

Körber European Science Prize 1990

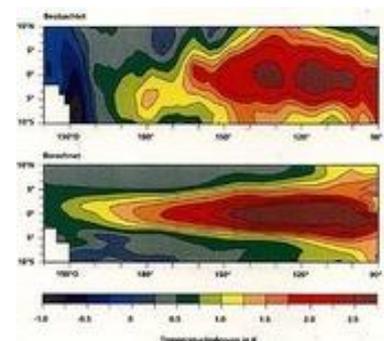
Forecasting Short-Term Changes in Climate

Lennart Bengtsson, Bert Bolin, Klaus Hasselmann

All over the world there is considerable interest in being able to predict the possible increase in future CO₂ concentrations and the effects of global warming thus caused. Closely linked to this is the problem of forecasting natural climate fluctuations. The 1990 Körber Prize was dedicated to this subject area, for which public funding is difficult to come by.

The study of short-term, natural fluctuations in the climate which occur in periods of a few weeks is interesting for several reasons:

1. to be able to distinguish anthropogenic climate influences from natural fluctuations;
2. to verify existing simulation models by means of observation data;
3. to gain insights into possible, severe effects of future climate changes which are less likely to occur as a result of an increase in the mean temperature and more due to a change in the frequency of external climate conditions (drought, storms, floods, cold snaps);
4. to develop better forecasts in the long term.



The Hamburg model calculates patterns and the strength of an 'El Niño' over a year in advance with satisfactory reliability. Top: observation, satellite photo October 1982. Bottom: forecast model for October 1982.

The prizewinners set their sights on a new, integrated climate model which brings together the previously existing individual models (atmosphere, ocean, sea surface and carbon cycle). To begin with, an explicit sea swell model was to be added to existing simulations of ocean-atmosphere interaction. The carbon cycle was then to be added as a fourth component.

At the Max Planck Institute for Meteorology in Hamburg the subsidy prize has primarily supported an already up-and-running research project which is investigating the strongest naturally occurring climate fluctuation in short time scales, the so-called 'El Niño' phenomenon in connection with the 'Southern Oscillation'. The ENSO phenomenon refers to the warming of the tropical Pacific Ocean roughly every four years, as well as the intermediate fluctuations of the surface temperature. The fluctuations in the sea surface temperature influence both the tropical and the global climate. "If we can forecast the El Niño phenomenon, that is half the rent for the tropics at least," says Mojib Latif from the Hamburg MPI, describing the motivation to create a model which comes to grips with precisely this effect.

Many scientists are involved in the international research project, and the Körber Prize serves above all to develop, in addition to the usual basic research, a forecast model which is to be used this year (1994) for the first time. However, Mojib Latif, who is coordinating the project, expects it to take another 10 to

20 years before its efficiency can really be assessed. In the Faculty of Meteorology at Stockholm University an attempt led by Bert Bolin was made to develop a model which tracks the exchange of carbon between the atmosphere and the ocean. This is also still in a "phase of intense compilation and experimentation". The heralded routine climate forecast is still a long way off. A suitable weather forecasting centre would have to be found for this purpose. But as Klaus Hasselmann himself said in 1990, the climate project is "certainly ambitious" – it is very difficult to define a timeframe for this kind of research.

Contact
Körber Foundation
Körber Prize
Kehrwieder 12
D-20457 Hamburg
Phone +49 40 · 80 81 92 -181
E-Mail koerberprize@koerber-stiftung.de