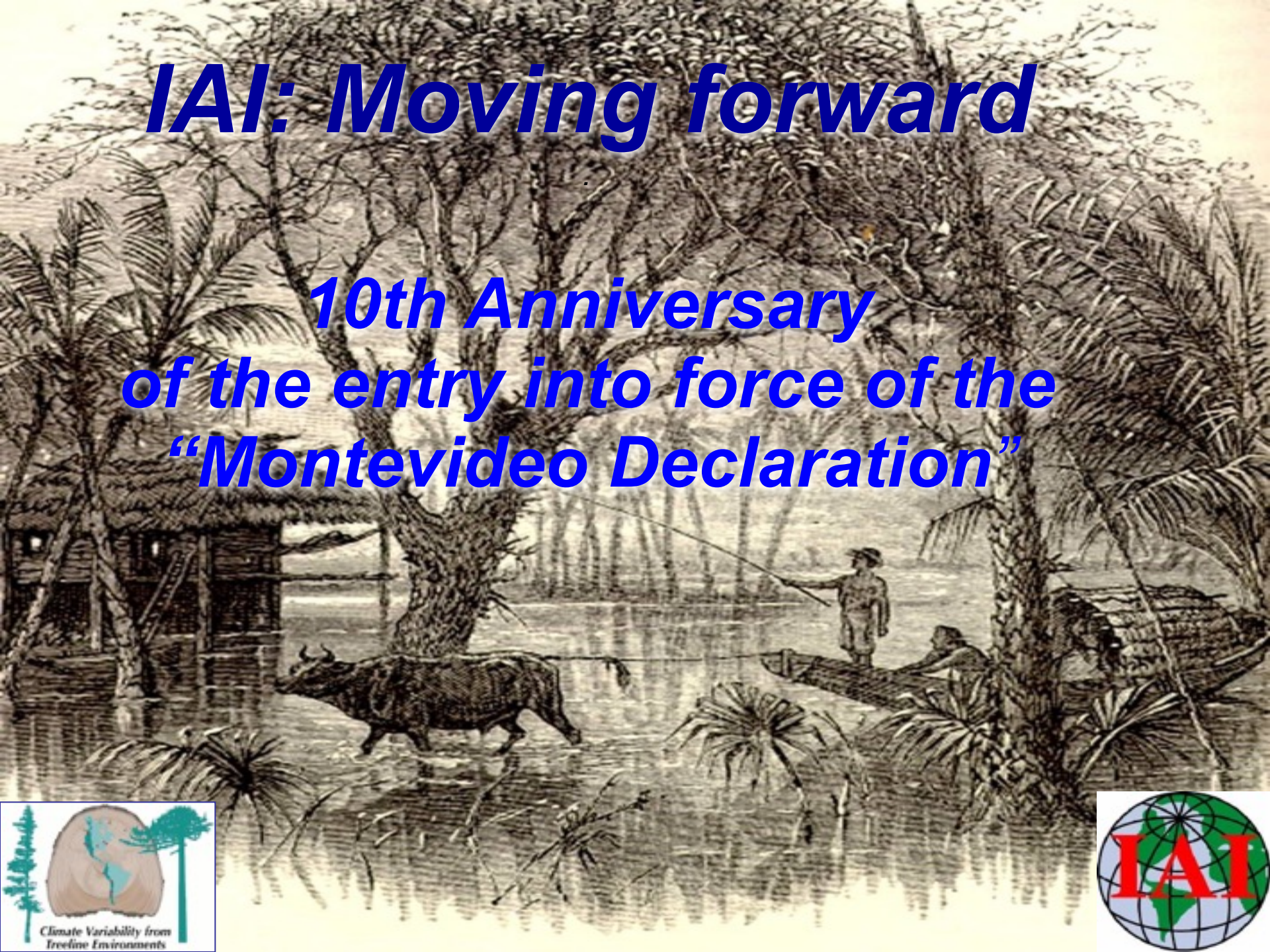
IAI: Moving forward

10th Anniversary of the entry into force of the "Montevideo Declaration"



Climate Variability from Treeline Environments

IAI

IAI: Moving forward

Presentation Overview

1.- How IAI has influenced our work in Mendoza

2.- How IAI has connected our work within the Americas

3.- How should IAI move forward? A personal view

We are:
The Laboratory of Dendrochronology,
IANIGLA - CRICYT – CONICET
Mendoza - Argentina

Climate Variability from Treeline Environments

Laboratory of Dendrochronology

Argentine Institute for Glaciers and Snow Research (IANIGLA)

Mendoza Regional Center for Science and Technology (CRICYT)

CONICET

- **History**
- **Personnel**
- **Products**

Our Lab History

Founded: 1976

From 1976 to 1982

- First exploratory works in tree-ring with native species
- First tree-ring chronologies in Argentina and Chile

From 1983 to 1990

- Expansion of the chronology network in Argentina
- Human resources increased
- Research funded by national agencies (CONICET)

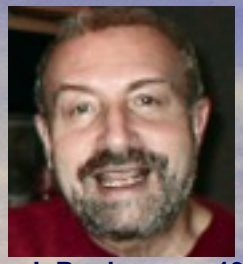
From 1991 to 1999

- PhDs obtained
- Involvement with IGBP and PAGES
- National grants (CONICET, FONCYT)
- International grants (ECC, Red de Botánica, IAI)

From 2000 to present

- IAI CRN03 start - Inter-labs cooperation
- Human resources recruitment
- International recognition and insertion
- Grants from National and International agencies

OUR LAB PERSONNEL



Ing. J. Boninsegna 1979
Principal Researcher

Dr. R. Villalba 1982
Senior Researcher
Univ. of Colorado

Dr. F. Roig J. 1985
Researcher Adjoint
Univ. of Berne

Dr. P. Villagra 2002
Univ. of Cuyo
Junior Researcher IAI supported 2000-02

Lic. Esteban Dussart
1993 - 1996Ms student
Univ Laval Quebec

Lic M. Morales 1997. PhD student Univ. of Cordoba
Partially IAI supported

Ing. A. Casteler 2001 PhD Student Univ. of Berne
Partially IAI supported

Ing. M. Masiokas 2001
PhD student Univ.
Western Ontario IAI supported

Lic. Juan Alvarez 2003
PhD student Univ. of
Comahue IAI supported

Lic. Erika Cesca 2004
PhD student Univ. of
Comahue IAI supported

Lic. Salvador Cali 1998
PhD student Univ. of
Comahue IAI supported

Lic. L. Paolini 2001
PhD student Univ. of
Tucuman

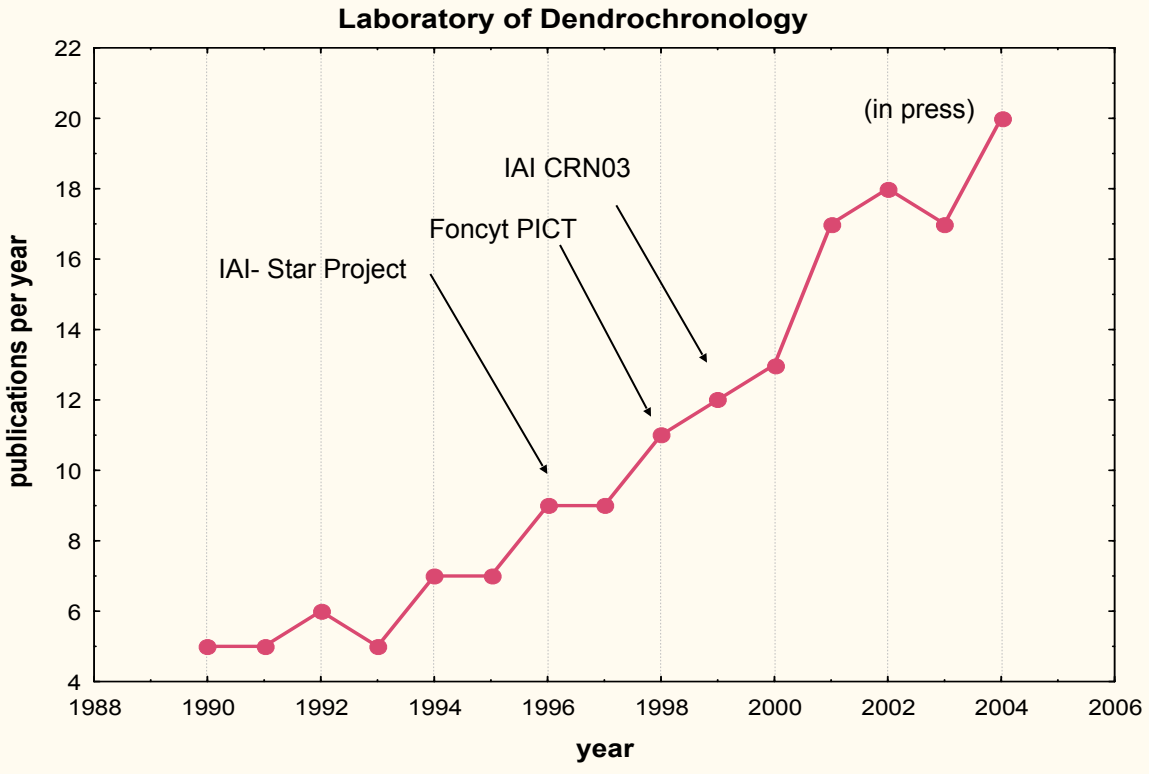
Lic. Anna Srur 2004
PhD student Univ. of
Buenos Aires IAI supported

Lic. Claudia Guerrido 2002
PhD Candidate Univ. of
Comahue IAI supported

Lic. Damian Fernandez
2002 PhD Candidate Univ.
of Comahue IAI supported

Production

In quantity



In quality

50% High Impact Journals

(Science, Nature, Climate Change, Climate Dynamic, Canadian J. of Forest Res., J. of Biogeography, The Holocene, Ecology, J. of Climate, Rev. Chilena de Historia Natural)

30% More specialized Journals

(Dendrochronologia, Tree-Ring Bulletin, J. of Arid Environments)

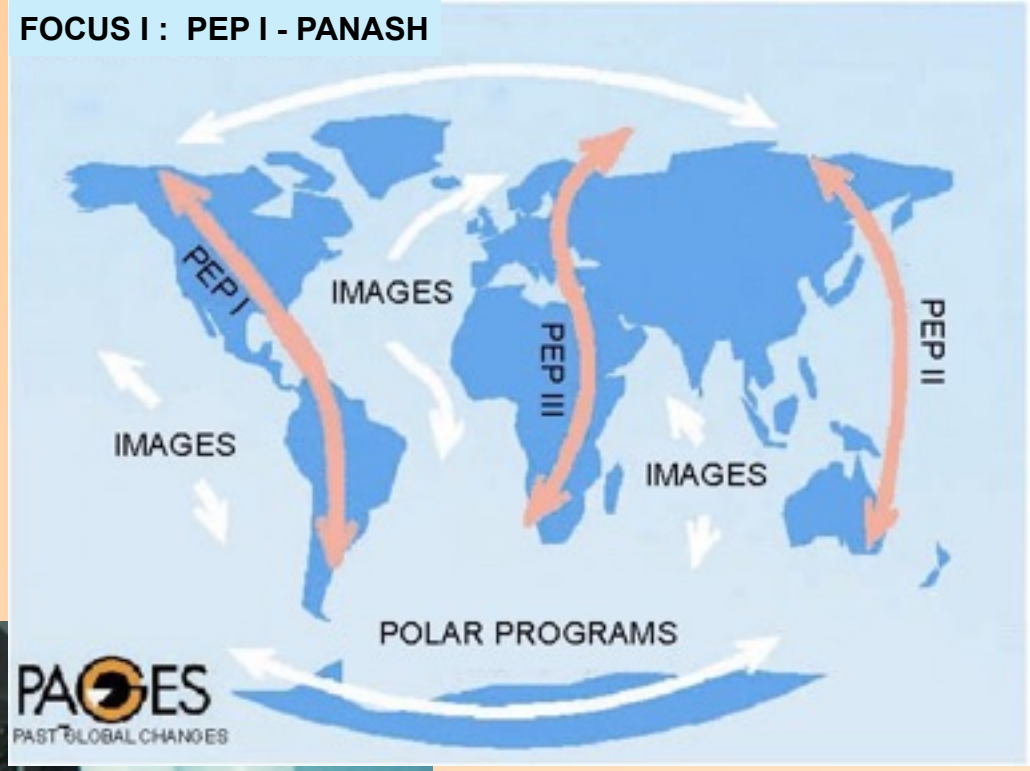
20% Local, National and others

Multequina, Meteologicas, Book chapters and Special editions

IAI: Moving forward

2.- How IAI has connected our work within the Americas

- PAGES Pole to Pole transect PEPI



Pages PEPI meetings provided the contacts, the scientific background and established the need to work together (1992 – 1997)

IAI: Moving forward

2.- How IAI has connected our work within the Americas

- IAI start – up Programs

IAI start – up programs gave us the opportunity to test some scientific ideas, to do some exploratory field work and to start building collaborative projects (1996 - 1998)

IAI: Moving forward

2.- How IAI has connected our work within the Americas

- IAI Collaborative Research Network (CRN) Program

IAI CRN give us the unique opportunity to participate in an integrated, interdisciplinary and international project to address climatic variability along a 100° latitudinal gradient and to collect critical data for understanding the history and dynamics of tropical environments

IAI start up grant

Assessment of Present Past and Future Climate Variability in the Americas from Treeline Environments
B. H. Luckman PI (CANADA)
Applied August 1995, Awarded May 1996

Meeting Jasper, Canada October 1996
Pre-proposal submission February 1998

Dendrochronological studies in tropical South America with special emphasis on Bolivian Forests.
J.A. Boninsegna PI (ARGENTINA)
Applied August 1995, Awarded May 1996

Meeting La Paz, Bolivia October 1997
Pre-proposal submission February 1998

CRN grant

Joint meeting Mendoza August 9-12, 1998
CRN Proposal submission, August 31, 1998

Assessment of Present Past and Future Climate Variability in the Americas from Treeline Environments
B.H.Luckman and J.A. Boninsegna, Co-PIs

Notification of Decision December 1998
Award of funds June 1999

PESCA

Dendrochronological studies of el Niño events
R.Rodriquez CoPI (2000-2001), SGP 2002-3

SGP II

Development of climate-sensitive tree-ring chronologies of *Araucaria augustifolia* in S.E. South America

(F. Roig, PI; SGPII 2004-5)

The CRN has

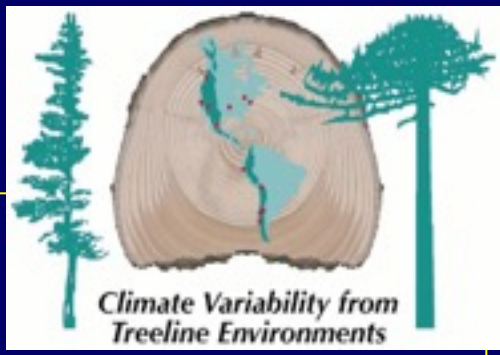
Grown

Diversified

Drawn in younger scientists

First CRN03 PI's meeting, Arkansas, 1999

CRN03 PI's Meeting Mendoza, October 2003



Introduction:

Goals and outline of the project

Scientific outputs

Links to other projects

Capacity Building

New Labs and Facilities

Training and Dissemination

Objectives

- Networks of tree-line tree ring chronologies Global (PEP-1) Transect
  - Pacific Decadal Oscillation PDO
  - Mexican Monsoon MM
  - El Niño S. Oscillation ENSO
  - Artic and Antarctic Annular Modes
- Tropical dendrochronology
  - Extend range into tropics
  - Develop records from new species
- Applied time series
  - Streamflow, precipitation, drought
  - Natural hazards (flood, fires)
  - Human impacts
  - Forest production and management

Collaborative Science Network

- Scientists exchange
- Training programs
- New laboratories

PUBLICATIONS

	2000	2001	2002	2003
Journals	7	14	18	16
In press	1	6	8	8
Submitted		5	9	10
Books	1		1	1
Book Chapters	5	7	8	7
(“ in press)	5	6	3	1
Other	7	6	8	10

Nature, Canadian J. Forest Res., Ambio, Geophys. Res. Letter, Holocene, Climate Dynamics, Quat.. Sci. Review, Rev. Ch. Historia Natural

CONFERENCE PRESENTATIONS

39	40	70	72

Capacity Building

INTERNATIONAL EXCHANGES
(internal US not shown)

TRAINING

	Student involvement	
Year	IAI Funded*	Other#
2000	15	17
2001	15	31
2002	15	27
2003	15	25

* salary and/or fieldwork
# funded from other sources

Does not include US data

Piura Lab

Labs created by this project

Basic equipment, technician and student support

San Luis Potosi, Mexico; operational July 2000, moved to Durango in 2001.

First dendroclimate laboratory in MEXICO

La Paz, Bolivia, operational October 2000

First tree-ring Laboratory in BOLIVIA

Piura, Peru April 2001 (with PESCA funds)

First tree-ring laboratory in PERU.

Rio Grande do Sul, Brazil , 2004-5 (SGPII funds)

First tree-ring laboratory in S.E. BRAZIL

Group Training activities

March 24-31, 2000 1st **Austral Dendro Fieldweek** San Martin de los Andes, Patagonia, Argentina; 48 participants 21 students and 6 leaders supported

March 23-30th, 2001 Dendroglaciology Field Course Valdivia & Casapangue, Chile, 9 students, 3 leaders attended).

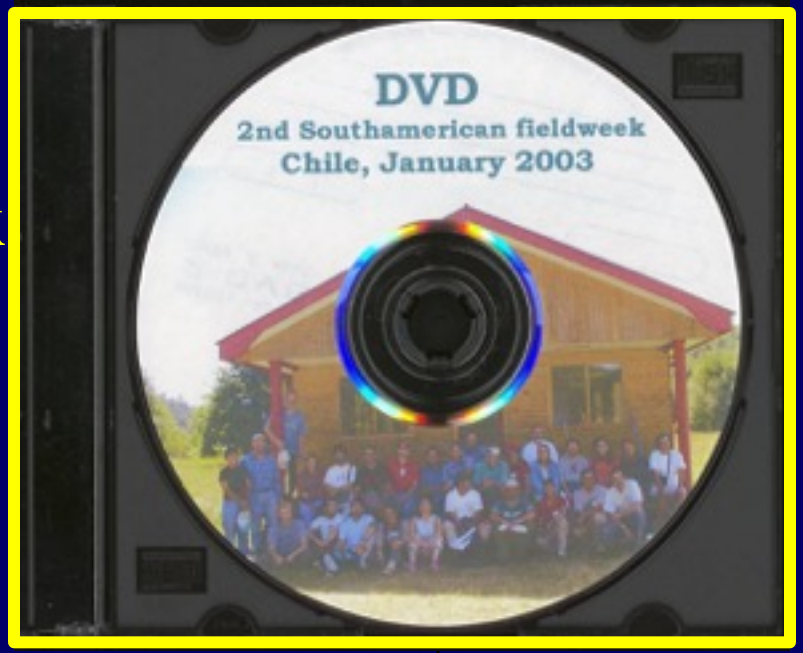
August 12-19 2001 11th North American Fieldweek at Saltillo , Mexico. 7 students & 3 leaders supported

November 1-15, 2001 First Tropical Dendro fieldweek Pando, Bolivia

Aug 30-Sept 5th 2002 Canadian Rockies Dendroglaciology (5 participants)

Jan. 3-11, 2003 second Austral Dendro Fieldweek. San Pablo de Tregua, Chile. 21 students supported .All 5 leaders from CRN03

Second South American Dendrochronological Fieldweek
San Pablo de Tregua, Chile
3-11 January 2003,
28 in attendance



Additional Group Training

October 2000 Villalba led a two week training and field course in Dendrochronology , La Paz, Bolivia (4 students)

December 2000 Roig led a Dendrochronological Course and Training at Cochabamba University, Bolivia (12 students)

May 2002 Hughes taught a 3 week Dendrochronology course at LTRR, Tucson. Crn03 supported two students (Chile and Mexico) to attend this course The CRN supported additional students in this course in 2003 and 2004

June 2002 Villalba and Lara led a one week course entitled "Global warming and its impacts on ecosystems in the Patagonia Andes" at Valdivia, Chile and a similar course in Conception, Chile in June 2003

Dissemination

Explaining the use of tree rings to farmers in Durango, Mexico

Mr. Ricardo Lagos, President of Chile, demonstrating his tree-coring skills and learning about dendrochronology

Training Results

Some Bolivian students start to apply techniques learned in different courses to the assessment of tropical trees production and management

The ability to date trees is very useful for land-use and/or forest history studies within **CRN01**(Land use change in the semi-arid Americas). Hurricane damage provided a unique opportunity to sample new tropical dry forest species for identifiable rings..

CRN 03 will teach a dendrochronology course for Venezuelan students from **CRN 040** (Vegetation changes in High mountain and seasonal savanna) to apply in their studies of forest and ecostsytem dynamics in tropical high mountains.

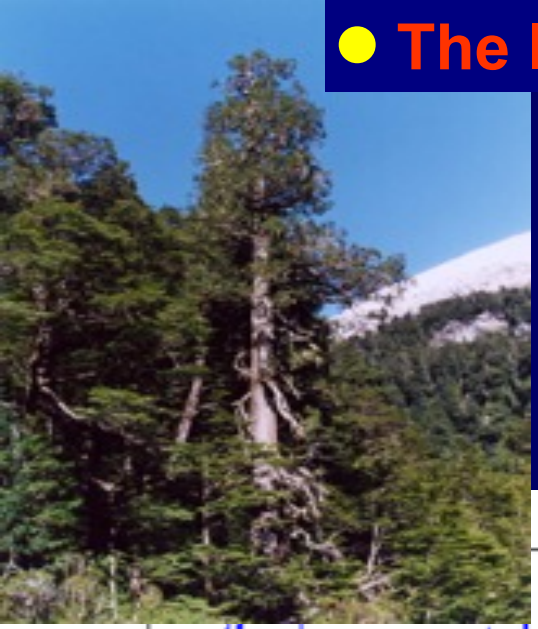
Researchers of **CRN03** and **CRN073** (Climate variability and impacts in Mexico and the Caribbean) have submitted joint proposals to integrate tree-rings into studies of climate variability in Mexico.

Jose Villanueva-Diaz (Mexico), Fidel Roig (Argentina) and CRN 01 team members sampling trees destroyed by a hurricane at a CRN01 study site in Yucatan, Mexico (April 2003)

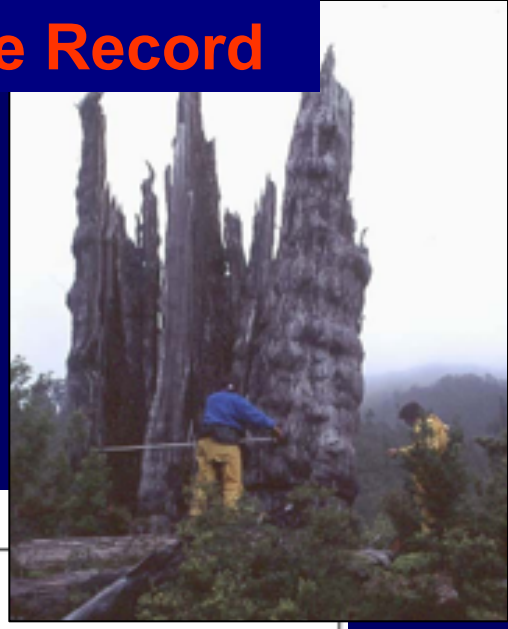
Unique contributions

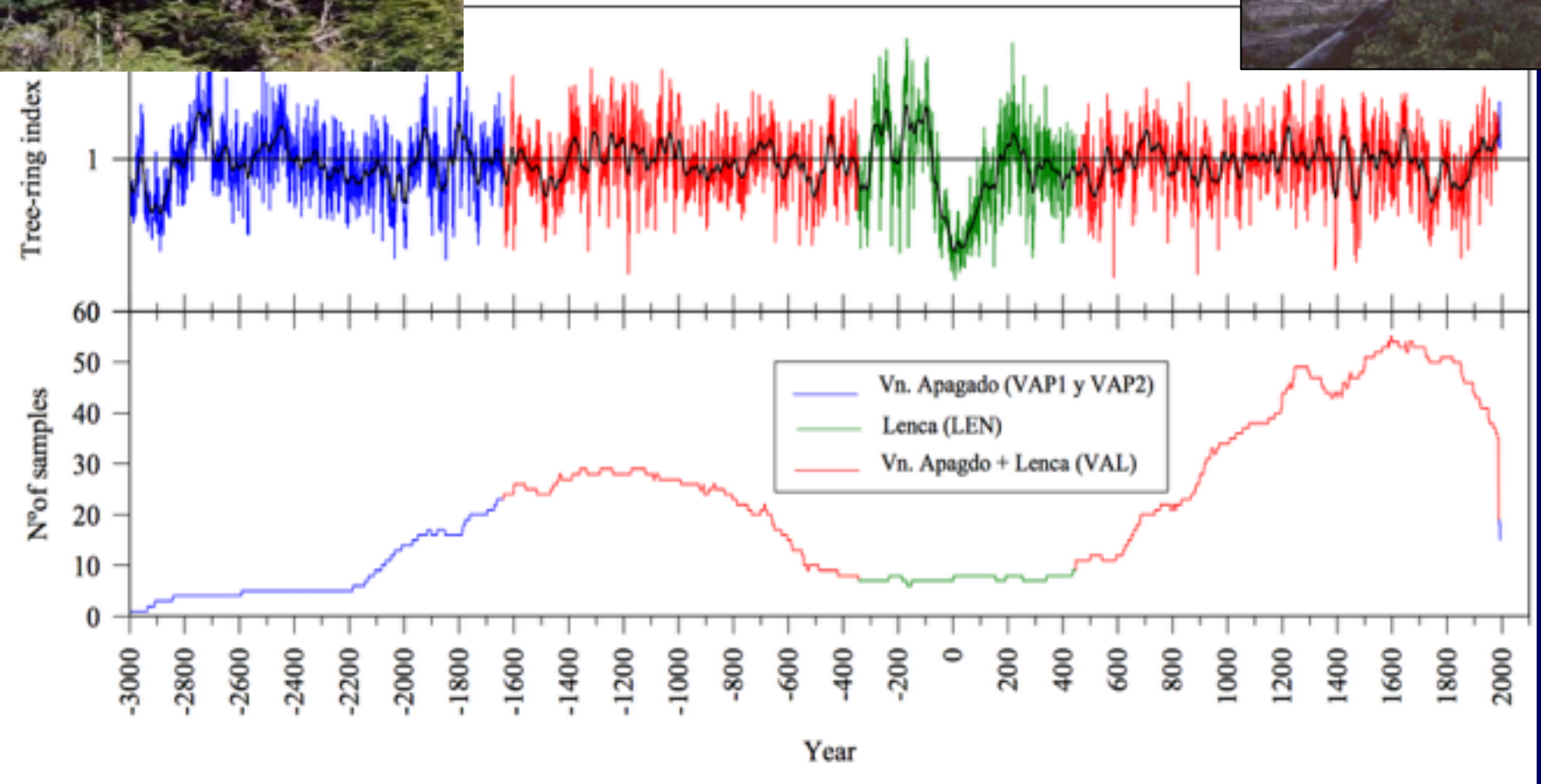
Science

The longest Southern Hemisphere Record

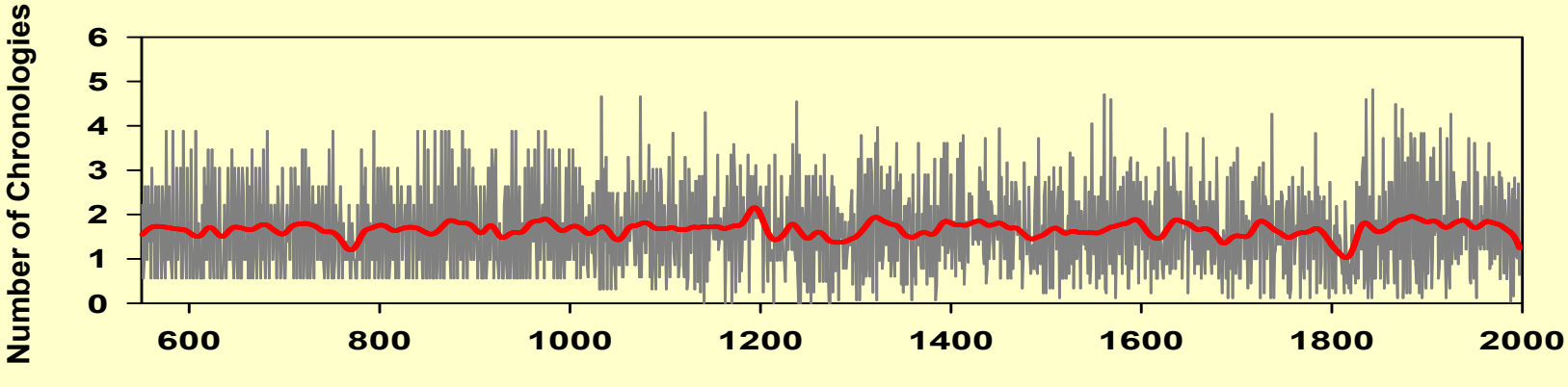


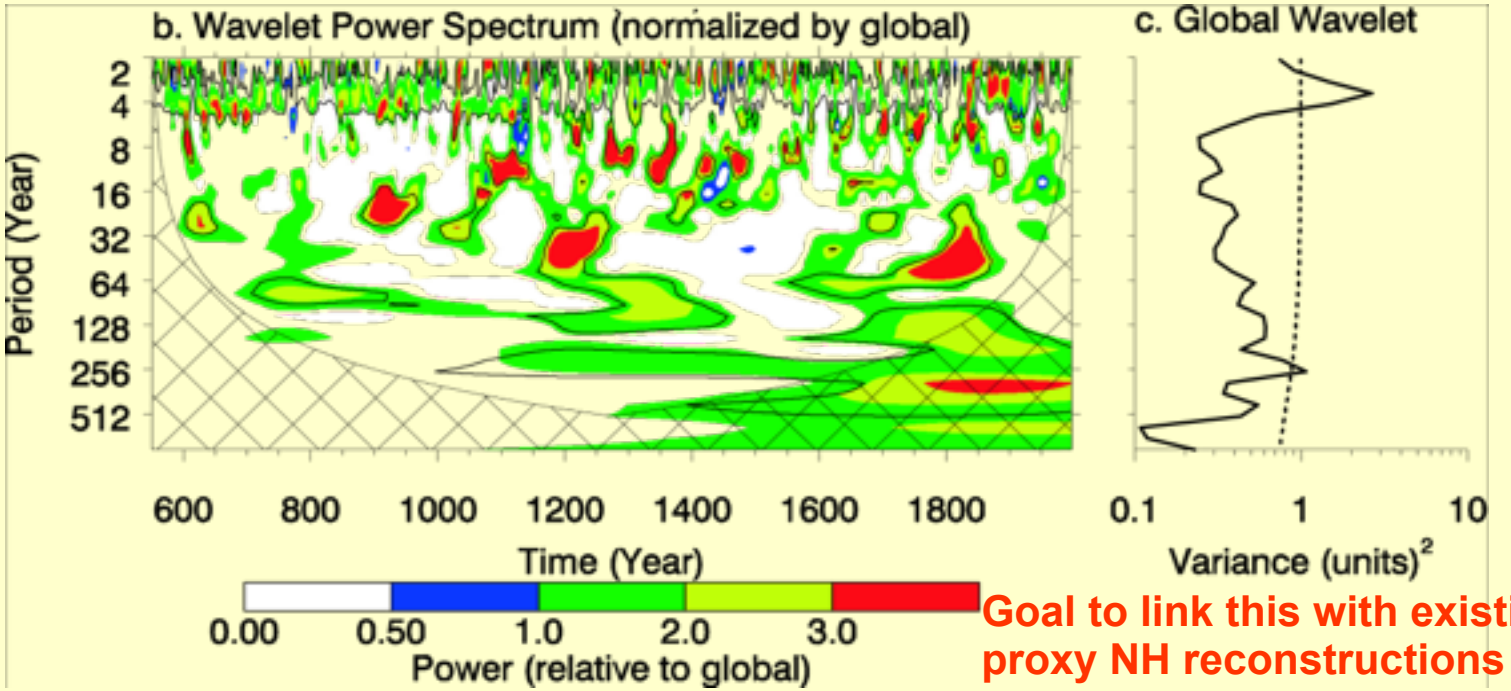
5,666-years, ***Fitzroya cupressoides***
Southern Chile





A new, Southern Hemisphere, long El Niño chronology from *Austrocedrus chilensis* in Argentina and Chile





Goal to link this with existing historic SH an
proxy NH reconstructions for a better global
signal

The highest trees in the world

Polylepis tarapacana **at 4900m**

Volcan Sajama, Bolivia (18°S)

This chronology is over 700 years long. There are now 8 chronologies, 3-500 years long, of this species in Bolivia . These data supplement the limited data from annually resolved ice cores in these high elevation environments

Unique contributions

Research Applied to Human Dimension

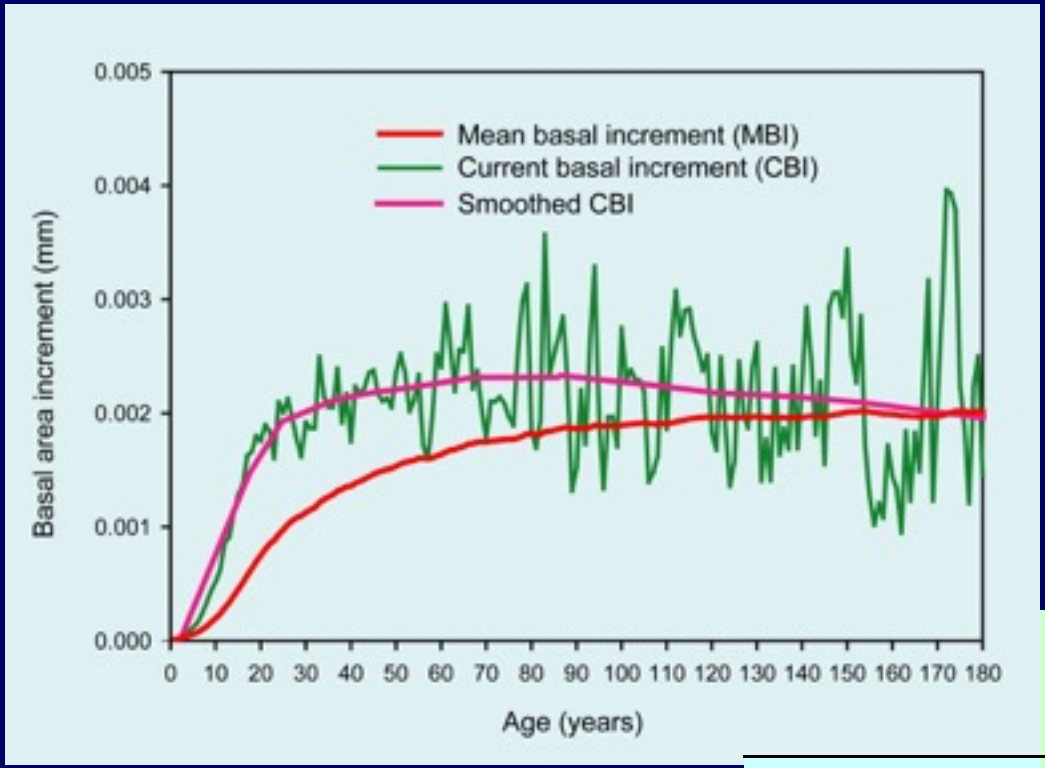
Forest Production and Management

Studies of growth rates and harvesting history can be used to plan and manage the exploitation of dry and semi-arid forest areas

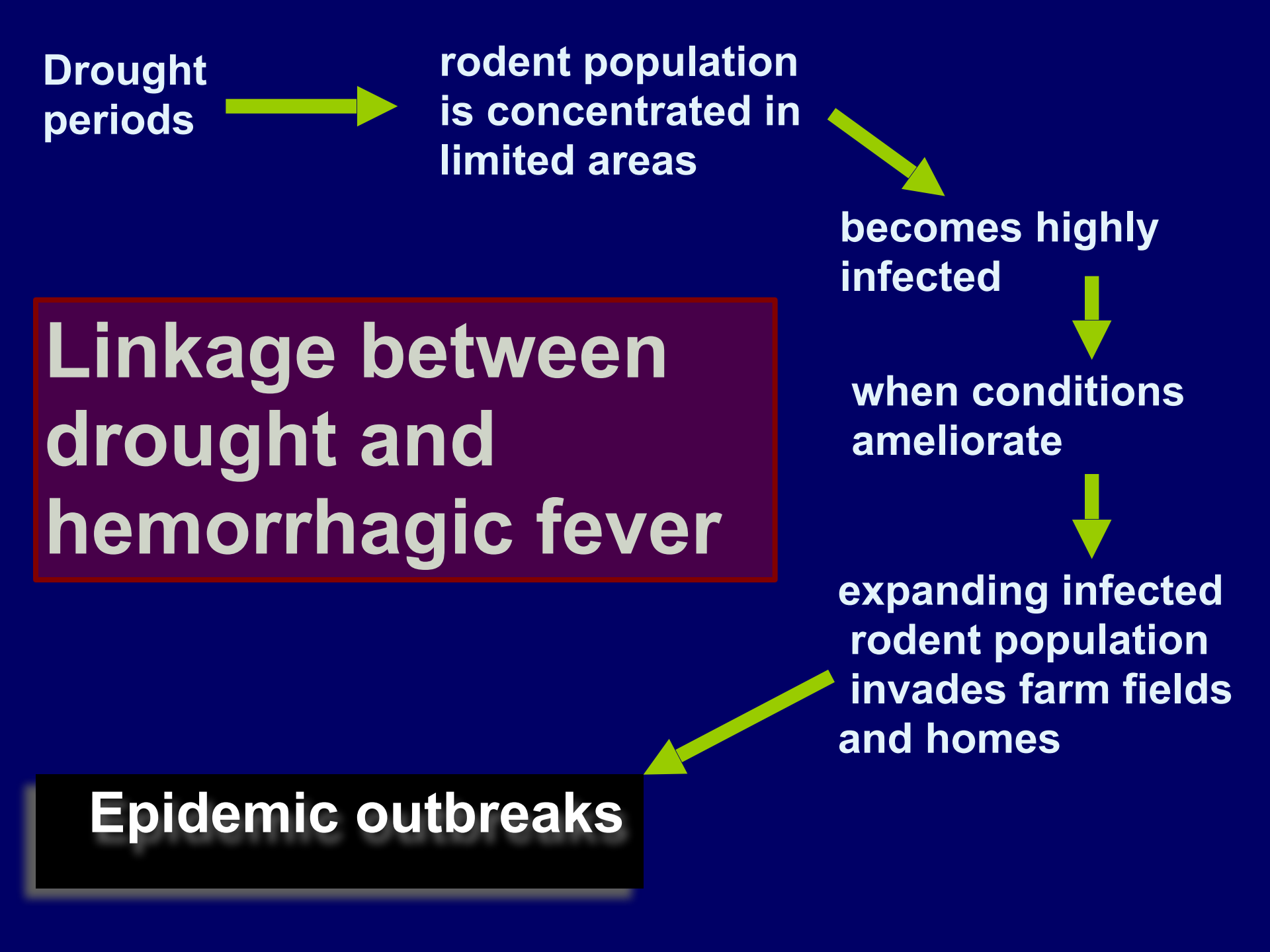

Prosopis flexuosa forest
Pipanaco – Catamarca- 24°S

Prosopis flexuosa forest
Pipanaco – Catamarca- 24°S

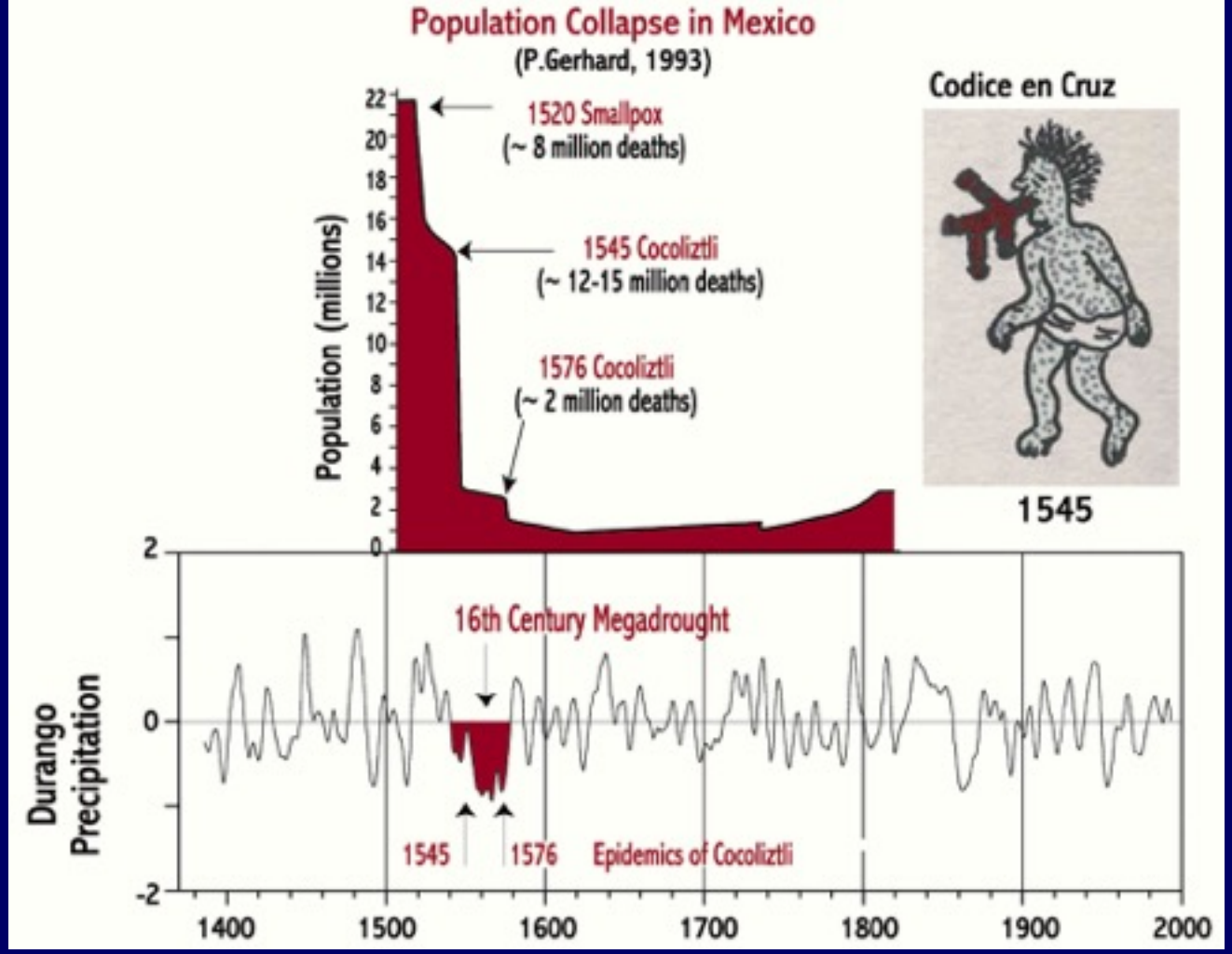
Determining CO2 sequestration capacity



	WOOD YIELD m^3/Ha/year	CO2 FIXED Tn/Ha/year	X 140.000 Ha Tn/year
Present growth	1.35	0.92	130000
Managed growth	3.00	2.00	280000
Plantation	5.00	3.36	470000



Linkage between drought and hemorrhagic fever



This diagram compares estimated population changes between ca. 1500-1800 in Mexico with a reconstructed winter-spring precipitation record derived from tree-ring chronologies in Durango, Mexico (Stahle et al., 1999, 2000).

FUTURE ACTIVITIES

- Develop a basic transect wide database
- Integrate results along the transect (begun in 2002)
- Continue regional collections and reconstructions
- Maintain search for new tropical species
- Expand networks in the semi-arid subtropics

- Increase emphasis on drought and water supply applications
- Prepare a special issue of "Dendrochronologia" on new applications in human dimensions field (14 short papers)
- Continue and seek sponsors for field weeks and maximize training (Fieldweek 4,January, 2005 at Porto Alegre, Brazil)
- Seek funding to continue integration with other CRNs and international projects
- Prepare a proposal for a new CRN
- Concluding conference and book 2005

IAI: Moving forward

1.- How IAI has influenced our work in Mendoza

2.- How IAI has connected our work within the Americas

3.- How should IAI move forward?

A personal view

- to IAI board

- to the participating countries

Should IAI move forward? Definitively YES

- It should continue the successful CRN experiment, maintaining the scientific momentum CRNs have generated, consolidating the existing network and strengthening the net by incorporation of new nodes or members
- It should continue its role as an international scientific agency that finances science and promotes specialist training in the Americas
- It should develop stronger and closer connections with other international climate and global change programs, like IGBP, Diversitas, IPCC etc.

but…

It should increase its visibility in order to:

-promote the profile of global change research at regional and national levels, sharing objectives, experiences and possible common solutions. (e.g. in addressing mega-urban problems)

-raise profile of global change science more generally in a regional/ national context.

-provide, through its scientific network the latest comprehensive scientific information for the use of policy makers at national/ regional level (e.g. Advising and encouraging trade blocs to adopt common policies on global change issues)

Should IAI move forward? Definitively YES

While it's true that publishing traditional scientific papers is extremely important, it's not enough

We need to become more engaged in promoting active policies that :

- reduce the vulnerability of human and natural ecosystems

- contribute sound scientific understanding in support of sustainable development in the region

- integrate natural, social and political sciences into synthetic studies of all components of the Earth System

…. some examples

from the latest IGBP Open Science Meeting, Banff, April 2003

Global Change SysTem for Analysis, Research and Training

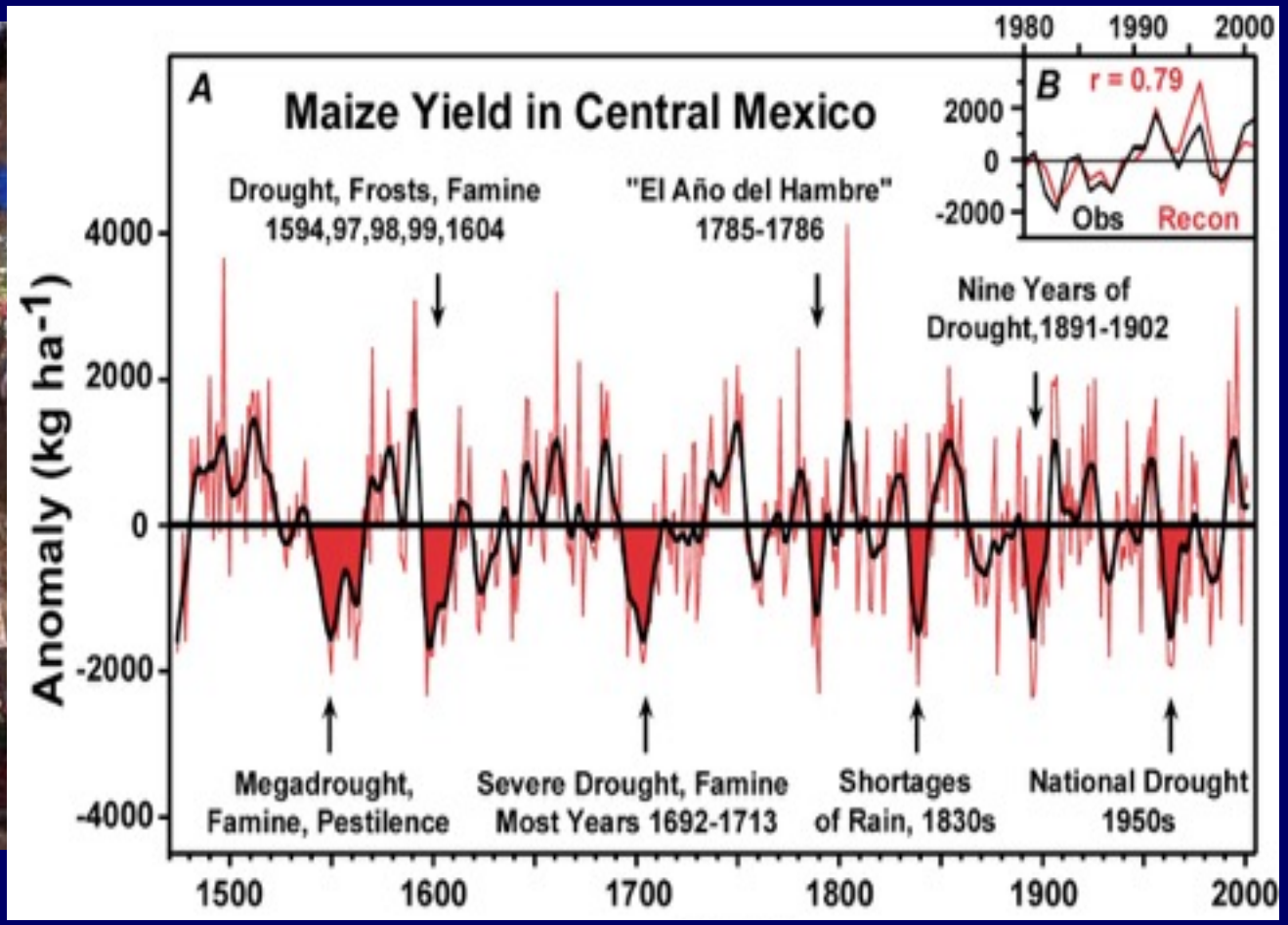
The START Mission:

- To develop a system of **regional networks** of collaborating scientists and institutions
- To **enhance scientific capacity** in developing countries - by strengthening and connecting existing institutions, training global change scientists and improving their access to data and results.
- To help **mobilise the resources** required to augment existing global change scientific capabilities, infrastructure and activities in developing countries.

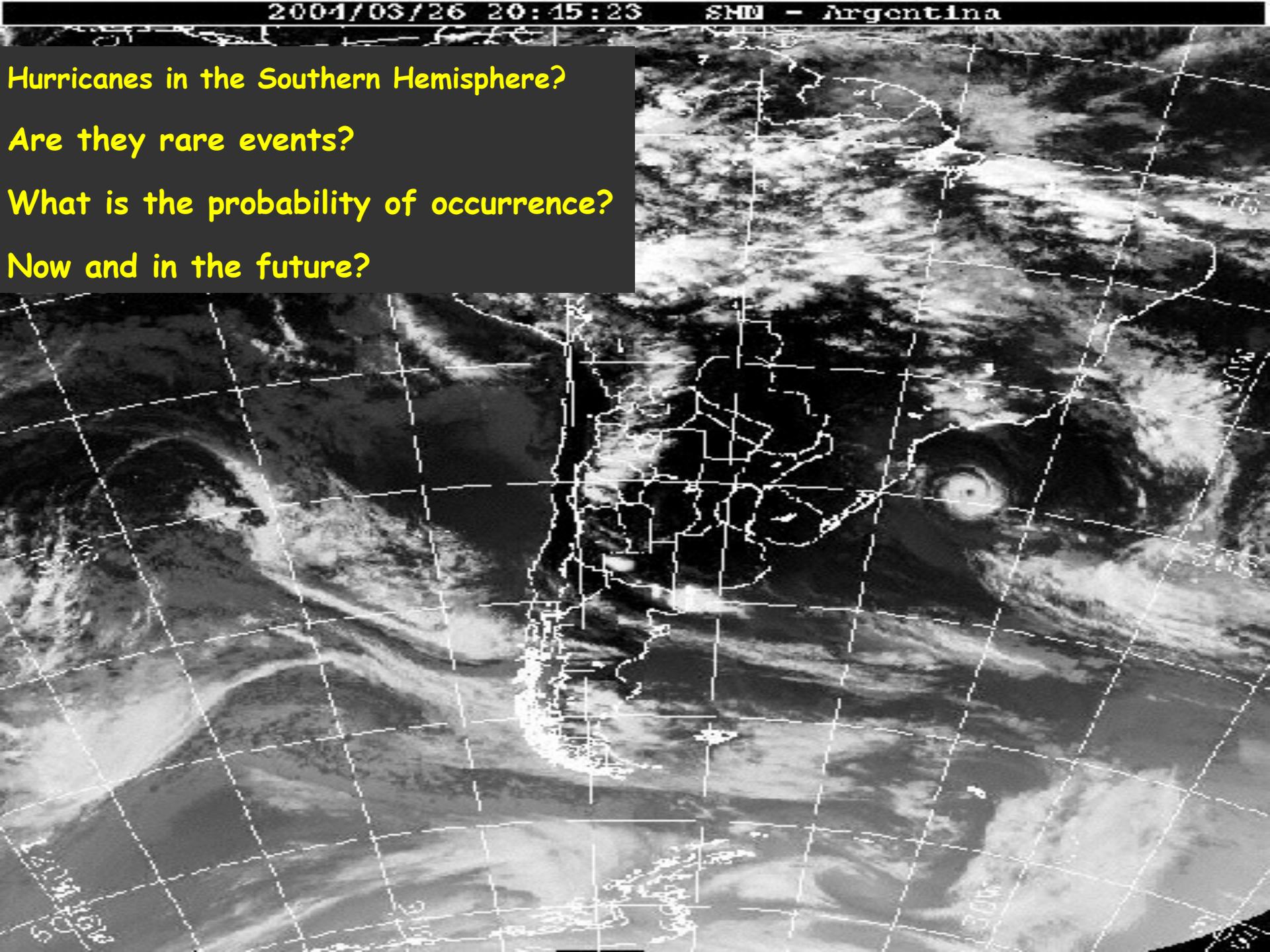
This surely is the CRN vision!!!…
Do we have 5 years Start already

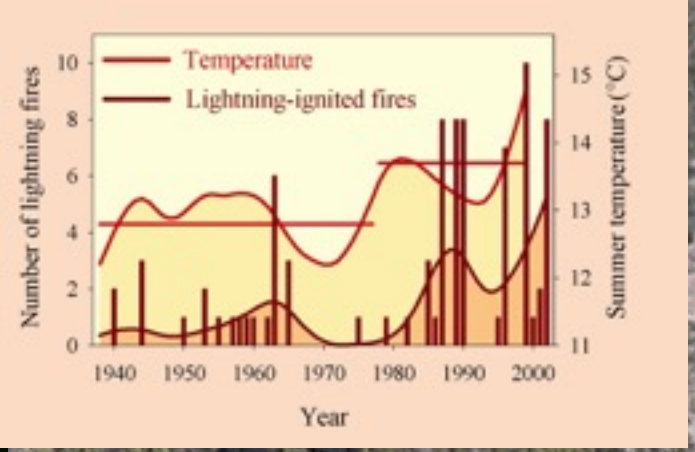
Food Provision

How will global environmental change affect food **provision** and **vulnerability**?
What would be the environmental /socioeconomic **consequences** of such adaptations?



Comparison of reconstructed maize yields (from tree-rings) with historic droughts and famines in Mexico. Past occurrences allow the calculation of the probability of future drought related impacts on the staple food crop.


2004/03/26 20:15:23 SHN - Argentina
Hurricanes in the Southern Hemisphere?
Are they rare events?
What is the probability of occurrence?
Now and in the future?



Biotic Resources

Forest die-back in Patagonia

is this linked to unusual drought conditions?

- are these areas increasingly vulnerable to fire?

-Does this lead to loss of biodiversity or possible rap
ecosystem change ?

-What is the impact on the future tourist economy?

Water Resources

-What is the nature of human-driven change to the global water system in terms of both magnitude and mechanisms?

- To what extent is the global water system resilient and **adaptable** to global change?

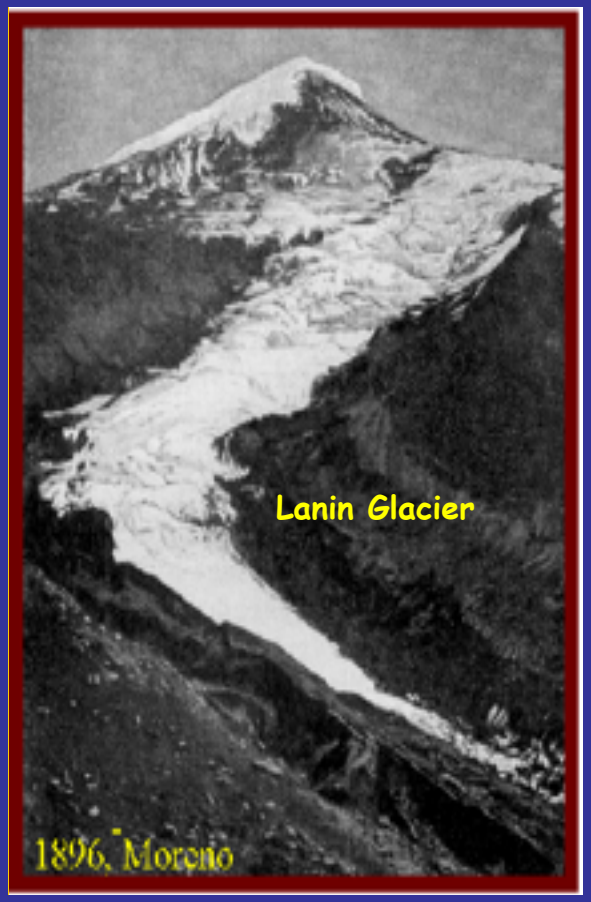
Glacier retreat in the Andes.

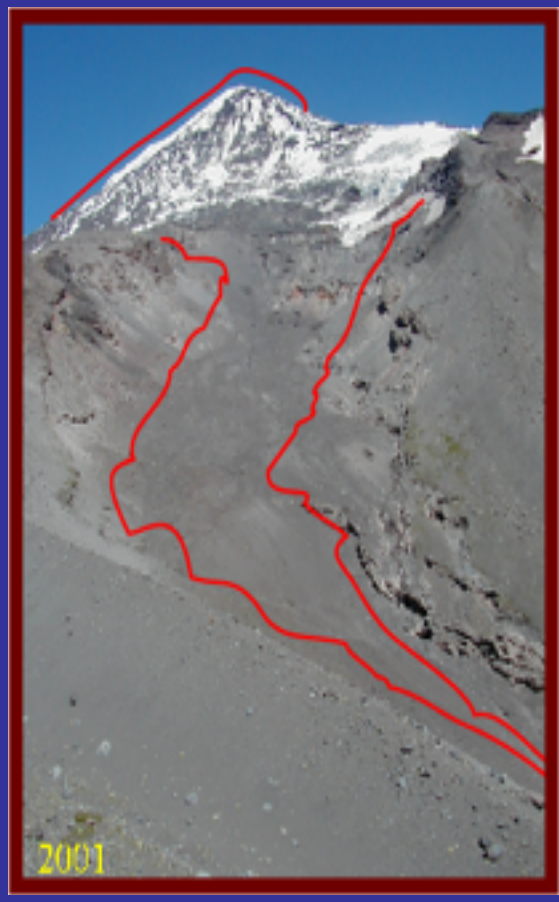
How extensive and how rapid is glacier loss?

Will eventually affect the fresh water supply?

Are Andean communities in jeopardy?

How could they possibly cope with this problem?



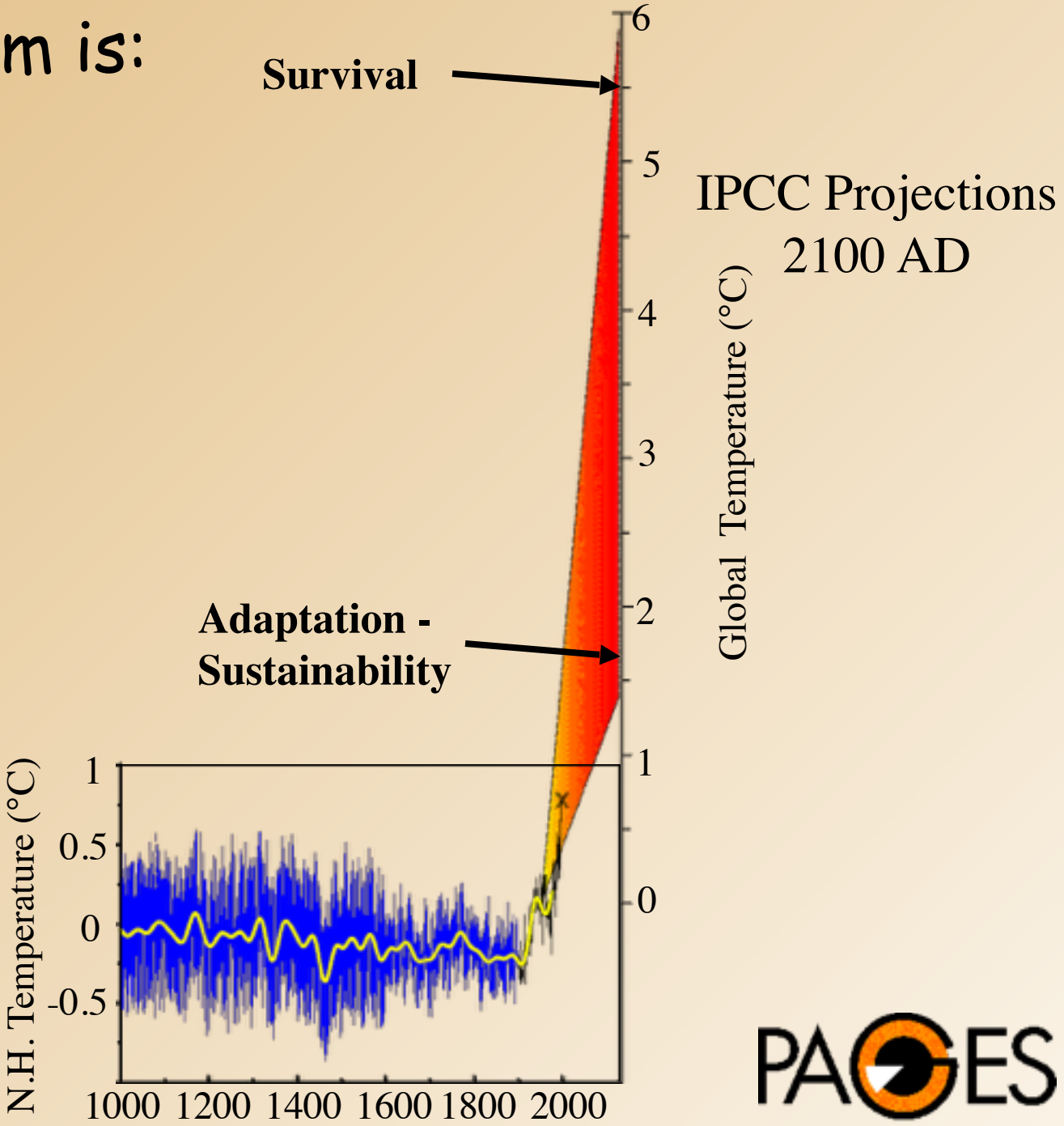


to the member countries …

We are all in the same boat..

…and there are no life jackets

The big problem is:



"NO REGRETS" STRATEGIES

(U.S. National Research Council Report, 2002)

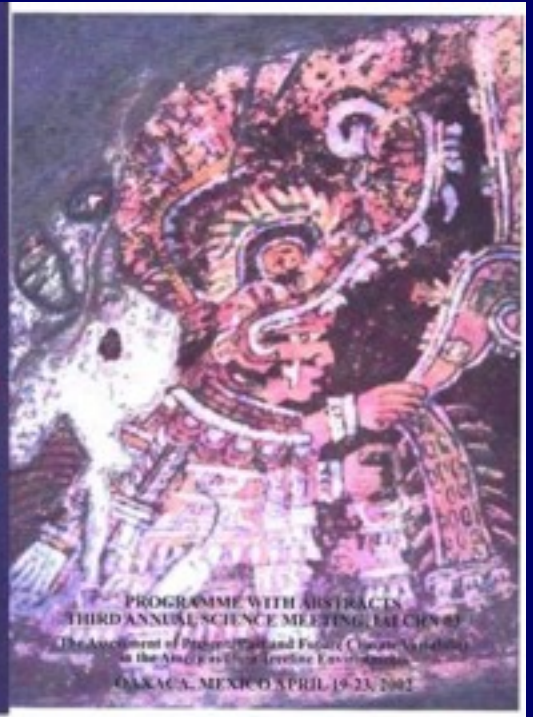
"…to reduce vulnerability and increase adaptation at little or no cost , by nudging research and policy in directions that will increase the adaptability of systems"

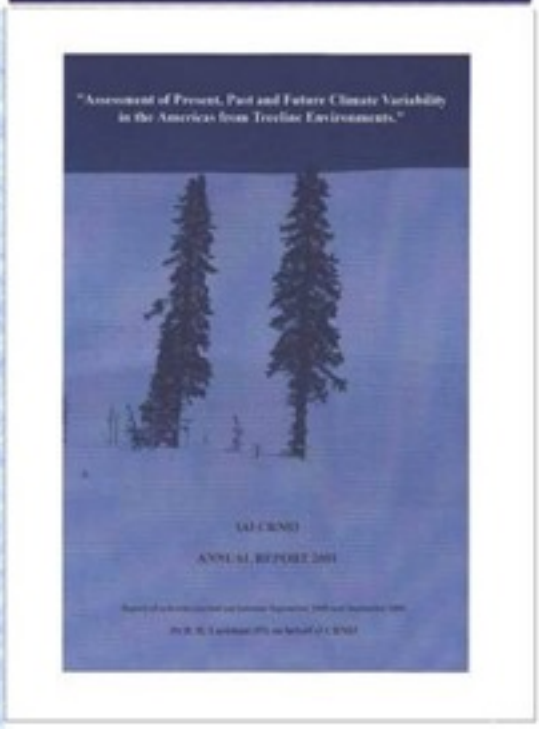
We need

- **Energy Policies - to slow climate change**
- **Ecological Policies - land use, coastal planning, water systems management.**
- **Forecasting of weather and weather related events**
- **Science and research to develop better understanding to guide policy and management**

The governments should NOT ONLY support science, they need science to sustain intelligent decisions... (Dr. M. Cereijido, BAires , April 2004)

- Promote the participation of your scientists in IAI activities
- Help raise funds for IAI activities
- The commitment of your governments, through contributions in funds and facilities, is crucial to IAI





IAI CRN03
ANNUAL REPORT 2002

Report of activities carried out between September 2001 and September 2002
Dr R.H. Luckman (PI) on behalf of CRN03

Acknowledgment

to the CRN03 PI's for letting me use their graph and pictures


Thank you for your attention!!