

# Matti Eronen

\* 14.1.1944 † 8.7.2016



**PROFESSOR MATTI ERONEN** died on July 8, 2016, after a long illness. He was born in Sonkajärvi on January 14th, 1944, and had been a member of the Finnish Academy of Science and Letters since 1998.

Eronen was known as a palaeoclimatologist, studying the climatic history of the Earth. He focused especially on dendrochronology, the use of tree ring records to investigate past climate changes, and began his dendrochronological work in Lapland in the 1970s. It had been known since the 19th century that old logs of Scots pine can be found on the bottom of small arctic and alpine lakes, often partially buried in the lake sediments, and that these megafossils showed that the climate had been warmer in the past and the pine tree-line had been located further north. Eronen understood the huge potential that such megafossils offered for more precise palaeoclimatic studies. By collecting a large number of them it would be possible to construct a tree ring chronology that would reach hundreds or thousands of years back in time and make it possible to reconstruct how warm or cold the summers in Lapland had been over the timespan covered by that chronology. Together with his colleagues and assistants, Eronen

made many fieldwork trips to Finnish and Norwegian Lapland. At first they hauled the megafossils to the shore by hand in order to cut a disc from each, but later the work became more efficient and divers and tripods were used to make the hauling easier. The construction of this chronology became a long-term project because it was always possible to discover new megafossils which would serve to make the chronology longer or more precise. As a result of over two decades of work, more than 3000 pine megafossils were lifted from the bottoms of lakes and the tree ring chronology covered the last 7600 years. This unique dataset was used by Eronen and his colleagues and students in a number of publications, and it is still regularly used as a database for new palaeoclimatological papers.

Lifting subfossil pine trunks from lakes is undeniably hard physical work, but the trips to Lapland also provided opportunities to relax and enjoy nature there. For Eronen, Lapland was far more than just a fieldwork area. He was interested in the environment and history of Lapland and had read many books describing life in its vast wildernesses, including the classics written by A. E. Järvinen and

Valter Keltikangas that tell of ordinary people struggling to survive and make a living under harsh conditions, or of how the first scientists began to map and investigate nature in the region. At the end of the 1990s his fieldwork expanded to the northern Ural Mountains in arctic Russia, where he worked with his colleagues and students and showed how here, too, there had been conifers growing earlier in the Holocene in places that are now in the middle of treeless tundra.

Another important scientific object for Matti Eronen was sea level changes. The geological history of the Baltic Sea is unique and highly complicated, not least because of the southward tilting of the Baltic basin caused by the fact that post-glacial land uplift is faster in the north than in the south. In his PhD thesis published in 1974 he investigated sea level changes during the Litorina Sea stage in the history of the Baltic Sea, some 9000 to 6000 years ago, when the flux of saline ocean water through the Danish Straits became invigorated, causing higher salinity, rising sea levels, and shoreline transgression. His interpretations were based on evidence from diatoms, microscopic aquatic organisms preserved in the bottom sediments of small lakes that respond sensitively to changes in water salinity. Thus a change in diatom composition from freshwater species to saline or brackish water species can be used as an indicator of a rise in sea level and renewed inundation of lakes which had previously been isolated from the Baltic Sea. Eronen sampled sediment cores from 11 lakes or mires along the coast from the Gulf of Finland to the Kemi-Tornio region in the north, and showed by means of his analyses that the sea level east of Helsinki

had risen several metres in the course of the transgression period. This was to be seen in changes in the diatom composition of the bottom sediment of Bastuberg, a small mire 50 km east of Helsinki, for example. By contrast, there was no observable sea level rise along the coast of the northern part of the Gulf of Bothnia during the transgression, because here the rate of land uplift remained higher than the rate of sea level rise.

The history of the Baltic Sea and global sea level changes remained a key object of scientific interest for Matti Eronen throughout his career, and he also investigated, for example, the shoreline transgression associated with the freshwater Ancylus Lake stage in the history of the Baltic, the history of the Baltic Sea during the Eemian interglacial prior to the last glaciation, and sea level changes in the Atlantic as seen on the north coast of Norway. He was a long-standing member of the International Union for Quaternary Science (INQUA) commission on "Sea level changes and coastal evolution".

Matti Eronen worked in many places and many universities during his career. Taking up his first position in 1971, he worked as a research assistant, amanuensis, researcher, director and associate professor at the universities of Helsinki, Turku, Joensuu and Oulu, and as a visiting scientist at the University of Washington and University of Colorado, before being appointed as professor of Quaternary geology at the University of Helsinki in 1995. He was chairman of the governing board of the Kilpisjärvi Biological Station from 1995 onwards. He was also an active and notable popularizer of science, writing fluently and clearly about recent advances in the earth sciences. He wrote nu-

merous papers in Finnish for a general readership, on topics varying from post-glacial land uplift to the geological history of the Baltic Sea, past and future ice ages and the climatic history of Finland and the Earth as a whole. When the causes of the cycles of ice ages were discovered in the late 1970s, Eronen was one of the first scientists to report these significant findings in Finnish, in papers that in effect anticipated discussions on the greenhouse climate and the future of the Earth as he described how the increasing carbon dioxide content of the atmosphere may cause changes which humankind will be unable to mitigate, claiming that we humans have initiated an experiment in which the global atmosphere will serve as our laboratory.

One of the most notable tributes to Matti Eronen's scientific achievements was the "Prize for Non-Fiction Writing" which was awarded to him in 1992 for his book *Jääkausien jäljillä* (Tracking the Ice Ages), published the previous year. This book describes the current state of knowledge about the climatic history of the Earth from its beginning to the present, with particular focus on the ice ages, the coldest climatic periods. The book was well received among the general public and aroused much interest in the fascinating history of the planet Earth. For a diligent writer, and someone who had a high regard for popular scientific publications, this was a well-deserved prize for a remarkable life of scientific work.

*Obituary by Heikki Seppä*