çolakoğlu S (2001). Late Paleocene Orthophragminae (Foraminifera) from the Haymana- Polatlı Basin (Central Turkey) and description of a new taxon, *Orbitoclypeus haymanaensis*. *Micropaleontology* 47: 339-357.
- Özcan E (2002). Cuisian orthophragminid assemblages (*Discocyclina*, *Orbitoclypeus*, *Nemkovella*) from Haymana-Polatlı basin (central Turkey): biometry and description of two new taxa. *Eclogae Geologicae Helvetiae* 95: 75-97.
- Özcan E, Less Gy, Kertész B (2007a). Late Ypresian to middle Lutetian orthophragminid record from central and northern Turkey: taxonomy and remarks on zonal scheme. *Turkish Journal of Earth Sciences* 16: 281-321.
- Özcan E, Less Gy, Baldi-Beke M, Kollanyi K, Kertész B (2007b). Biometric analysis of middle and upper Eocene Discocyclinidae and Orbitoclypeidae (Foraminifera) from Turkey and updated orthophragmine Zonation in the Western Tethys. *Micropaleontology* 52: 485-520.
- Özcan E, Less Gy., Báldi-Beke M, Kollányi K, Acar F (2009). Oligo-Miocene Foraminiferal Record (Miogypsinidae, Lepidocyclinidae and Nummulitidae) from the Western Taurides (SW, Turkey): biometry and implications for the Regional Geology: *Journal of Asian Earth Sciences* 34: 740-760.
- Özcan E, Less Gy, Báldi-Beke M, Kollányi K (2010a). Oligocene hyaline larger foraminifera from Kelereşdere section (Muş, eastern Turkey). *Micropaleontology* 56: 465-493.
- Özcan Z, Okay AI, Özcan E, Hakyemez A, Özkan-Altner S (2012). Late Cretaceous-Eocene geological evolution of the Pontides based on the new stratigraphic and paleontologic data between the Black Sea coast and Bursa (NW Turkey). *Turkish Journal of Earth Sciences* 21: 933-960.
- Özcan E, Less Gy, Okay AI, Yılmaz I Ö (2010). Stratigraphy and larger foraminifera of the Eocene shallow-marine and olistostromal units of the southern part of the Thrace Basin, NW Turkey. *Turkish Journal of Earth Sciences* 19: 27-77.
- Özcan E, Scheibner C, Boukhalfa K (2014). Orthophragminids (foraminifera) across the Paleocene/Eocene transition from north Africa: taxonomy, biostratigraphy and paleobiogeographic implications. *Journal of Foraminiferal Research* 44: 203-229.
- Özcan E, Hanif M, Ali N, Yücel AO (2015). Early Eocene orthophragminids (foraminifera) from the type-locality of *Discocyclina ranikotensis* Davies, 1927, Thal, NW Himalayas, Pakistan: insights into the orthophragminid paleobiogeography. *Geodinamica Acta* 27: 267-299.
- Özcan E, Abbasi IA, Drobne K, Govindan A, Jovane L et al. (2016a). Early Eocene orthophragminids and alveolinids from the Jafnayn Formation, N Oman: significance of *Nemkovella stockari* Less & Özcan, 2007 in Tethys. *Geodinamica Acta* 28: 160-184.
- Özcan E, Saraswati PK, Hanif M, Ali N (2016b). Orthophragminids with new axial thickening structures from the Bartonian of the Indian subcontinent. *Geologica Acta* 14: 261-282.
- Özcan E, Ali N, Hanif M, Hashmi SI, Khan A et al. (2016c). New Priabonian *Heterostegina* from the Eastern Tethys (Sulaiman fold belt, West Pakistan): implications for the development of Eastern Tethyan heterostegines and their paleobiogeography. *Journal of Foraminiferal Research* 46: 393-408.

- Özcan E, Okay AI, Bürkan KA, Yücel AO, Özcan Z (2018a). Middle-Late Eocene marine record of the Biga Peninsula, NW Anatolia, Turkey. *Geologica Acta* 16: 163-187.
- Özcan E, Saraswati PK, Yücel AO, Ali N, Hanif M (2018b). Bartonian orthophragminids from the Fulra Limestone (Kutch, W India) and coeval units in Sulaiman Range, Pakistan: a synthesis of shallow benthic zone (SBZ) 17 for the Indian Subcontinent. *Geodinamica Acta* 30: 137-162.
- Özcan E, Pignatti J, Pereira C, Yücel AO, Drobne K et al. (2018c). Paleocene orthophragminids from the Lakadong Limestone, Mawmluh Quarry Section, Meghalaya (Shillong, NE India): implications for the regional geology and paleobiogeography. *Journal of Micropalaeontology* 37: 357-381.
- Özcan E, Less Gy, Jovane L, Catanzariti R, Frontalini F et al. (2019a). Integrated biostratigraphy of the middle to upper Eocene Kırkgeçit Formation (Baskil section, Elazığ, eastern Turkey): larger benthic foraminiferal perspective. *Mediterranean Geoscience Reviews* 1: 55-90.
- Özcan E, van Gorsel JT, Sarı B, Yücel AO, Erbay S et al. (2019b). Primitive *Helicorbutoides* (Foraminifera) and associated larger benthic foraminifera from the Campanian Tonya Formation, Trabzon, eastern Pontides, NE Turkey. *Cretaceous Research* 101: 30-42.
- Özcan E, Erbay S, Abbasi AI, Pereira CD, Erkızan LS et al. (2019c). The first record of *Nemkovella daguini* (Neumann, 1958) from the middle-late Eocene of Oman (Arabian Peninsula) and Meghalaya (Indian Subcontinent) and its significance in Tethyan correlations and paleobiogeography. *Rivista Italiana Paleontologia e Stratigrafia* 125: 13-28.
- Özcan E, Hohenegger J, Yücel AO, Kaygılı S, Nowrad A et al. (2019d). *Baculogypsina sulaimanensis* n. sp. (Calcarinidae) from the Priabonian of Sulaiman Range, Pakistan: A possible ancestor for the Recent *Baculogypsina sphaerulata*. *Journal of Foraminiferal Research* 49: 423-433.
- Özcan E, Mitchell SF, Less Gy, Robinson E, Jonathan RB et al. (2019e). A revised suprageneric classification of American orthophragminids with emphasis on Late Paleocene representatives from Jamaica and Alabama. *Journal of Systematic Palaeontology* 18: 1551-1579.
- Özcan E, Hakyemez A, Çiner A, Okay AI, Soussi M et al. (2020a). A reinterpretation of the age and depositional environment of the Eocene Çayraz Formation (Haymana Basin, Central Turkey) in the light of new planktonic foraminiferal data. *Journal of Asian Earth Sciences* 183: 104304.
- Özcan E, Özcan Z, Okay AI, Akbayram K, Hakyemez A (2020b). Ypresian-to Lutetian marine record in NW Turkey: a revised biostratigraphy and chronostratigraphy and implications for the Eocene paleogeography. *Turkish Journal of Earth Sciences* 29: 1-27.
- Özcan E, Yücel AO, Erkızan, LS, Gültekin MN, Kaygılı S et al. (2022). Atlas of the Tethyan orthophragmines. *Mediterranean Geoscience Reviews* 4: 3-213.
- Özcan E, Abbasi IA, Yücel AO, Aşçı SY, Erkızan LS et al. (2022). First record of the foraminiferal genera *Clypeorbis* Douvillé and *Ilgazina* Erdoğan from the Maastrichtian of the Arabian Peninsula (Simsima Formation, North Oman): Paleobiogeographic implications. *Cretaceous Research* 138: 105290.
- Pereira CD, Khanolkar S, Banerjee S, Özcan E, Saraswati PK (2022). Larger benthic foraminifera and microfacies of late Paleocene-early Eocene sections in Meghalaya, Northeast India. *Journal of Foraminiferal Research* 52: 40-56.
- Rodelli D, Jovane L, Özcan E, Giorgioni M, Coccioni R et al. (2018). High-resolution integrated magnetobiostratigraphy of a new middle Eocene section from the Neo-Tethys (Elazığ Basin, eastern Turkey). *The Geological Society of America Bulletin* 130: 193-207.
- Yücel AO, Özcan E, Erbil Ü (2020). Latest Priabonian larger benthic foraminiferal assemblages at the demise of Soğucak Carbonate Platform (Thrace Basin and Black Sea shelf, NW Turkey): implications for the shallow marine biostratigraphy. *Turkish Journal of Earth Sciences* 29: 85-114.
- Yücel AO, Özcan E, Catanzariti RHakyemez A, Okay AI, Çiner A et al. (2023). Calcareous nannofossils, planktonic foraminifera and revised stratigraphy of the Eocene Çayraz Formation; the final stage of marine sedimentation in Central Turkey. *Turkish Journal of Earth Sciences* 32: 1-26.