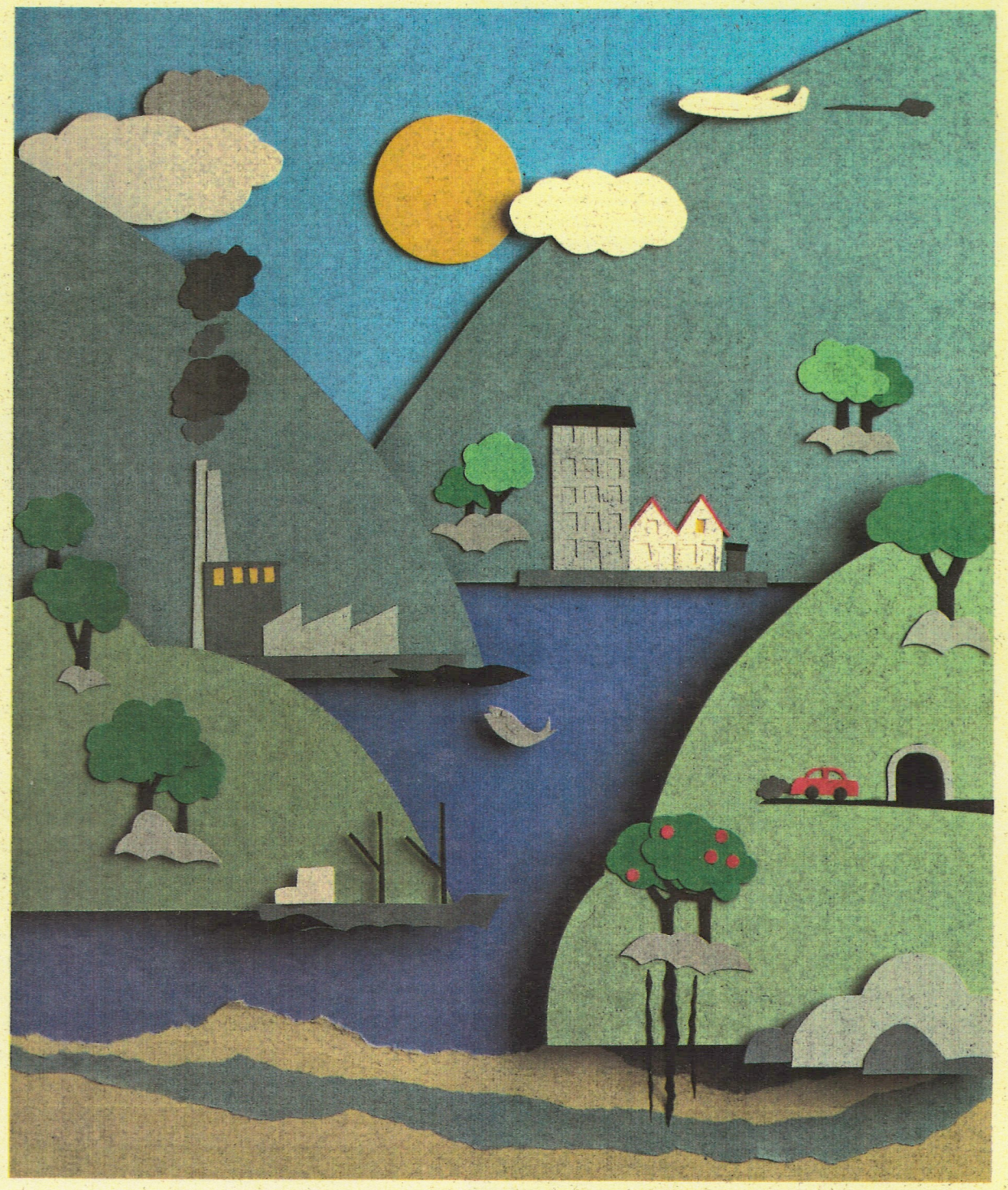
Environmental Sciences

Bergen Scientific Centre



The environment and its contamination

MAY 1990

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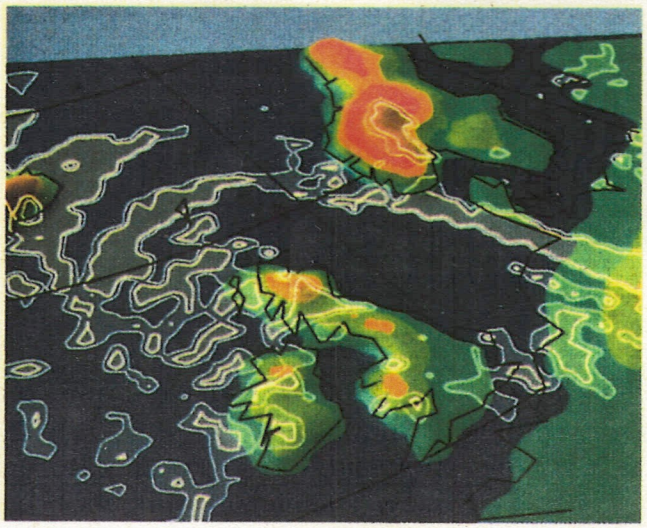
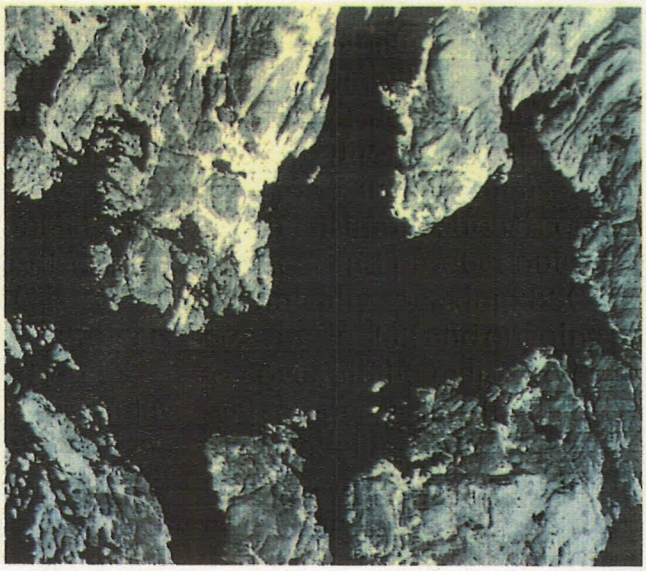
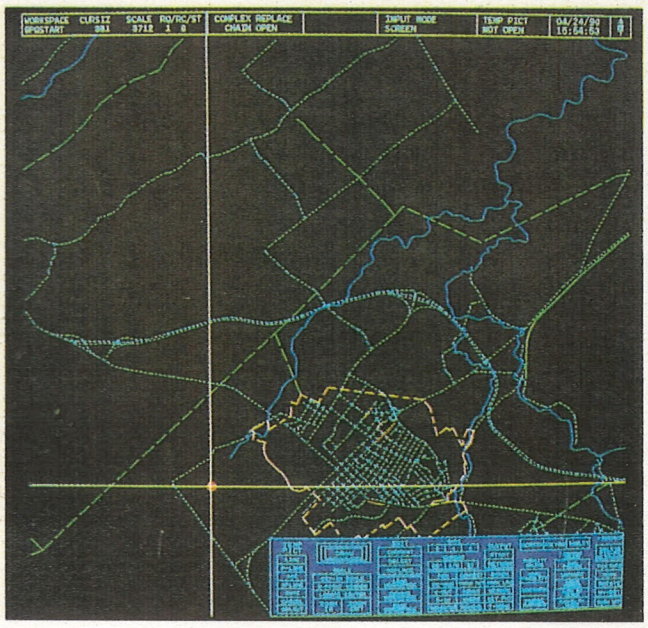


A visualization depicting cloud coverage, using the HLSC plotting technique developed for the *3D Oil Reservoir Modelling & Visualization* project. The application is from work performed under a joint reserch project with the Department of Meteorology, University of Bergen.



The Advanced Very High Resolution Radiometer (AVHRR) on board the NOAA satellite records reflected radiation from the earth's surface. This thermal infrared (Band 4) image shows Bjørnafjorden south of Bergen. (Courtesy GRID Database.)



Geographic Information Systems (GIS) allow the user to combine

The Environmental
at the Bergen Scie

IBM has a long history of research and development activities in ES. Most of this work, which started in the late 60s, was performed at several IBM scientific centres around the world.

Since August 1989, IBM Europe has given to BSC the mission of leading and coordinating ES studies. BSC has thus become the focal point for the company's activities in this field. This evolution is affecting BSC in four ways, i.e., in tecnical aspects, geographical implications, contacts with partners and product outputs. Technically speaking, BSC is growing in staff and ongoing projects to cover all the major fields in ES, with emphasis on studies of simulation modelling of environmental contamination (in air, water and soil) and databases.

Geographically speaking, BSC is expanding its projects from local studies (i.e., in the Nordic regions) to continental and global applications. In searching for partnerships, BSC is developing joint research projects with Nordic organizations, European Universities and other partners in Europe and in the United States. Finally, in terms of products, emphasis is now given to the development of transferable software tools and the acquisition of technical competence and skills on environmental issues.

Sciences (ES) Project
ntific Centre (BSC)

In a nutshell, BSC's ES activities in the past, present and future are summarized below.

Past

• Oceanographic modelling • Flow simulation in fractured porous media • Atmospheric modelling • Remote sensing • Mapping

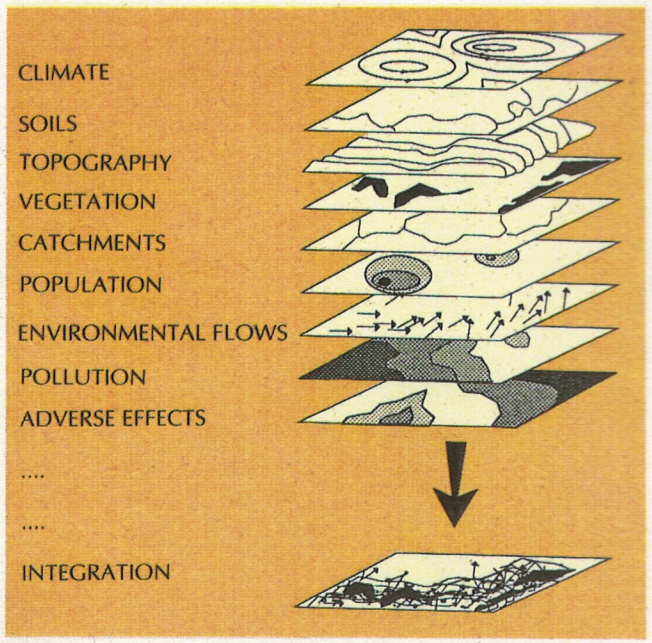
Present

- Initial phase of a major ES project sponsored by IBM Europe and involving national and international partners along the following research topics: 1) simulation modelling of environmental flows and pollution contamination in air, water and soil, from local to global scales; 2) databases; 3) remote sensing; 4) mapping; and 5) visualization.
- Final identification of the major research topics, the partners with which to collaborate and project priorities.

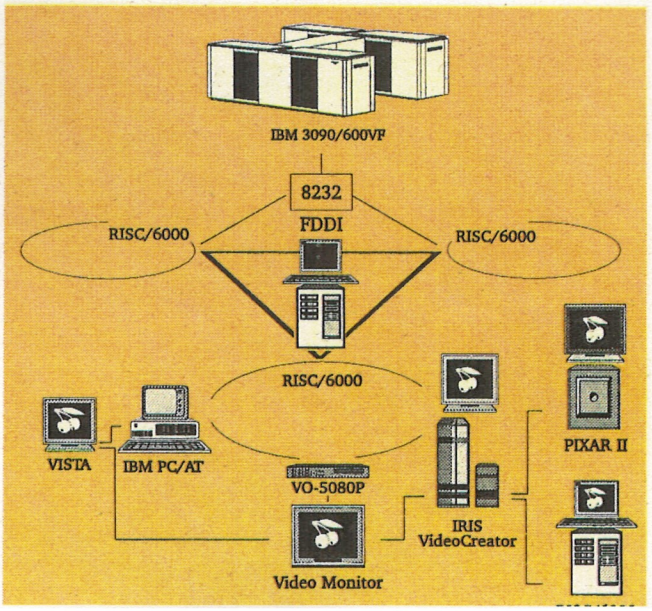
Future

- Full development of the ES project. Implementation of multi-purpose simulation modules for ES. These modules should be user-friendly, interactive, with advanced graphic capabilities and able to perform a direct access to databases.
- Development of expert systems for environmental applications. These tools should be designed to assist decision makers in environmental planning.
- Assistance to private and public organizations for environmental analyses and simulations and, ultimately, problem solving and optimization of resources.

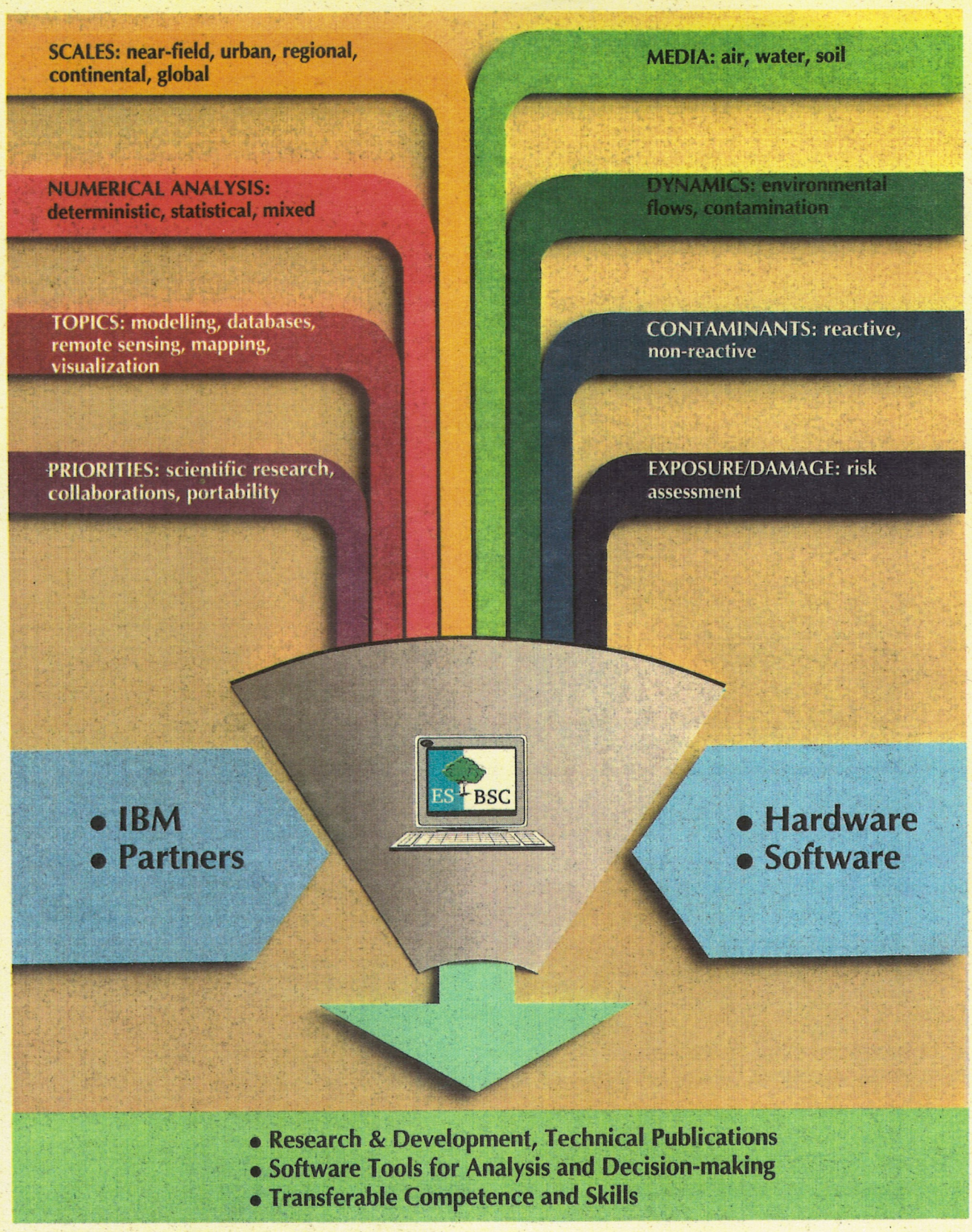
Computer simulation of ice distribution at a sea ice-open ocean boundary region such as the Western Greenland Sea. Dark red represents 100% ice cover while dark blue represents ice-free regions. (Courtesy Institute of Ocean Sciences, Department of Fisheries and Ocean, Canada, and Nansen Remote Sensing Center, Norway.)



Outline of integrated databases and models for environmental assessment and decision-making.



The current ES project at BSC



Project Leader: Paolo Zannetti

Key Technical Staff: Trond Aukrust, Paul Budgell, Rune Espelid, Alastair Jenkins, Anne Lucas, Noelle Odling, Lisbeth Skodvin, Christopher Thompson, Anne Siw Uberg

Cross Section of Partners: University of Athens, GREECE; Bergen Foundation of Science, NORWAY; University of Catalunya, SPAIN; The Centre for Environment and Resource Studies, University of Bergen, NORWAY; FORUT, Narvik, NORWAY; Department of Geology, University of Oslo, NORWAY; GRID, Geneva, SWITZERLAND; University of Iowa, USA; Institute of Marine Biology, University of Bergen, NORWAY; Institute of Marine Research, NORWAY; The Max Planck Institute for Meteorology, Hamburg, WEST GERMANY; Department of Meteorology, University of Bergen, NORWAY; The Nansen Remote Sensing Center, Bergen NORWAY; NILU, Lillestrøm, NORWAY; The Norwegian Meteorological Institute, Bergen, NORWAY; The Norwegian Meteorological Institute, Oslo, NORWAY; Rice University, USA