Potsdam Institute for Climate Impact Research

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of PIK

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Looking Back

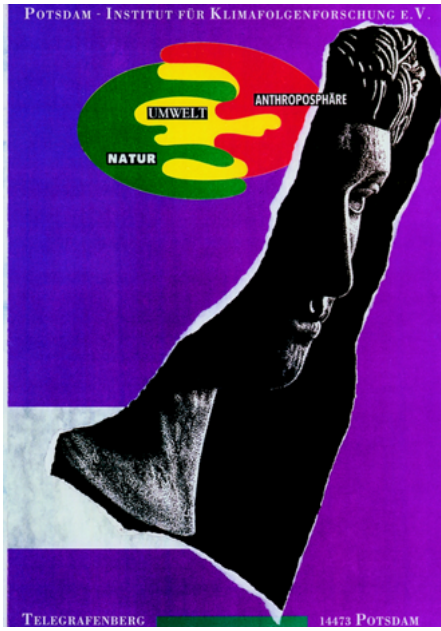
The First 10 Years

By Udo E. Simonis

Times of change are times of chances. And so it was when after German re-unification the question arose of where to preserve scientific capacities and where to build new ones, and more so, how to meet the new challenges that were in need of first class science.

Climate research had quite a tradition in both East and West Germany. Climate impacts and global change, however, were still largely unexplored. The decision then to establish an innovative research institute in Potsdam was, probably, an easy one, in reverence for the *genius loci* of that historic center of research. To define the tasks of the new institute was not that easy.

The promoters in the ministries in Bonn and Potsdam, however, had a good idea. They wrote an elemental paper and appointed a founding committee, with experienced administrators and renowned academicians, both from the natural and the social sciences. The new Potsdam Institute for Climate Impact Research (PIK) was thus destined to become an inter-disciplinary and policy-oriented research institution of high international reputation.



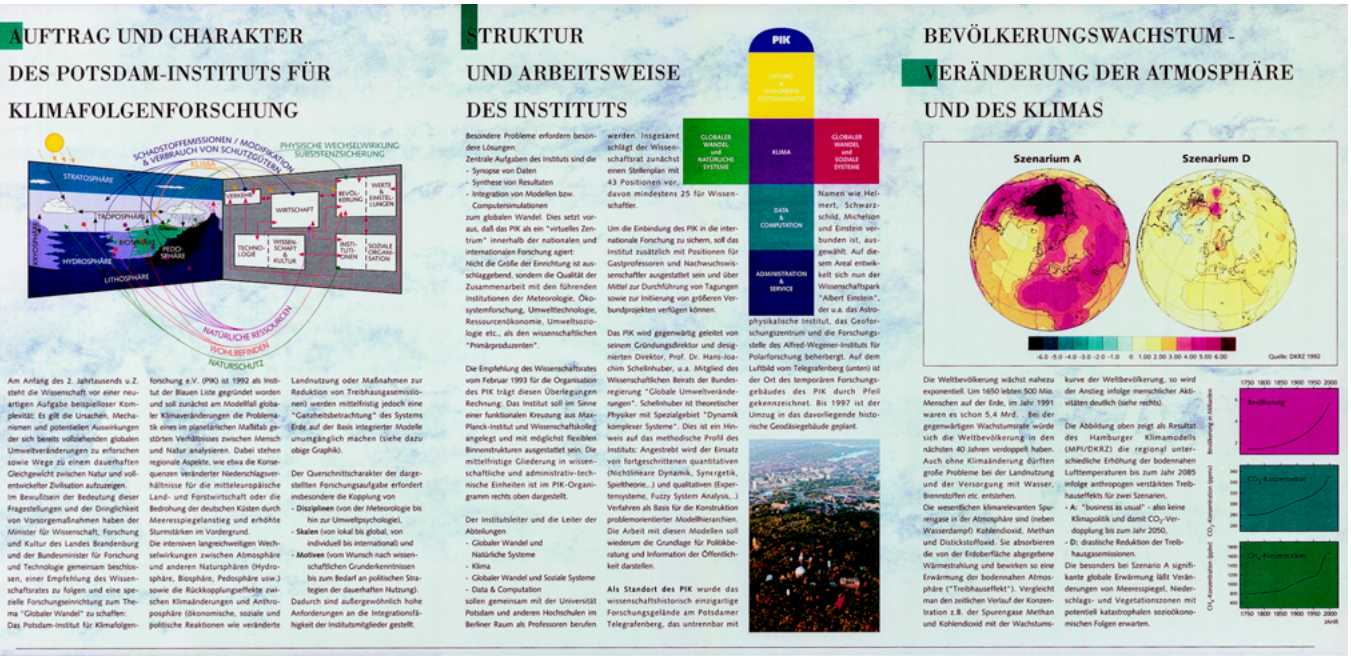
Basically, the founding members discussed Gilbert F. White's suggestion that the future condition of the globe's interlocking natural and social systems might depend more on human behaviour than on the further investigation of natural processes. Thus a strong social science component was agreed upon, intensive debates on the institute's concept and projects started, and the prompt appointment of a brilliant, imaginative director and prominent leading scientists helped to get things going.

1991 July	Recommendation of the Wissenschaftrat (German Science Council) to establish an institute for climate impact research
1991 October	First meeting of the Founding Committee of the Potsdam Institute for Climate Impact Research (PIK), a registered society (e.V.) in Potsdam
1991 December	Inaugural meeting, establishing the statutes of the institute and appointing H.J. Schellnhuber as its Founding Director
1992 January 1	Official foundation of PIK by the German Federal Ministry of Science and Technology and the Ministry of Science, Research and Culture of the State of Brandenburg
1993 April	Inauguration of PIK´s provisional building on the Telegrafenberg in Potsdam - departure from the offices in Berlin
1994 February	Constituent assembly of the international Scientific Advisory Board of PIK
1994 November	Inauguration of PIK's first parallel supercomputer IBM RS 6000 SP by Manfred Stolpe, Prime Minister of the State of Brandenburg
1998 October	Institute review by an evaluation committee of the Wissenschaftsrat to result in an expert report
2001 October	10 years of PIK - inauguration of the new main building and the new high-performance computer during the First Sustainability Days

Personally, I do recall the struggle with Klaus Hasselmann who, at that time, did not think that the social sciences had much to say on climate impacts. My repeated hints on the role economists – and rather conservative ones at that! - played in US climate research, made him think twice and, later on, he became a respected speaker at international economic institutes …

The institution's further evolution was, of course, not without struggle and battle on resources, location, appointments, and even on the name and its logo. In historical perspective, however, such contests appear as stimulating and constructive; the Board of Trustees was a reliable and determined guard.

In the minutes of the very first meeting of PIK's founding committee two specific features had been stressed - integrated scientific assessments and innovative societal functions: The challenge, it said, is to develop solutions for highly complex man-nature interactions, to coordinate those solutions and to bridge the gap between theoretical modelling of processes and practical implementation of policies.



Parts of PIK´s first brochure.

Over the years, this basic mission of PIK was again and again transmitted to its own members and its outside collaborators. A resourceful Scientific Advisory Board (SAB) was established that took up intensive discussions with an ever growing number of researchers from various disciplines. PIK thus became deeply involved in thoroughly investigating the geophysical, ecological and socio-economic aspects of climate change, and climate-impact research became part of a more comprehensive Earth system analysis.

For various reasons and deliberately so, the concept and structure of the research work at PIK changed in the course of time. The work was first conducted in a matrix structure, and research management was based on departments, the Climate System, Natural Systems, Social Systems and Data & Computation Department, complemented by a Department for Integrated Systems Analysis dedicated to methodologies that cut across traditional scientific boundaries. Actual research work was carried out in projects (with often stimulating acronyms!) that tried to answer key questions, the so-called core projects. Nine such core projects were clustered under three research angles, namely global perspective, regional focus and sectoral view.

For years this structure proved quite successful and led to a first grade evaluation by the "Wissenschaftsrat", the German Science Council, who in 1999 defined PIK as "an outstanding research facility".

Mitigation of and adaptation to climate change were major themes of that first period of research work. Through data analyses, computer simulations and models, PIK provided sound information on and proposed appropriate goals, instruments and strategies for sustainable development, now and in the future. In addition to pro-active publishing in peer-reviewed journals and high-calibre books, scientific advice was given to national and regional authorities, to industry, non-governmental organisations and civil society at large.

Over the years, need was felt to revise the programme and to develop a new research profile – TOPIK^{2K}, an outcome of an elaborate internal contest and major efforts for increased excellence. In close collaboration with the Scientific Advisory Board seven major transdisciplinary research areas were prescribed, and the functions of the departments more clearly defined to support the resources for the research projects and to ensure the quality of the results. TOPIK^{2K} will thus contribute to integrated systems approaches to global change in general and Earth system analysis in particular.

Understanding the Earth system is a task that no institution can tackle alone. PIK therefore closely collaborates with many partners, plays an active role in activities such as the International Geosphere-Biosphere Programme (IGBP), the European Climate Forum (ECF), and the Intergovernmental Panel on Climate Change (IPCC), and coordinates a great number of multi-national research projects.

Excellent research depends, above all, on excellent people. And here PIK was extremely happy, particularly in engaging the Schellnhubers; both John and Petra, in their distinct functions, with their wide range of ideas and enduring creativity, made PIK the exceptional place it is, a well run, first-class institute, attractive to experienced senior and promising junior staff alike.

Petra Schellnhuber, who died so early (see the obituary on the next page), was a charming, but very outspoken woman, the "angel of the institute". The side-events of the annual meetings of the international Scientific Advisory Board, which she took special care of, will be unforgotten. We had never had before and probably will never have again, a board meeting among the mummies in the Egyptian museum …

Construction of PIK´s provisional building on the Telegrafenberg in Potsdam.

All in all the number of staff now amounts to more than 150. They do cost a lot, but they also earn a lot, in research grants and in academic esteem, in better understanding of complex interactions and in suggesting relevant solutions – as is manifest from the other parts of this report.

Ten years of work - ten years PIK - this is a good occasion to look back. But there is equal reason to look forward, as neither the climate system nor the Earth system has yet reached a sustainable path, and the stability of the ecosphere is seriously threatened by human activities. I therefore would like to see PIK flourish for the next ten years and more, both in intellectual capacity and in excellent research work. Maybe my personal normative criteria for academic life could help to secure these wishes: Your work should be theoretically demanding, empirically relevant and done at the right time.

Congratulations to all PIK members for your work in the past; high expectations for your work in the future!

The author: Prof. Dr. Udo E. Simonis is Research Professor for Environmental Policy at the Science Center Berlin (WZB). He was Chair of PIK´s Scientific Advisory and member of PIK´s Board of Trustees from 1994 - 2001.

PIK´s Paleosites

At the "Ex-Stasi Headquarters", PIK members from four of the future five departments began working together in a makeshift mode. In November 1992, Klaus Bellmann, Head of the Natural Systems Department, was joined there by his collaborator, and later successor, Wolfgang Cramer. These winter months were a peculiar and certainly memorable time for all those working in Berlin's Magdalenenstrasse. The group had found offices in the massive, deserted office complex formerly occupied by the "Ministry of State Security" (Stasi). Germans from both sides of the wall and some colleagues from other countries were working together, with Stasi furniture and phones, western UNIX workstations (but no internet access), and a steady stream of international visitors wanting to see the new institute. The director and the administration were, it seemed, on a different planet, accommodated temporarily in various buildings scattered all over the Telegrafenberg in Potsdam. Head-of-department meetings in Potsdam involved several hours of travel in the institute's grey Wartburg vehicle. These hours were of considerable value: both scientific issues and structural decisions for the institute were thoroughly discussed in Berlin traffic jams or along the bumpy streets crossing what used to be the Berlin wall. This "Berlin era" came to an end when the widely distributed parts of PIK were finally united on the Telegrafenberg in March 1993 *M. Stock*

Petra Schellnhuber: an Obituary

The Potsdam Institute for Climate Impact Research deeply regrets the death of Petra Schellnhuber. On Friday, September 28, 2001, Petra Schellnhuber, one of the pioneers of our Institute, passed away. She endured a long and severe illness with great courage and faced death with amazing dignity and love. Petra died on her birthday in her own and John Schellnhuber's home in Potsdam.

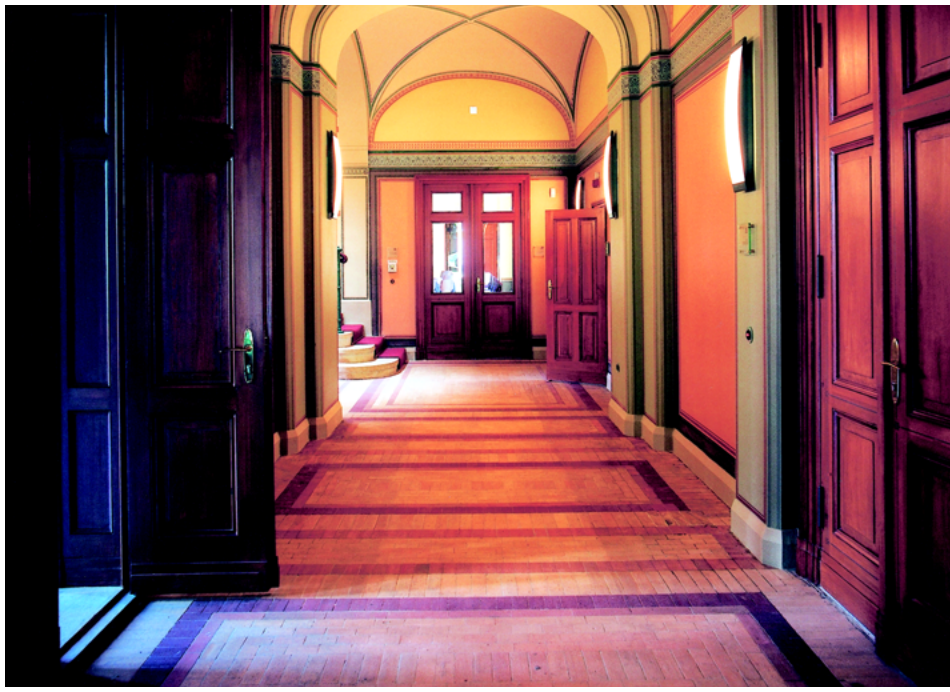
Petra was born in 1950 in Frankfurt/Main. Her university training was in archaeology, completed with a degree from the University of California, Santa Barbara, in 1982. Petra changed direction in her professional career when she helped to establish our institute in 1992/93 as full-time Public Relations Manager. Her illness forced Petra to retire gradually from this position from 1997 on.

The importance of Petra's achievements during the initial phase of the institute cannot be overstated. Creating an interface with the outside world, the general public, governments, funding agencies and media was only one, albeit important, contribution that she made. Helping a growing team of scientists and technical/administrative staff, from different disciplines, academic cultures and nationalities to grow together was another, equally important one.

A crucial factor in Petra's approach to the advancement of PIK's goals was her fearless attitude to the traditional ways to conduct, and manage, research in a multidisciplinary environment. If rules and regulations were helpful to the scientific goals identified by the institute, then she would find them for us and help us all make best use of them. If a personal contact with someone, somewhere, could help identify better solutions, then she would make that contact for us too.

Not only staff members at PIK, but also colleagues and friends worldwide are aware that Petra's contributions to PIK, although poorly visible in a classical sense, are outstanding. Thanking her for these contributions, and for the positive spirit she brought to much of our work, is the least we can do, and we do so wholeheartedly. More in her spirit, however, will be to continue the path she has helped us commence and to pursue our research on a transition to sustainability.

Petra Schellnhuber (1950-2001).



The Institute and its Mission

The Potsdam Approach to the Integrated Investigation of Climate Change

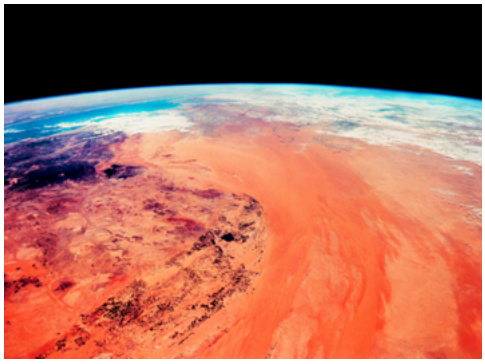
The Mission

The transformation of the global climate system, set going by the very nature of our technical civilization, represents one of the greatest challenges so far in the history of mankind. The main cause of this development is the emission of greenhouse gases (such as CO_2, CH_4 and N_2O) by industry, traffic and households, which has modified the radiation balance of the Earth's atmosphere and will bring about a planetary warming of two to three degrees Celsius in the 21st Century. And this is happening, moreover, during one of the Earth's warm periods, a time at which our environment is anyway at the peak of a natural fever. The special challenge noted initially relates to the complexity of the expected repercussions, the gigantic spatiotemporal range of the perturbation, the irreversibility of probable damage to innumerable ecological an socioeconomic systems and to the completely novel aspects of international and intergenerational justice that are involved: who pays the price, who is liable, who profits, who makes provision and who provides the aftercare?

Public opinion and politicians began about two decades ago to become interested in these questions, which initially were addressed only gradually at individual scientific conferences. But nowhere did the research capacity exist which could provide well-founded answers to specific problems, not to speak of an integrated assessment of the problem as a whole. In this situation some farsighted representatives of ministries, universities and research communities made use of the short-term window of opportunity arising from the German re-unification to set in motion the foundation of the "Potsdam Institute for Climate Impact Research (PIK)". PIK was to run in a manner appropriate to its subject, in other words with a radically holistic approach. On the one hand scientists from all relevant disciplines (i.e. meteorology, ecology, economic sciences, systems analysis, etc.) should work together closely and without bias ("horizontal integration"), on the other hand all aspects of the relevant problem (from its formulation to proposals for its solution for decision-makers) should equally be considered ("vertical integration"). The possibilities to contain human-induced ("anthropogenic") climate change at a tolerable level, together with suitable measures to adapt to the unavoidable warming of the planet (with its particularly grave consequences for the poorest developing countries), should be at the core of the institute's research.

The Institute

Today, ten years after the official foundation of the institute on 1st January 1992, it can be remarked – in all modesty – that this radical approach has brought success. PIK is located on the Telegrafenberg in Potsdam, on a unique historic science campus, and was able in autumn 2001 to move into its new headquarters, the carefully restored former Astrophysical Observatory, where many of the giants of modern physics worked in the first decades of the 20th Century. More than 170 members of the institute make up the five scientific departments (Integrated Systems Analysis, Climate System, Global Change & Natural Systems, Global Change & Social Systems, and Data & Computation) together with the slim administrative and service units. This structure by no means implies any barrier to interdisciplinary co-operation: the actual research is carried out in small project teams, the "human capital" for which must be drawn from at least two different departments. PIK is a member of the Leibniz Gemeinschaft and has annual care funding of around 6 million euros from the German Federal Republic and the State of Brandenburg, in addition to soft funding from national and international sources amounting to several million Euros, including



major contributions from the European Community. The institute furthermore operates a supercomputer (a 200-processor, IBM SP parallel computer), which will in 2002 achieve teraflop level. This computer has a central importance in the Potsdam research approach. This is due to the fact that no institute in the world could be in a position on its own to collect the data in detail or study all the processes relevant to the whole subject of climate change. Fortunately this is done by tens of thousands of researchers in the international scientific community – in basic research, in remote sensing, and in countless measurement campaigns in the field. All this information, however, needs to be looked at in parallel to get a panoramic view of the problems, in order to provide priorities and possibilities for action for policy-making.

The Research Fields

Such an overall picture, with clear insights into the past, the present and the future, can only be provided through the virtual reality of computer simulation. PIK focuses in particular on this function, which can only be accomplished through massive efforts in data analysis, development of models, numerics and software development. Six broad thematic fields - so called "TOPIKs" (cf page 25) are currently being investigated in this way; these relate to

- the nonlinear dynamics of the ecosphere,
- civilization's handling of extreme events such as storms, droughts or floods,
- the socio-economic driving forces of global environmental change,
- the emergence of a globally interlinked civil society,
- the construction of regional simulators, and
- the vulnerability of economic sectors of climate change.

All these activities should contribute to the process of creating the scientific foundation for global sustainable development, i.e., for the acceptable coevolution of our technical civilization and the natural ecosystems of our planet.

Hans Joachim Schellnhuber, Director of PIK.