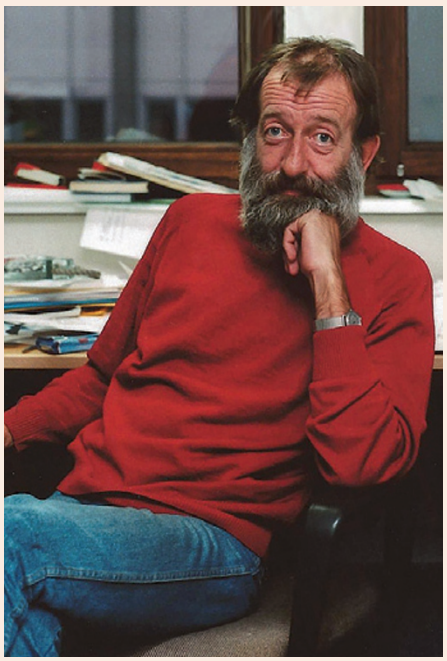
ERNST MAIER-REIMER

The discovery of silence

Within less than a generation, climate change has been transformed from a research topic for a few experts to a prominent concern of society and decision-makers worldwide. The increasing evidence of human influence on climate and the predicted impacts of future global warming are being discussed fervently. But the quiet efforts of individual climate modellers who provided the scientific basis for this discussion have received less attention. A key player in this community was Ernst Maier-Reimer. For decades he was the pillar of ocean modelling in Hamburg. He died on 22 July, aged 69.

Ernst Maier-Reimer was renowned for his innovative modelling contributions — and his ability to present these with a minimum of words. Having studied physics in Göttingen, he wrote his (37-page!) PhD thesis on numerical modelling of North Sea currents at the Hamburg Institute of Oceanography. In 1978, he went on to join the Max Planck Institute for Meteorology in Hamburg, to help augment the institute's global atmospheric model with a state-of-the-art model of the oceans. While most of the team was still struggling to develop a numerical representation of the complex multi-scale structure of the global ocean circulation that could run on the computers of the early 1980s, Maier-Reimer quietly solved the problem with an innovative implicit numerical integration scheme. The resultant large-scale geostrophic model served as the ocean component of the institute's global climate model for many years.

With the coupled ocean–atmosphere model — at that time, one of only a handful of similar models — it became possible to simulate the natural variability of the climate. This achievement allowed us in the early 1990s to detect the human influence on climate by comparing observed climate change patterns with the simulated human-induced and natural-variability patterns. Later, simulations by Maier-Reimer and colleagues showed that variations of global temperatures at a decadal scale can be caused by the slow response of the oceans to short-term weather fluctuations — a finding of renewed relevance that could help explain the much-discussed observed slow-down of global warming in the past 15 years.



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Ernst Maier-Reimer applied his unique ability to translate the qualitative concepts from diverse disciplines into quantitative numerical models to a wide range of phenomena, from tides, storm surges and plankton blooms to the El Niño/Southern Oscillation climate see-saw in the Pacific region. In the early 1980s, he was already spearheading the incorporation of a whole new field of science — chemistry — into the ocean models that had until then been largely restricted to fluid dynamics.

Initially, Maier-Reimer's efforts focussed on computing the storage of carbon in the oceans, essential to understanding carbon-dioxide-induced climate change. The models quantified the important capacity of the oceans to absorb anthropogenic carbon dioxide emissions — although at the cost of an increasing acidity of the oceans. Successively, however, more and more chemical and biological components were included.

All this was achieved with few spoken words. Even before Maier-Reimer came to the Max Planck Institute, I witnessed his silent efficiency in a seminar I had initiated to explore possible themes for a larger interdisciplinary project. Following a presentation by biologists on the processes that lead to large plankton blooms in spring, a lively discussion ensued about whether this might be a suitable topic for oceanographers to model. The modellers were cautiously optimistic, but the biologists were adamant that the processes they had described were far too complicated to be cast into a realistic numerical model. As usual, Maier-Reimer said not a word. But in a follow-up seminar a week later, he clinched the debate by presenting an impressive numerical model, complete with beautiful graphics, that incorporated everything the biologists had described.

The ensuing interdisciplinary collaboration culminated in a comprehensive international experiment, FLEX 1976, and a wealth of insights. I have long suspected that this demonstration of our successful collaboration across subject boundaries, inspired by Maier-Reimer's landmark innovation in modelling, contributed to the Max Planck Society's decision to create an institute dedicated to climate research in Hamburg.

Ernst Maier-Reimer never sought the limelight. Although often the principal contributor to the joint papers that described his work, he rarely appeared as first author. And although many of his colleagues went on to become tenured professors all over the world, he was perfectly content to concentrate on leading the ocean modelling department at the Hamburg Max Planck Institute. In his quiet way, he was always friendly, unassuming and very generous with his insights. He probably realised — as did his grateful colleagues and the generations of students that he advised — that as a group leader he was more productive, scientifically, than he could have been in a more prestigious position elsewhere.

In a scientific world so often ruled by vanity and competition, Ernst Maier-Reimer leaves a painful gap as a gifted modeller, and as an exceptional person. It has been a privilege, pleasure and source of great satisfaction to have worked with him for more than four decades.

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