

# **Cybercartographic Atlas Workshop**

**Centro Nacional Patagónico (CENPAT)**

**Puerto Madryn, Argentina**

**29 November – 1 December 2001**

Supported by Agencia Nacional de Promoción Científica y Tecnológica (ANPCYT)

## Executive Summary

A well-presented and supported workshop on the Cybercartographic Atlas of Antarctica took place from 29 November to 1 December 2001 in Puerto Madryn, Argentina.

The highlights of the meeting were:

- Obtaining Argentinian support for and participation in the project, from a number of different agencies within Argentina.
- Inclusion of a climate and climate variability component to the Atlas.
- The possible inclusion of a "Impact of Climate Change in the Antarctic Ecosystem" vignette in the Atlas through joint Argentinian / Belgium cooperation.
- The conceptual design and the technical structure of the Atlas is moving forward. Further funding will see a rapid increase in the technical development and implementation of the Atlas.
- There is a wealth of Antarctic data already available. Groups of scientists (through SCAR and other organisations) are encouraged to participate in the project.

Participants thank Agencia Nacional de Promoción Científica y Tecnológica (ANPCYT), CENPAT, Dr Vergani and his team at CENPAT, for making the workshop possible.

## Introduction and background

The term "Cybercartography" was first introduced in 1997 at the International Cartographic Association (ICA) meeting in Stockholm. The idea for a Cybercartographic Atlas of Antarctica first evolved after work on the Cybercartographic Atlas of Latin America had been finalised <[www.atlaslatinoamerica.org](http://www.atlaslatinoamerica.org)>.

The Canadian Committee for Antarctic Research (CCAR) discussed and approved the Antarctic project in 1999. The work was then presented to the Scientific Committee on Antarctic Research's Working Group on Geodesy and Geographic Information (SCAR WG-GGI) meeting in Tokyo, in July 2000. The project was also presented to the Antarctic Treaty's Committee for Environmental Protection (CEP) in Amsterdam in September 2000.

The project was formally adopted by WG-GGI at its meeting in Siena, Italy in July 2001. The project work plan included the requirement of holding at least one of meeting, prior to the XXVII SCAR meeting in July 2002, to discuss the project. The workshop in Puerto Madryn has brought together a number of key stakeholders to discuss the conceptualisation and initial design phases of the project.

The workshop was supported by ANPCYT of Argentina through RC2001 and was presented by Dr Casamiquela and Dr Vergani of CENPAT-CONICET.

## Agenda

### Workshop: From Antarctica to the Puna: a Contribution of Cyber Cartography to the Sustainable Development.

Centro Nacional Patagónico  
Puerto Madryn, November 29 - December 5 2001.

Granted by: Agencia de Promoción Científica y Tecnológica RC 2001  
Responsible: Dr. R. M. Casamiquela- Dr. D. F. Vergani

#### ANTARCTIC SESSION. NOVEMBER 29TH TO DECEMBER 1ST, 2001

##### THURSDAY 29 NOVEMBER

- 09:00 - 11: 00** - Welcome and Opening of the Meeting  
 - Agenda Revision and Reporters designation  
 - Introduction of Cyber Atlas Project Background and Objectives Dr. Fraser Taylor
- 11:00 - 11:30.**- Coffee break
- 11:30 - 13:00.**- Joint Project Belgium - Argentina Vrije Universiteit Brussel (Belgium) Dr. Ludo Holsbeek
- 13:00 - 14:00.**- Lunch
- 14:00 - 15:30.**- Atlas Content
- 15:30 - 16:00.**- Coffee Break
- 16:00 - 18:00.**- Technical aspects Peter Pulsifer: Hardware and Software.
- 19:00** Open Conference: "Cybercartography and Antarctica: Cartography for the 21st. Century".  
Dr. Fraser Taylor, Carleton University, Canada.
- 20:00** Open exposition "Antarctica Yesterday and Today".

##### FRIDAY 30 NOVEMBER

- 09:00 - 11:00.**- Presentation of Argentine Participation in the Cyber Atlas: Impact of Climate changes on the Antarctic Ecosystem: Joint Project CENPAT (CONICET)- Universidad de Cuyo, CRICYT (CONICET)- Dr. D.Vergani, Prof. G. Garcia de Martin, Prof. D.Soria, MSc Z. Stanganelli.
- 11:00 - 11:30** Coffee
- 11:30 - 13:00.**- Discussion of possibilities of background information integration with the proposal: "Impact of Climate changes on the Antarctic Ecosystem":  
Climatology Project Dr. Barros (UBA), Lic. Labraga (CENPAT) (Argentine)  
Instituto Geográfico Militar (Argentine)  
Servicio de Hidrografía Naval (Argentine)
- 13:00 - 14:00** Lunch
- 14:00 - 16.00.**- Connection between Cyber Atlas Project with SCAR Group of Specialists on Seals; SCAR birds sub-committee; Globec; CCAMLR Monitoring Program etc. Designation of representatives.
- 16:00 - 16.30.**- Coffee
- 16:30 - 19:00.**- Funding: European Union, National Science Foundation, etc. Work Design

##### SATURDAY 1 DECEMBER

- 09:00 - 11.00.**- Report preparation and next meeting
- 12:00 - 13.00.**- Lunch
- 13 00 - 15:00.**- Report approval
- 16:00 - 21.00.**- Visit to natural places in Peninsula Valdes

**Closure of the session.**

## Welcome and Opening

The Vice Director of CENPAT, Dr Nestor Ciocco, opened the workshop. He outlined what CENPAT does and its multi-disciplinary style of work, the international involvement as well as local Patagonian research. He welcomed participants and hoped the workshop would be successful and that the participants enjoy Patagonia.

Prof. Taylor, on behalf of the participants, thanked the Vice Director for his kind words.

### Prof. Fraser Taylor – “Cyber Atlas project background and objectives”

Prof. Taylor outlined previous projects he has been involved with, including

- an electronic atlas of China
- a geographic explorer of Canada (in CD-ROM format)
- Queen Charlotte Islands Mariner - off the coast of British Columbia in Canada (in CD-ROM format)
- DataAtlas@China – a commercialised version of the initial electronic atlas of China
- A Cybercartographic Atlas of Latin America. This project continues to build on its initial work and it going very well. Outside help has now ceased and each of the countries are taking their own projects ahead.

A number of countries have identified they wish to participate in the Antarctic project

- |             |               |                |
|-------------|---------------|----------------|
| • Argentina | • China       | • Poland       |
| • Australia | • Germany     | • South Africa |
| • Bulgaria  | • New Zealand | • UK           |
| • Chile     | • Norway      | • US           |

Other countries will be added as the project develops.

CCAR first discussed the project, the work was then presented to the WG-GGI meeting in Tokyo, in July 2000 and to the CEP in Amsterdam in September 2000.

Project was formally adopted by WG-GGI at its meeting in Siena in July 2001.

Prof. Taylor first introduced the term “cybercartography” in 1997 at the ICA meeting in Stockholm. Cybercartography is where the map is central element of a cartographic information system. It is different to a GIS where a map, it can be argued, is either an output or an input. Cybercartography includes most of the functions of a GIS and also goes beyond that. With maps you consistently use vision – with cybercartography you use moving images, touch, sounds and work is being done on trying to add smell and taste.

In Antarctica there are vast distances and disparate scales of information. A Cybercartographic atlas allows for different scales and details. The Antarctic environment is also subject to slow and dynamic changes.

A combination of qualitative and quantitative data allows for new perspectives on existing issues.

Large amount of machine-readable and georeferenced data already available for Antarctica. USGS work through the on-line scientific atlas and US Antarctic Resource Centre, BAS produced ADD, the RADARSAT mosaic and global change datasets.

Bring together existing datasets together to present in a different form. Virtual reality examples of undersea areas as well as utilisation of existing web cams set up on the ice.

The ICA Commission on Maps and the Internet is offering its assistance to the project.

Follow up workshops are planned for Shanghai at the XXVII SCAR meeting in July 2002 and, if funding is available, another one in Ottawa sometime in March or April 2002.

Funding – estimates are currently at \$450 000 USD for the whole project. Initial funding has been obtained from the Canadian Department of Foreign Affairs and International Trade. ANPCYT, Argentina approved

\$25 000 of funding for the Puerto Madryn workshop. Other major funding bids are being worked on at the moment. Other smaller and as important bids include ICSU 2003 grants and money from the Tinker Foundation.

The management structure of the project was outlined – a major hub would be set up in Canada with hubs, nodes and sub-nodes in other countries / organisations. For example, the existing USGS Antarctic Atlas would function as a major node.

Middleware / fusion ware (such as OGD) is being considered as an option for linking and transferring data.

There are 3 key user groups that have been identified:

1. Scientists and researchers (SCAR)
2. Decision makers / administrators
3. General public

and each user group would have a different interface into the atlas.

The initial team includes Fraser Taylor, Barbara George, Peter Pulsifer and Daniel Vergani.

The General Bathymetric Chart of the Oceans (GEBCO) is very interested in getting an updated bathymetric dataset included in the Atlas. Dr. McNab from the Canadian Geological Survey will be approaching the IHO and others for assistance.

A copy of the Powerpoint presentation Dr Taylor gave is available.

### **Mr Peter Pulsifer – “Atlas Dimensions”**

Mr Pulsifer gave a presentation in which

- Traditional and current definitions of “maps” (according to ICA) were given
- A definition of atlases was provided.
- The traditional and current techniques for:
  - Data collection;
  - Production tools;
  - Reproduction; and
  - Distribution

were described

The Canadian Geographic Explorer, the Queen Charlotte Islands Mariner, the DataAtlas@China and AtlasLatino America projects were described in detail.

Production methodology was discussed by way of describing the following stages – conceptualisation, design, content development, product construction, promotion and distribution

Cartography can be seen as an integrator of data, a bridge between disciplines and nations.

Some standards are required in order for as much data as possible to be available through the Atlas. Extensible Markup Language (XML) is being considered for coding some of the data. Most of the effort will go into the structure of the atlas and the development of interfaces are relatively easy once you have the structure in place.

A copy of the Powerpoint presentation Mr Pulsifer gave is available.

### **Mr Peter Pulsifer – “Technical approaches”**

Primary technical considerations were described and a required level of interoperability is needed for the project to succeed.

Metadata for geographic data is working well, but trying to have metadata descriptions for objects like sound, movies, etc is much more difficult. The authenticity of the record is an important issue to consider.

In the real world three approaches are used to achieve interoperability including: a common theory of spatial information, data discovery services and cooperative process control.

The Open GIS Consortium (OGC) simple feature model was outlined.

Data using CORBA [common object request broker architecture], OLE [object linking and embedding] / COM [component object model] and SQL [structured query language] will easily fold into the Atlas. For those databases that do not use any of those 3 approaches then middleware can be used as a possible solution. OGDII is an example of this.

A middleware licence currently costs about \$15 000 USD (this could be purchased by a hub) and then other groups could be a node and connect to the hub, use the middleware and the only cost for the node would be a driver (eg. ESRI driver if their data were in shapefiles or coverages) and the costs involved for developing an interface (usually minimal).

The process of being involved in the Cyber Atlas works is a 2 way street

1. you can enter your data and
2. then get back data (as well as gaining access to a whole lot of other data).

Semantics and the way in which different disciplines describe the same feature will be a problem not easily resolved (eg. Roads can displayed completely differently depending on what your end use is)

A copy of the Powerpoint presentation Mr Pulsifer gave is available.

## **Open Conference on Cybercartography in Antarctica**

Prof Taylor gave a presentation, open to the public, on cybercartography and the cybercartographic atlas of Antarctica project.

## **Open Exhibition “ Antarctica Yesterday and Today”**

An exhibition of Argentinian participation in Antarctic research activities and a photographic exhibition (open to the public) was launched. The high quality photographs and posters reflected the hard work put in by CENPAT and the exhibition was well supported by the Lions Club of Puerto Madryn.

## **Dr Ludo Holsbeek – “Seals and Penguins as indicators for Antarctic ecosystem changes”**

Dr Holsbeek presented the research he and others have been conducting in Antarctica. Closed pack ice is very important to the biomass of the top predators (seals and penguins). The biomass of these animals in Antarctica is about 7 times greater than the biomass found in the Arctic. The total biomass now is about 1/3 of what it was at the turn of the 20<sup>th</sup> century.

A “Seals” vignette would make a good case study to start with for the Atlas and could appeal to all levels of users (scientists, decision makers and the general public). It would be developed in the framework of Belgium-Argentine cooperation.

When the various datasets are made available there is a whole range of new possibilities opened up to stimulate cross-discipline studies.

A copy of the Powerpoint presentation Dr Holsbeek gave is available.

## **Dr Daniel Vergani – “History & Current Scientific Cooperation in the Antarctica Peninsula”**

Dr Vergani outlined Argentinian participation in Antarctic scientific studies starting from the 1830's when the first explorers headed south towards Antarctica.

The historical exploration of the Antarctic continent would be a good case study / vignette to use in the Cybercartographic atlas.

Dr Vergani then spoke about some of his work in Antarctica, starting in 1976. He and Zulma Stanganelli conducted research on the weaning mass of Elephant seals which has led to further working linking possible changes in the biomass of top predators (seals and penguins) to climate variability (phenomena such as ENSO).

The impact of climate change in the Antarctic ecosystem, utilising existing experience and team members from the Cybercartographic Atlas of Latin America, is being proposed as another possible vignette for the Antarctic Atlas. It would be developed in the framework of Argentine-Belgium cooperation.

A copy of the Powerpoint presentation Dr Vergani gave is available.

### **Dr Vicente Barros & Lic. Juan Carlos Labraga – “Impact of Climate Variability on the Antarctic Ecosystem”**

Dr Barros and Lic. Labraga’s field of expertise lies in climate variability in South America and Lic. Labraga has developed a climate change scenario for Argentina. Using the CSIRO9 general circulation model they showed the results of some work in Antarctica with:

- the change in observed surface temperature between 1955 and 1997 and a projected mean surface temperature up to 2047
- the mean sea level pressure change from 1973 to 1997 and the projected MSL pressure change from 1998 to 2022

Free climate datasets are available with only 2 projections (polar stereographic and another). Surface temperature, winds, sea surface temperature, humidity, precipitation, etc are amongst the data being collected by climatologists. The European community has some data, however, it is not free.

Each satellite has its own sensor for sea surface temperature and so the results vary (first started in about 1979)

The IPCC – Intergovernmental Panel on Climate Change – gathers climatic data, rather than actually doing the research. Information on the various climate models (and their outputs) is available from the IPCC web site

Dr Barros indicated there was a possibility of mapping climatic variability. Inter-annual and inter-decadal variability is an issue that needs to be understood by users other than climatologists if other scientists (like ecologists) are going to use climate data.

Dr Barros asked if there could be guidelines included in the Atlas for non-climatologists on how to use climatological data. Prof Taylor indicated this was a good idea and could be done by those who are putting together a vignette on climate data.

### **Maj. Lauria – “IGM activities in Antarctica”**

A hard copy paper from Maj. Lauria was provided outlining previous IGM activities in Antarctica.

IGM is specifically responsible for mapping and geographic information of mainland Argentina and there has been a small amount of work done in Antarctica. This has been done in cooperation with DNA – this cooperation will continue.

Maj. Lauria indicated that currently no digital data for Antarctica is held at IGM.

Antarctic place names are managed by IGM.

## **Cfin. Armella – “Hydrographic Service activities in Antarctica”**

The Hydrographic Service started digital hydrographic charts in the Rio de la Plata region in raster format. Because of budget cuts progress in charting the waters to the south has been greatly slowed.

When possible digital data will be contributed by the Hydrographic Service to the cybercartographic atlas project.

## **Connections between the Cybercartographic atlas and SCAR GoS, CCAMLR and others**

The WG-GGI Chief Officer needs to write SCAR WG's and GoS to make them aware of the project and to invite them to participate. They should reply to Prof. Taylor directly with cc to Glenn Johnstone.

There could be a possible presentation to XXVII SCAR (either at the delegates meeting or special session during the first week when WG's meet). Glenn Johnstone to discuss with John Manning and report results to Prof. Taylor.

## **Funding**

Currently a number of funding bids have been applied for – for example, the Tinker Foundation, the Social Sciences and Humanities Research Council of Canada and ANPCYT in Argentina.

ICSU funding for 2003 is being sought and an application will be submitted in January 2002.

A total of about \$400-450 000 USD is required to make the project work well and there is a need to be innovative and flexible with an application, not just to focus on Antarctic science.

The International Development Research Centre (IDRC) in Canada has the objective of funding international research (including capacity building) and may be one possible source for developing countries to pursue.

Other funding opportunities were discussed and Dr Barros mentioned a couple of agencies involved with climatological research that may fund an application if a climate variability component to the Atlas were incorporated. The International Committee on Climate Change (ICCC) offers money to developing countries and the IAI – Inter American Institute on Research (which has a high latitude research component) were mentioned.

UN and European Union sources were also discussed.

## **Next Meeting**

Follow up workshops are planned for Shanghai at the XXVII SCAR meeting in July 2002 and, if funding is available, another one in Ottawa sometime in March or April 2002. Prof. Taylor will contact the group when further information is known.

## **Thanks and words of appreciation**

The participants of the workshop wish to record their thanks to the following people:

- Dr Vergani and MSc. Zulma Stanganelli from CENPAT, who worked so hard to make the workshop happen;
- ANPCYT for funding the workshop.
- Capt. Pascual Quevedo, from the National Hydrographic Service and
- the Lions Club of Puerto Madryn for organising and supporting the exhibition

Delegates from outside Argentina, (representatives from SCAR, USGS, Carleton University and the Free University of Brussels) expressed their appreciation to CENPAT and ANPCYT for hosting a very successful workshop and for the generous hospitality shown while they were in Puerto Madryn.

## Actions

Task	Due by
1. Possible presentation to SCAR plenary (delegates or special session during the first week) by Fraser Taylor. Glenn Johnstone to discuss with John Manning and get back to Fraser Taylor.	End January 2002
2. Glenn Johnstone will need to go back to contacts (and all WG-GGI members) who said they would like to participate to find out in more detail about what contribution they are willing to make to the project.	End January 2002
3. WG-GGI Chief Officer to write SCAR WG's and GoS to make them aware of the project and to invite them to participate. Reply to Fraser directly with cc to Glenn Johnstone.	End December 2001
4. Possible presentation to SCAR GoS on Seals, and Birds sub-committee, by Dr Vergani on the cyber atlas project and their involvement in it.	XXVII SCAR, July 2002

## Research

Task	Due by
5. Dr Holsbeek and Dr Vergani to invite the SCAR GoS Seal to join the Cyber Atlas project. Seal information could be provided as a case study / vignette to the Atlas	End December 2001
6. Glenn Johnstone to investigate CCAMLR, what it does and what it might be able to contribute to the Cybercartographic atlas. Send conceptual design papers for Atlas to CCAMLR. Send results to Fraser Taylor.	End December 2001
7. Glenn Johnstone to ask the Cooperative Research Centre for Antarctica in Hobart, Australia about access to climate variability data collections in Australia. Send results to Peter Pulsifer and Fraser Taylor.	End December 2001
8. Glenn Johnstone to find out more about the Halley Centre in the UK and its data holdings. Provide results to Peter Pulsifer	End December 2001

## Funding

Task	Due by
9. Dr Barros to investigate ICCO and IAI funding options. Report findings to Fraser Taylor	End February 2002
10. Ludo Holsbeek to explore the European Union connection and possible funding sources there.	End January 2002
11. Glenn Johnstone to investigate what options are available through UN funding sources – for areas such as global change research / new technologies / information management	End January 2002

## Argentinian digital data

Task	Due by
12. Jerry Mullins to send digital data of Marambio station to Maj. Lauria	End January 2002
13. Maj. Lauria to send astronomical station coordinates to Glenn Johnstone	End December 2001
14. Did BAS scan Argentinian maps to go into ADD? Glenn Johnstone to find out and report back to Maj. Lauria with cc to Janet Thomson.	End December 2001

## Contact Details

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