

**FROM THE “ARCTIC CLIMATE SYSTEM STUDY” TO A NEW GLOBAL
PROJECT “CLIMATE AND CRYOSPHERE” OF THE WORLD CLIMATE
RESEARCH PROGRAMME (WCRP)**

V. Ryabinin

*Joint Planning Staff for the World Climate Research Programme, WMO, 7 bis, Avenue de la
Paix, Geneve, CH-1211, Switzerland, ryabinin_v@gateway.wmo.ch*

During the last decade the polar climate studies of the WCRP have been regional. The Arctic Climate System Study (ACSYS) had three main objectives:

- To improve understanding of the interactions between the Arctic Ocean circulation, ice cover, the Arctic atmosphere and the hydrological cycle;
- To initiate long-term climate research and monitoring programs in the Arctic so as to determine key Arctic processes and Arctic climate variability and trends;
- To provide a scientific basis for a more accurate representation of Arctic processes in global climate models.

The decade of ACSYS is ending in 2003, and the WCRP is planning a major international conference to summarize the project achievements. More information on the project is available at the ACSYS home page address: <http://acsys.npolar.no>.

The Joint Scientific Committee for WCRP endorsed CliC as a new project in 2000. The project aims are to:

- Assess and quantify the impacts of climatic variability and change on components of the cryosphere and their consequences for the climate system, and determine the stability of the global cryosphere;
- Improve understanding of the physical processes and feedbacks through which the cryosphere interacts within the climate system;
- Improve the representation of cryospheric processes in models to reduce uncertainties in simulations of climate and predictions of climate change;
- Enhance the observation and monitoring of the cryosphere in support of process studies, model evaluation, and change detection.

The CliC home page address is located at: <http://clic.npolar.no>. CliC is a global project. Its science plan of CliC refers to the following main questions:

(1) How stable is the global cryosphere?

- How well do we understand and model the key processes involved in each cryospheric component of the climate system?
- How do we best determine the rates of change in the cryospheric components?

(2) What is the contribution of glaciers, ice caps and ice sheets to changes in global sea level on decadal-to-century time scales?

- How can we reduce the current uncertainties in these estimates?

- (3) What changes in frozen ground regimes can be anticipated on decadal-to-century time scales that would have major socio-economic consequences, either directly or through feedback on the climate system?
- (4) What will be the annual magnitudes, rates of change, and patterns of seasonal redistribution in water supplies from snow- and ice-fed rivers under climate changes?
- (5) What will be the nature of changes in sea-ice mass balance in both polar regions in response to climate change?
- (6) What is the likelihood of abrupt climate changes resulting from regime changes in ice shelf - ocean and sea ice - ocean interactions that impact the ocean thermohaline circulation?
- (7) How do we monitor cryospheric components as indicators of change in the climate system?

Several of these questions are of importance for ACD.

ACSYS has developed an ACSYS Data and Information Service (ADIS). The aim of ADIS is to provide a meta-data directory to help other researchers locate historical or newly available Arctic data sets, which are stored at different institutions and data centres. Arctic data sets in the disciplines of meteorology, oceanography, sea-ice and hydrology may be of interest for the ACD. Main data providers associated with ACSYS and CliC are listed below:

- Global Run-off Data Centre,
- Global Precipitation Climatology Centre,
- National Snow and Ice Data Center,
- Polar Science Center,
- Alfred Wegener Institute,
- Norwegian Polar Institute,
- Scott Polar Research Institute,
- UCAR Joint Office for Science Support (e.g. for SHEBA),
- NOAA National Oceanographic Data Center,
- Canadian Ice Service,
- Russian Research Institute for Hydrometeorological Information.

The development of data provision services will continue under CliC. The ACD participants are invited to benefit from using the ACSYS/CliC data and to voluntarily contribute data to ADIS and Data and Information Service of CliC (DISC).