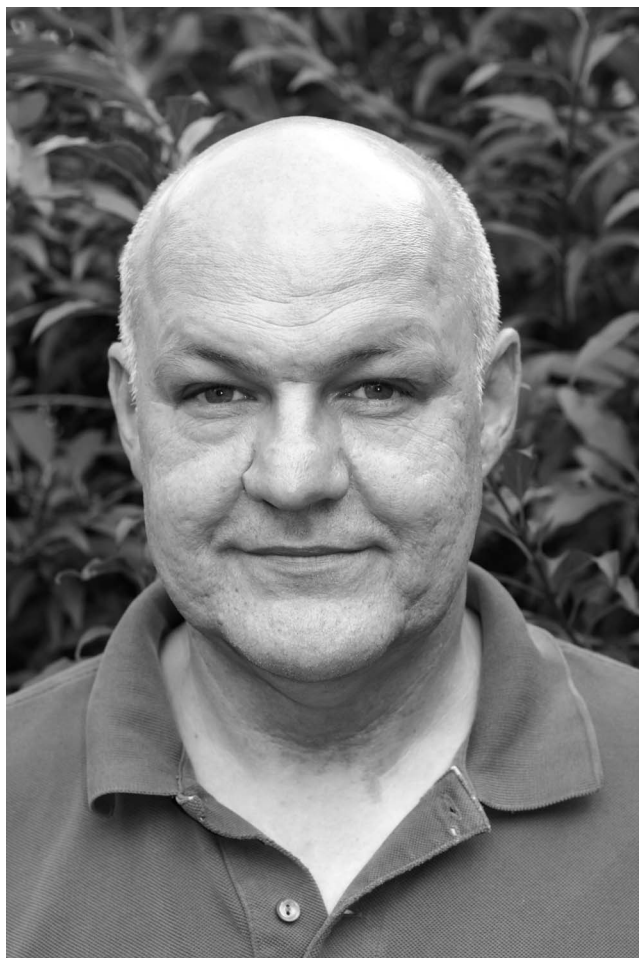


## MEMORIAL TO ALEXANDER VOLKER ALTENBACH (1953-2015)



Alexander Volker Altenbach was born in 1953 in Frankfurt/Main, Germany. Alex attended school in Königstein/Taunus, where he passed his Abitur in 1974. He then studied Geology and Paleontology at Goethe University, Frankfurt. During an internship on an oil rig in Denmark, he first experienced a professional working environment and the adventures of hydrocarbon exploration in the North Sea. For his diploma thesis Alex worked on the stratigraphy and tectonics of the Sierra de Montgai, in the Pyrenees, Spain, under the supervision of Rolf Schroeder, Senckenberg Museum, Frankfurt/M. The subject comprised a genuine geological mapping exercise and biostratigraphic dating of the exposed formations. Stratigraphic ages were determined with the Mesozoic orbitoids and planktonic foraminifera in thin sections. Alex shared the long travels to Spain with his two companions Hans-Joachim Wallrabe-Adams (aka Kolli) and Peter Brinnel, enjoying an old “concha naranja” Volkswagen van, as well as field work in the spectacular scenery of the Sierra de Montsec, and living the Catalan lifestyle. As late as 1993, the theme of Alex’s habilitation defense again was the geology of the Sierra de Montsec, for which he had kept his fascination (cf. Wallrabe-Adams et al., 2005). Being challenged by disentangling the complicated

tectonic structure of the Sierra de Montgai, Alex learnt Fortran78 to produce a virtual Schmid net on the central university computer, visualizing different deformation styles of the different tectonic units. His early professional computer programming probably gave rise to his later endeavor in computing.

Attracted by the developments in Marine Geosciences at Kiel University during the early 1980s, Alex joined the Micropaleontology Group of Gerhard Friedrich Lutze, and commenced his PhD work in the late Collaborative Research Centre (CRC) 95 “Sea–Seafloor Interactions”. He developed and applied an infrared adsorption method to determine the biomass of individual benthic foraminifera, which was a major step in the quantitative understanding of the ecological role of foraminifera in benthic ecosystems (Altenbach, 1985, 1987). It took more than 20 years until the issue could be successfully revisited again, using the next generation of spectrometric technology, and still inspired by Alex’s original work (Movellan et al., 2012).

With the advent of the first microcomputers, Alex’s programming skills were highly demanded, and he established IT technology for the use of micropaleontologists together with Uwe Pflaumann, Horst Schulz, and Peter Weinholz at

the Institute of Geology and Paleontology at Kiel University. Together with Bill Colbourn, Alex still used the old PDP10 central computer. As a result of long discussions with G. F. Lutze and Michael Sarnthein, Alex developed the concept of food flux as the decisive environmental factor driving the distribution of benthic foraminifera and stable carbon isotopic composition of their shell carbonate.

Alex then joined the new CRC 313 “Environmental Change: The Northern North Atlantic“, at Kiel University, as an assistant professor and subproject leader. Alex was involved in the development of the so-called Biocontainer, a 20' laboratory container equipped with a surgery microscope, which was a major achievement in marine environmental research at that time. A complete box core could be moved into this seagoing laboratory, where the sediment surface could be examined like a petri dish. Many new observations were made in this facility aboard research vessels, leading to the idea of the dynamic microhabitat concept of foraminifera as a basic strategy to optimize food acquisition (e.g., Altenbach et al., 1993, Linke et al., 1995; Ahrens et al., 1997). In total, he spent about one and a half years on research cruises to the tropical to polar North Atlantic and the Baltic Sea. Among other observations, Alex described the upright life position of monothalamous arenaceous species and the spider web-like pseudopodial mesh they are using to collect particles from the bottom current (Altenbach et al., 1988). Alex discovered that a similar strategy is used by *Rupertina stabilis*, which he found in a narrow band along the Norwegian continental slope (Lutze & Altenbach, 1988). In addition to his work on the Recent, his ideas interacted between geology and biology, and he pursued an avenue of research on the Quaternary paleoceanography of the northern North Atlantic together with his colleagues of CRC 313 (e.g., Sarnthein & Altenbach, 1995; Nees et al., 1997).

In 1992, he summarized the observations he made in the context of the dynamic CRC-313 community, and compiled the flux estimates in his habilitation thesis at Kiel University (Altenbach, 1992). Assuming that the flux of organic matter serves as a major food source of benthic foraminifera and as a driver of assemblage compositions, he computed threshold values confining the distribution of species on continental slopes. By doing so, he disentangled the complicated interplay between vertical and lateral advection of food particles (Altenbach et al., 1999; Altenbach et al., 2003; Altenbach & Struck, 2001). The concept was later applied to explain the distribution of *Uvigerina* species in the eastern Atlantic (Schönfeld & Altenbach, 2005).

In parallel to his academic career, Alex developed the second generation of IT infrastructure at the Institute of Geology and Paleontology at Kiel University. He also founded SCILAB GmbH (Hamburg) together with Peter Weinholz and Michael Prall, offering expert systems and software programs for graphical solutions (Xact) in Earth Sciences, some of which are still abundantly used in academia and industries.

In 1995, Alex accepted a call as a Professor of the Bavarian State Collection and the Institute of Paleontology and Historical Geology at Ludwig Maximilians University (LMU), Munich. He was soon faced with education and university administration, the establishment of laboratories and many students claiming attention. His national and international activities as a much-demanded reviewer added to his

workload, which sometimes was a tedious task at times of heavy budget cuts and disintegration of entire university departments. Nevertheless, he regularly came back to northern Germany with his students on marine-geological excursions, and to get dirty in the mudflats of the North Sea.

In the years to follow, Alex became Dean of the Faculty of Geosciences at LMU, enjoying his new office. His new responsibilities left very little time for research projects and cruises. He nonetheless pursued his interest in the flux of organic matter and its effects on benthic foraminifera. One of his major new findings is the presence of *Virgulinitella fragilis* in anoxic environments (Leiter & Altenbach, 2010; Altenbach et al., 2012). Another new discovery was the unusual shallow occurrence of deep-water foraminiferal assemblages in the fjords of southern Chile (Mayr et al., 2011). He took the lead, gathered an interdisciplinary team of researchers at LMU, and proposed a new Collaborative Research Center on the ecology of Chilean Fjords, which was approved by the German Science Foundation (DFG). However, German research vessels were not available for expeditions to high southern latitudes of the Pacific Ocean, and chartering a Chilean navy vessel was refused by the funding agency. Finally, the project was declined because of legal issues.

New and pleasant collaboration with Patrick De Deckker at the Australian National University provided nonetheless long travels under southern skies. An acknowledged travel guide to the beauties of the Australian nature originates from these activities, which Alex co-authored together with his wife Maren Gaulke (Gaulke & Altenbach, 2007). In general, Alex was very much taken by Maren's research interests, and intensively collaborated on the ecology and behavior of varines and other reptiles from Indonesia and the Philippines (e.g., Gaulke & Altenbach, 1994).

Alex's late activities included the editorship of a book on eukaryote survival under anoxic conditions, and strategies for their paleontological investigation, which he edited together with Joan Bernhard and Joseph Seckbach (Altenbach et al., 2011). This effort, and coping with a changing strategy of the Geological Institute of LMU took much of his time and power. Increasingly, the strains of his cancer disease took his energy. Alex passed away on August 24, 2015. We lost a passionate discoverer and innovator, a dedicated scientist and communicator, a responsible teacher and mentor, and a colleague with the vocation to enthuse and to cheer his dear colleagues.

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