INTERNATIONAL 2007 2008 POLAR YEAR

AWI Alfred-Wegener-Institut für Polar- und Meeresforschung in der Helmholtz-Gemeinschaft

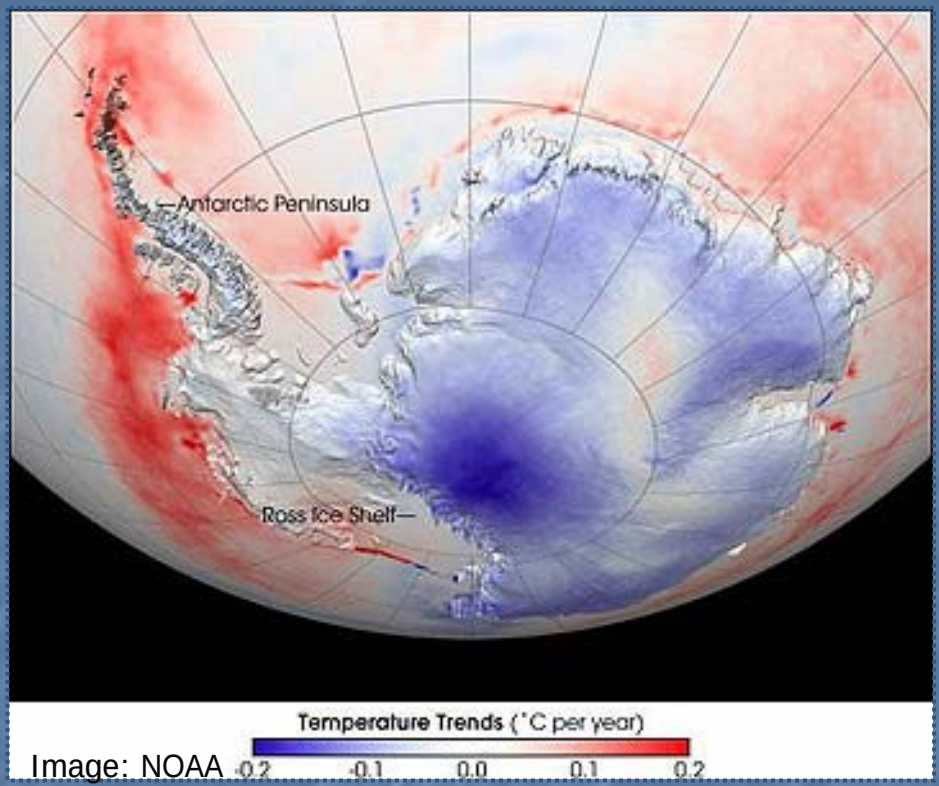

Image: NOAA

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A **multi-national** and **multi-disciplinary initiative** of **European** and **South American Scientists** to investigate CLImate Change in COastal areas of the Antarctic PENinsula

Mean aerial warming at Western Antarctic Peninsula (WAP): 2-3°C (3.6-5.4 F) in 50 yrs

SCAR

Korea
Chile
Brazil

- 9 polar stations along the Peninsula
- scientists from 16 countries
- > 50 individual projects

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Russian Bellingshausen Station

Dallmann-Jubany

Palmer, US

Rothera - UK

Polar Research Stations along WAP :

First Row Seats for investigation of climate linked changes in marine and terrestrial coastal systems

Long-Term Data Sets: Compilation – Intercalibration - Completion

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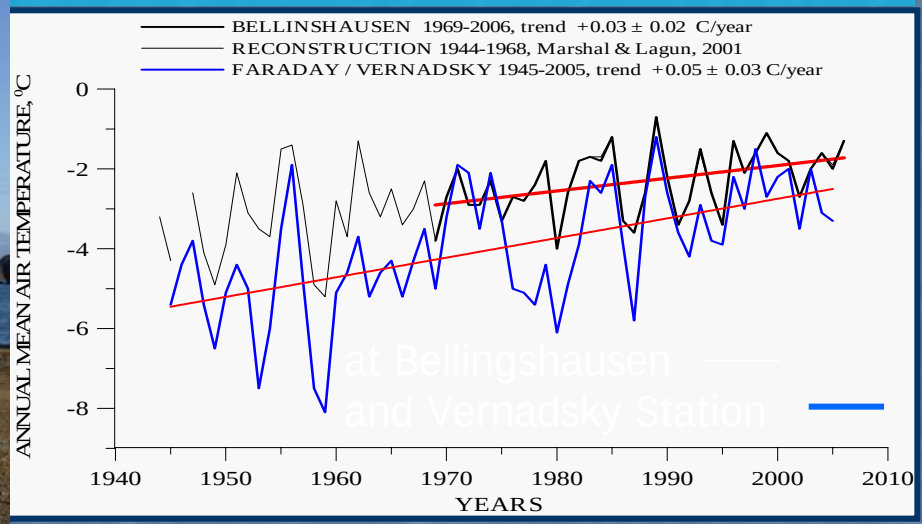
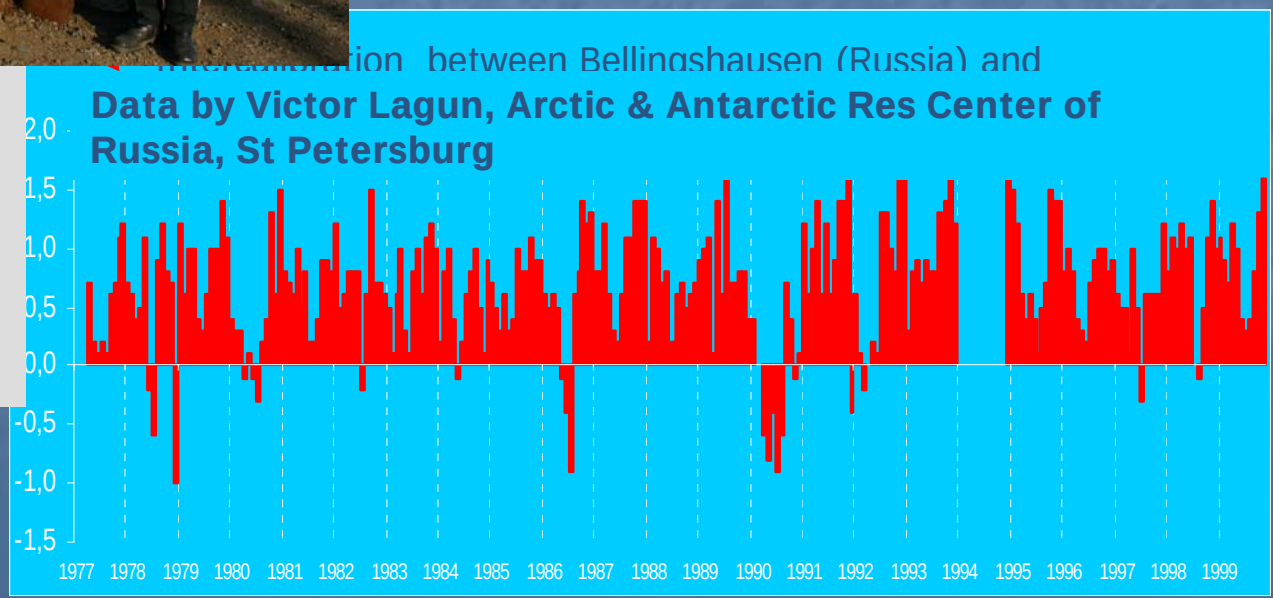
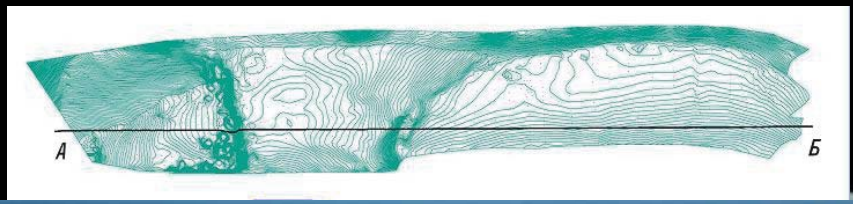
- How representative and reliable are these data?
- How high is the regional variability?

Air Temperature Recordings:





Modeling spatial and temporal glacier dynamics and melt water discharge along WAP



Data by Gennadi Milinevsky
National Antarctic Scientific Center,
Kyiv, Ukraine

Effects on WAP coastal systems:
air warming -> glacier melting -> rock erosion at glacier underside

Europe & global:

WAP glaciers add 0.2mm/yr to global sea level rise

Daily periodicity of glacier melt water signals
High gages during times of highest daily air T
-> turbidity signal

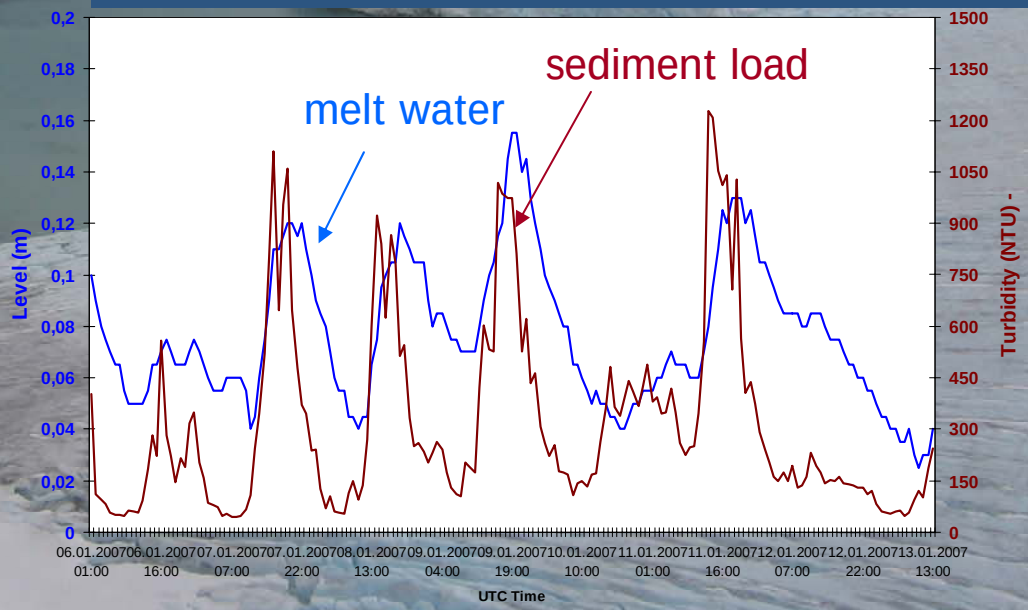
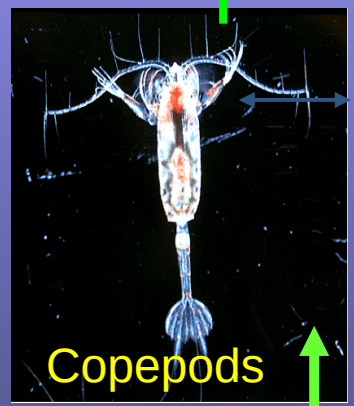


Foto: K. Zacher, AWI

Unpubl. data by C. Dominguez & A. Eraso (Univ Salamanca, Spain)

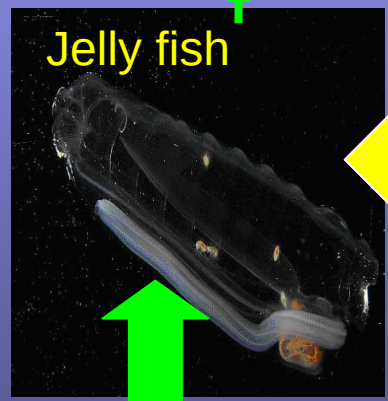
SURFACE FRESHENING and CHANGES IN COASTAL FOOD WEBS

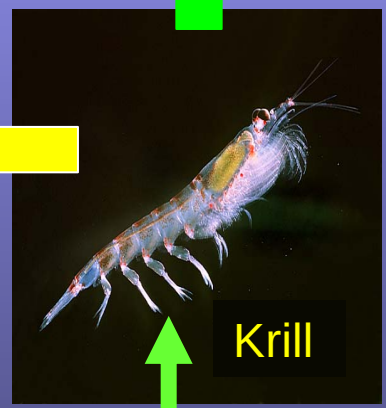
Micro-
zooplankton



Copepods

Jelly fish





Krill

SURFACE
FRESHENING

Phyto < 20 µm

Phyto > 20 µm

Bacteria

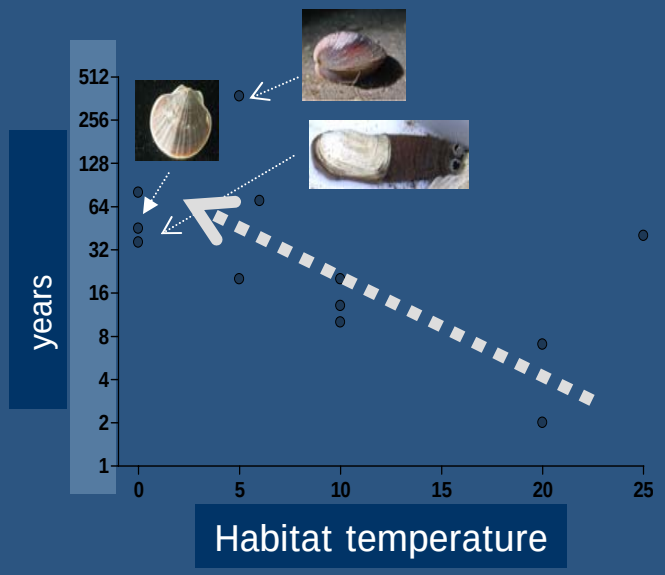
Phytoplankton

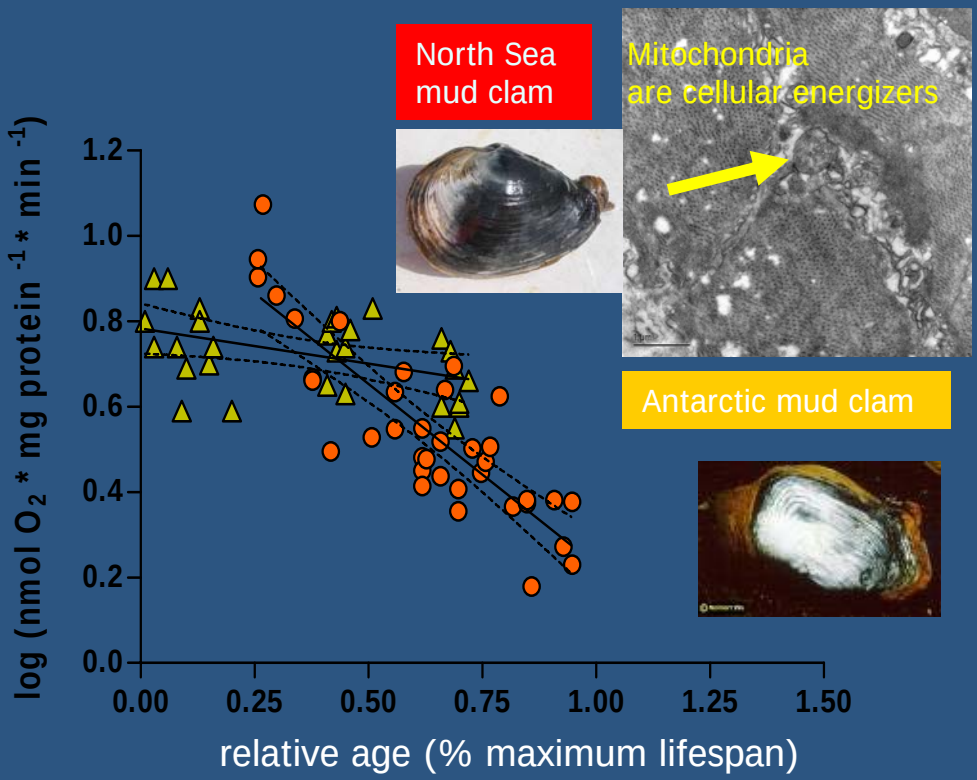
Courtesy of
I. Schloss (IAA, B. Aires, Arg)
M. Vernet (Scripps Inst, US)

LIFETIME ENERGY BUDGETS and AGEING :

What mechanisms prolong fitness to very old age in Antarctic Benthos ?

Long life expectancy in polar animals ← Cell respiration is maintained over age





Antarctic molluscs maintain high levels of cellular antioxidants to prevent free radical damage of cells and chromosoms. They age slowly and maintain their mitochondria intact over lifetime.

We investigate HOW they do that.

AWI

Courtesy of Eva Philipp (Alfred-Wegener Inst, Germany)

Environmental Genetics

New Technologies

Antarctic genetic markers & DNA-arrays

Antarctic marine organisms were isolated > 25 Ma under extreme environmental conditions

Cold & high oxygen adapted proteins

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Gene flow to and along Antarctic Peninsula

Novel metabolic pathways and molecular interactions

Speciation and genetic heterogeneity/flexibility of Antarctic populations

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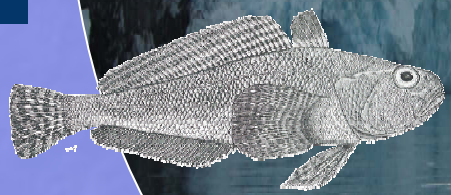

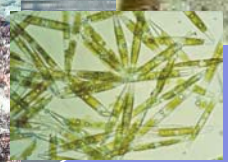

New model systems :
animals, plants,
cells from polar species

Examine and model the potential of polar species to respond to Rapid Climate Change

Biotechnology at low temperature

clicOPEN interactive program structure

Inter-disciplinary projects financed through national funding agencies

share tools

clicopen@lists.wdc-mare.org
connects > 100 scientists

Common sampling patterns, experimentation procedures

Cross sampling between projects

Joint use of stations in IPY

Exchange of students and expertise between labs

- equipment
- platforms
- long term data
- genetic tools
- ....

glaciers

ecosystems

species

Steering committee (& observers)

workshops

symposia

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METADATA

Data management (Pangaea)
historical data, **inter-calibration**
Rules for data storage and access to metadata within program
GIS based visualization (KGIS, etc)

Process models

clicOPEN: cooperation network for young scientists

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Last clicOPEN workshop in Bremerhaven, Germany in Oct 2006

Thanks for your attention

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