

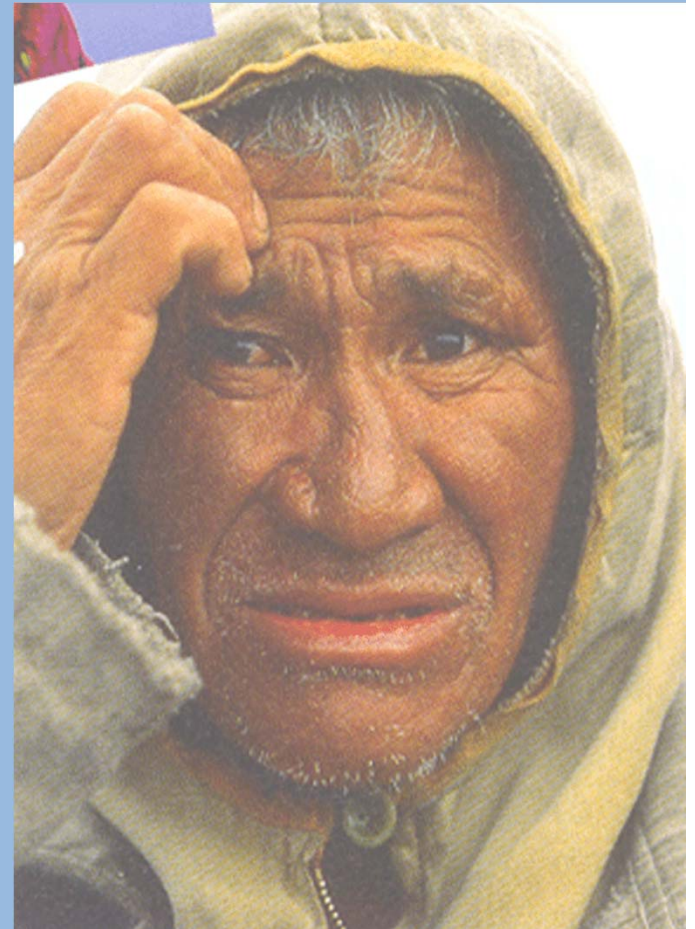
AMAP

Arctic Monitoring and Assessment Programme

Arctic Monitoring and Assessment Programme (AMAP)

Workshop at IIASA 19-20 May 2014

Lars-Otto Reiersen
AMAP Secretariat,



AMAP

Arctic Monitoring and Assessment Programme

Thawing of the Cold war





ARCTIC COUNCIL

AMAP

Arctic Monitoring and Assessment Programme

ARCTIC COUNTRIES

Permanent Participants (indigenous peoples organizations)

Observers (countries and organizations)

ARCTIC COUNCIL

ACAP

Arctic Council
Action
Plan

AMAP

Arctic Monitoring
and Assessment
Programme

CAFF

Conservation
of Arctic Flora
and Fauna

EPPR

Emergency, Prevention,
Preparedness
and Response

PAME

Protection of
the Arctic Marine
Environment

SDWG

Sustainable
Development
Working Group



ARCTIC COUNCIL

AMAP

Arctic Monitoring and Assessment Programme

Permanent Participants (6 Arctic Indigenous Orgs):

- Aleut International Association
- Arctic Athabaskan Council
- Gwich'in Council International
- Inuit Circumpolar Council
- Saami Council
- Russian Arctic Indigenous Peoples of the North (RAIPON)

AMAP Assessment 2009: Human Health in the Arctic



Arctic Monitoring and Assessment Programme (AMAP)

AMAP

Arctic Monitoring and Assessment Programme

AMAP initiated in 1991 to monitor and assess levels, trends and effects on Arctic ecosystems and humans:

Pollutants – Persistent Organics (POPs), heavy metals, radionuclides, petroleum hydrocarbons & acidification;

Climate change, incl. UV, ozone, black carbon, methane & ocean acidification;

Analyzing samples from: air, water, snow, ice, sediments, plankton, invertebrates, fish, birds, mammals & humans;

Perform integrated assessments of several drivers.

Provide science based policy related Actions

AMAP

Arctic Monitoring and Assessment Programme

AMAP's geographical coverage



<http://www>

Boundaries of the Arctic
— Arctic Circle
— AMAP

© AMAP

AMAP

Arctic Monitoring and Assessment Programme

AMAP Assessment - leads

POPs	Canada & Sweden
Radionuclides	Norway & Russia
Mercury	Canada & Denmark
Oil	Norway & USA
Human health	Canada & Norway
AACA-C	Norway & USA

Barents: Finland, Norway, Russia & Sweden

Berings.: Canada, Russia & USA

Baffin/Davis: Canada & Denmark/Greenland

AMAP

Arctic Monitoring and Assessment Programme

AMAP Assessment - leads

Ocean Acidification: Norway & USA

SLCF: BC & Ozone: Norway & USA

Methane: Canada & USA

Land ice: Canada, Denmark/Greenland,
Russia & USA

Sea ice Canada, Norway & USA

Permafrost: Russia & USA

Snow: Canada

Arctic Freshwater Budget: Canada

Status & Forecast: Russia & USA

AMAP

Arctic Monitoring and Assessment Programme

AMAP Thematic Data Centres

- | | |
|---------------------------|---------------|
| •Atmospheric | NILU, Norway |
| •Marine | ICES, Denmark |
| •Terrestrial & Freshwater | UAF, USA |
| •Radioactivity | NRC, Norway |
| •Human | National |
- Provide access to data from recent monitoring and research
 - Ensure that data are treated in a consistent manner, QA/QC
 - Provide long-term secured archive of Arctic-relevant environmental data for use in future research and assessments.

AMAP Project Directory (www.amap.no)

- Who's doing What, Where, Methods and Data reporting!

<http://www.amap.no>

Evaluating specific episodes: PCBs at Ny-Ålesund

AMAP
ARCTIC MONITORING AND ASSESSMENT PROGRAMME



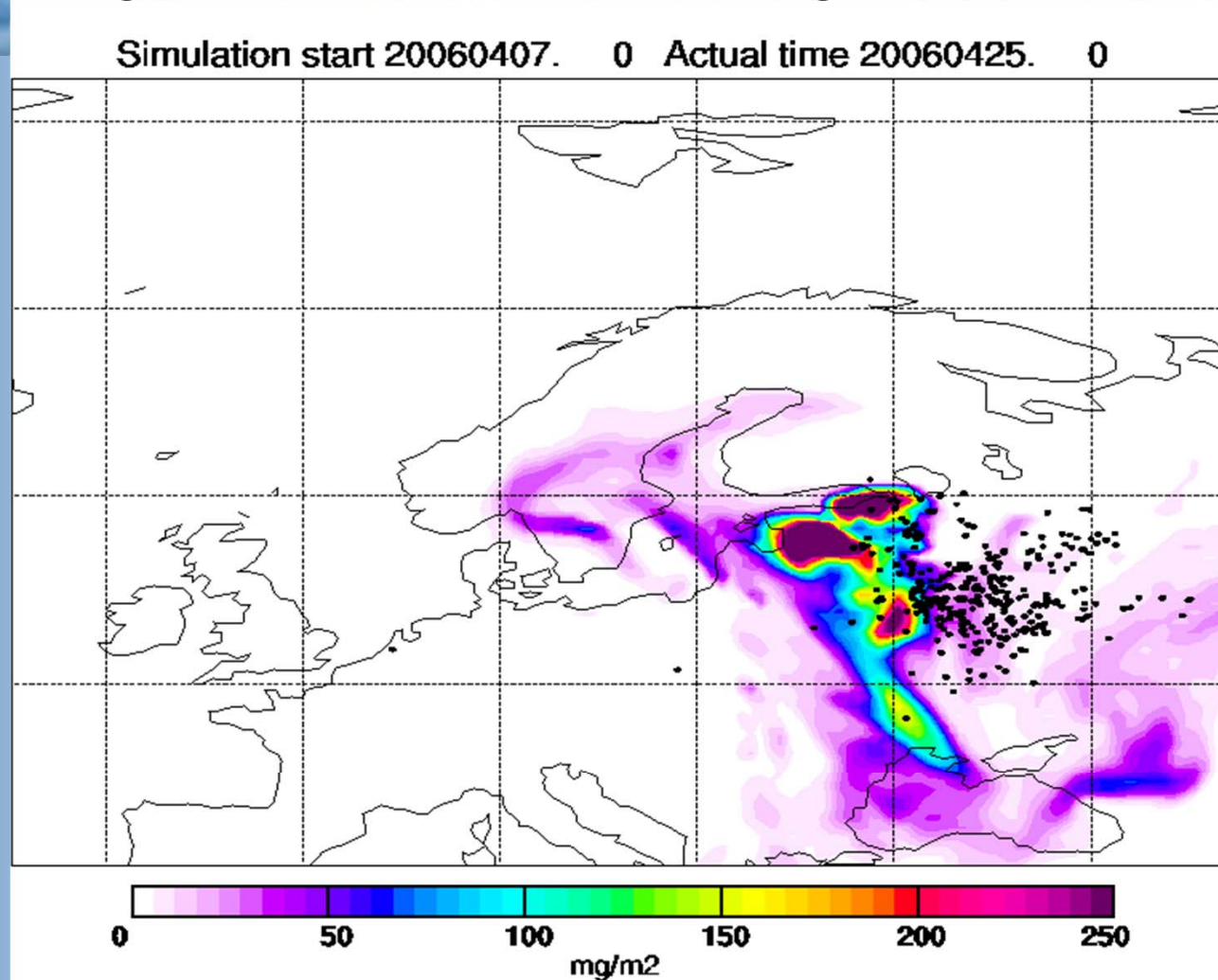
**View from the station on
a clear day...**



**And during the 2nd
episode in May, 2006**

<http://www.amap.no>

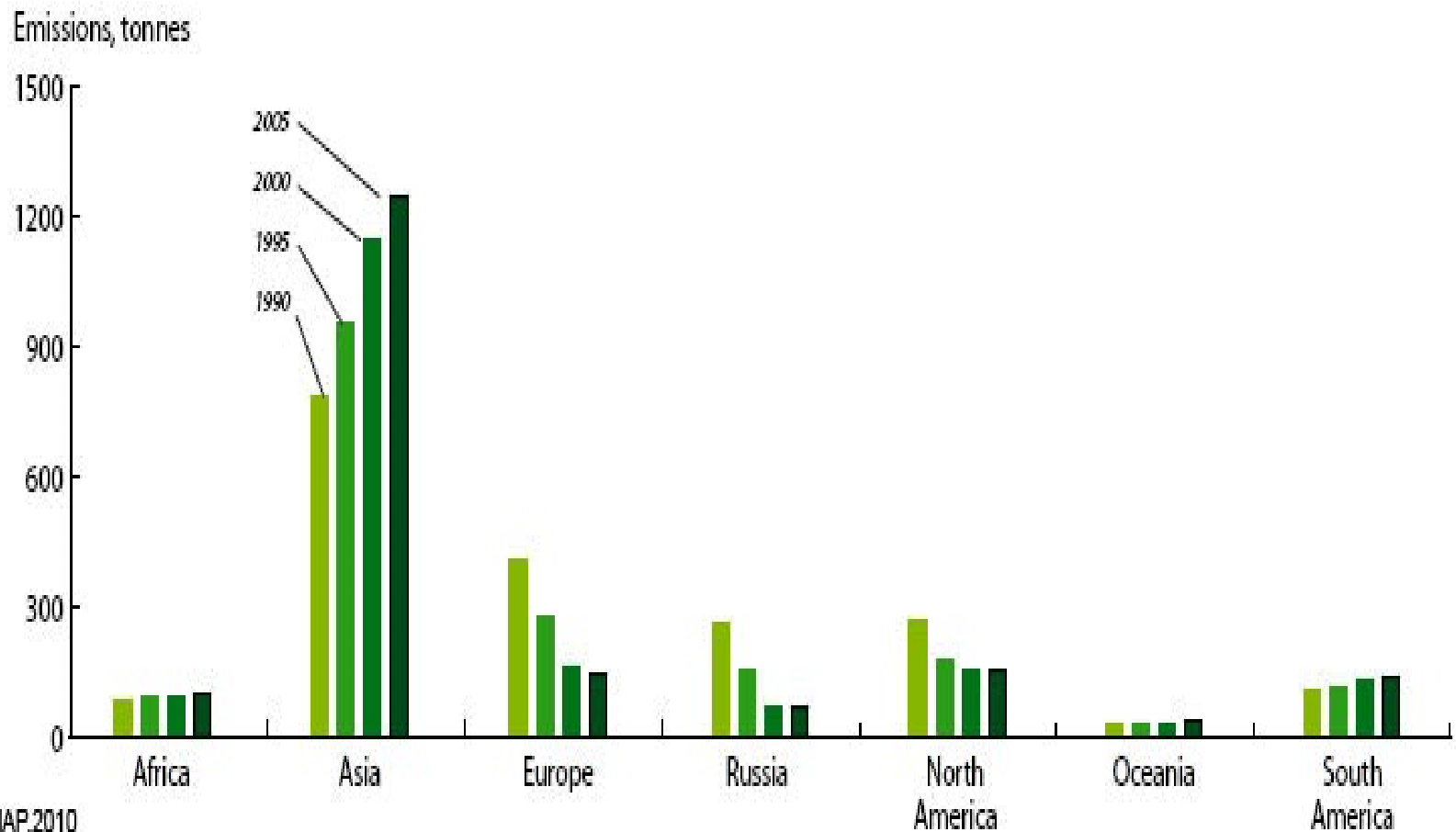
Evaluating specific episodes, e.g. PCBs at Ny-Ålesund



AMAP

Arctic Monitoring and Assessment Programme

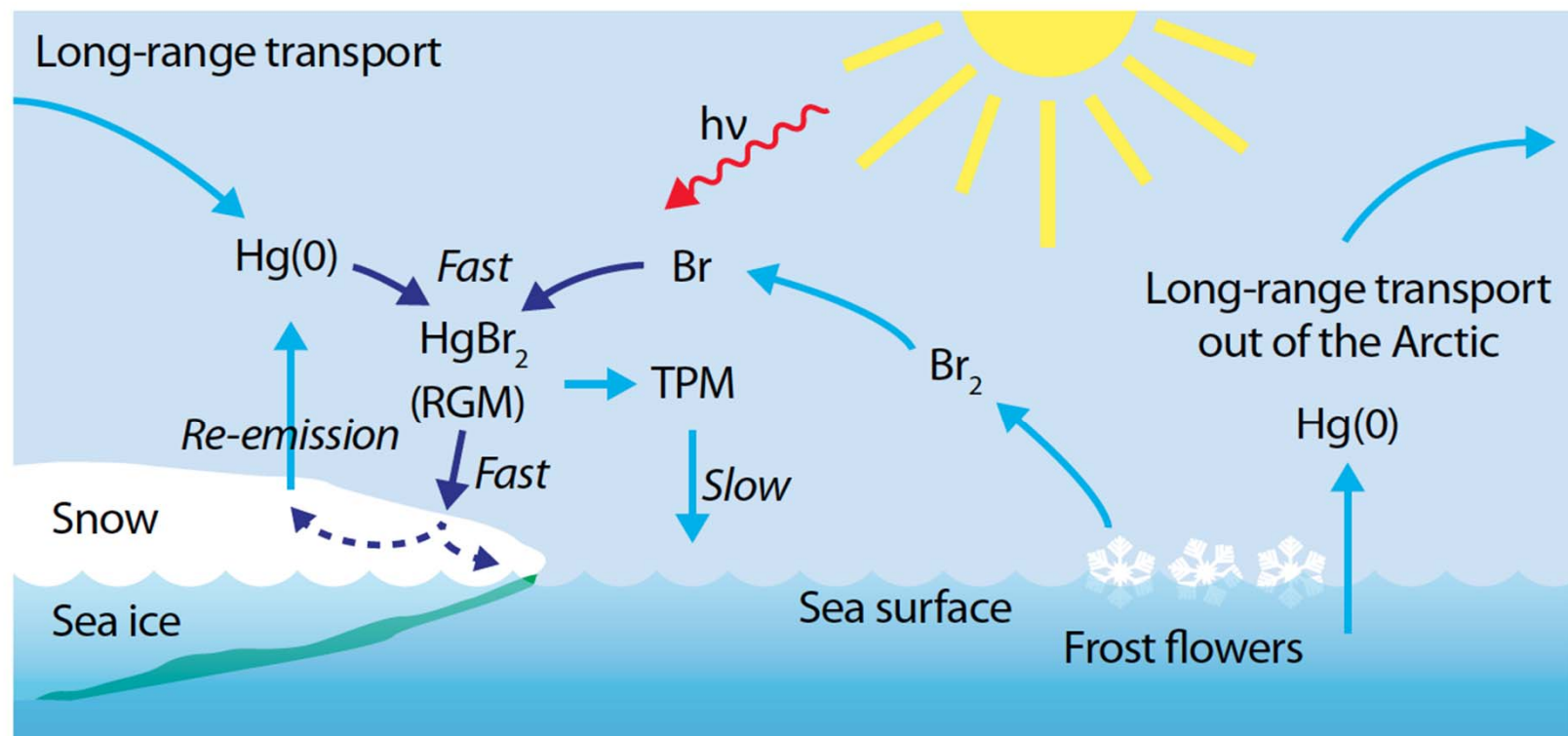
Global emissions of mercury 1990 – 2005 (AMAP 2011)



AMAP

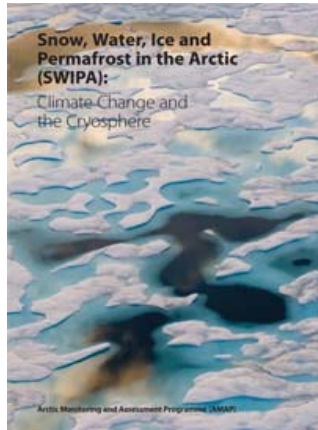
Arctic Monitoring and Assessment Programme

Mercury cycle in the Arctic

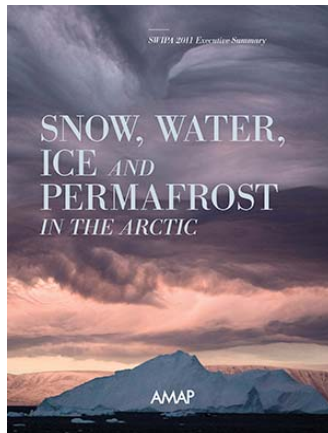


Combined effects, climate and Contaminants, AMAP 2012.

Snow, Water, Ice and Permafrost in the Arctic (SWIPA)



For scientists ... decision-makers/public



... policy-makers ... educational use

The screenshot shows the Vimeo website interface. At the top, there's a navigation bar with 'vimeo', 'Join', 'Log In', 'Create', 'Watch', and 'Upload'. Below that is a search bar. The main content area features a large video thumbnail of icebergs. Underneath, there are tabs for 'Group Videos' and 'Group Activity'. A list of video thumbnails is displayed, each with a title in Inuit and English, and a timestamp. On the right side, there's a sidebar with the group name 'SWIPA - Snow, water, ice and permafrost in the Arctic', a description, and a 'BROWSE THIS GROUP' section with statistics: 60 Videos, 1 Moderator, 0 Forum Topics, and 10 Albums.

... 3 films in 10 languages

www.amap.no/swipa and www.vimeo.com/groups/swipa

Key Findings: Arctic Ocean Acidification

Key finding 1

Arctic marine waters are experiencing widespread and **rapid ocean acidification**

Key finding 2

The **primary driver** of ocean acidification is uptake of carbon dioxide emitted to the atmosphere by **human activities**

Key finding 3

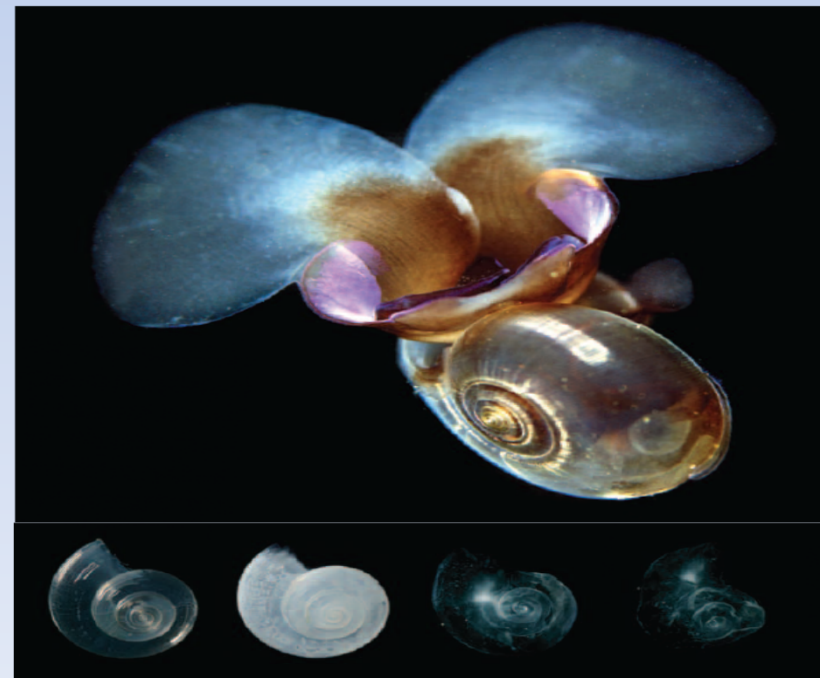
The Arctic Ocean is especially **vulnerable** to ocean acidification

Key finding 4

Acidification is **not uniform** across the Arctic Ocean

pH	H ⁺ (moles per liter)	change in acidity
7.2	6.3×10^{-8}	+900%
7.3	5.0×10^{-8}	+694%
7.4	4.0×10^{-8}	+531%
7.5	3.2×10^{-8}	+401%
7.6	2.5×10^{-8}	+298%
7.7	2.0×10^{-8}	+216%
7.8	1.6×10^{-8}	+151%
7.9	1.3×10^{-8}	+100%
8.0	1.0×10^{-8}	+58%
8.1	7.9×10^{-9}	+26%
8.2	6.3×10^{-9}	

Average global surface ocean pH has fallen from a pre-industrial value of 8.21 to 8.10, corresponding to an increase in acidity of 28.8%. Values of 7.8–7.9 are expected by 2100, representing a 100–150% increase in acidity (NOAA/PMEL)



AMAP

Arctic Monitoring and Assessment Programme

Climate Change - Combined Effects



Consequences of change ?

Challenges

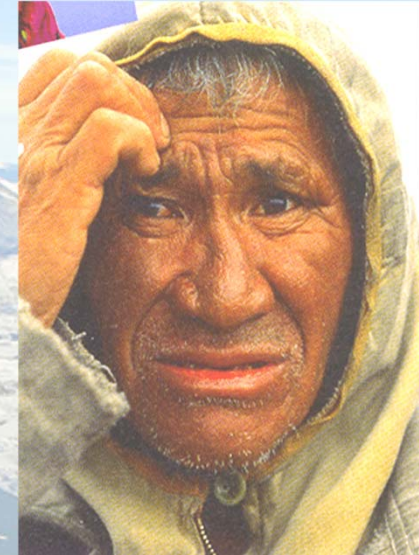
Arctic residents
Losers?

Insecure travel routes,
diminishing traditional
food sources



Opportunities

The global community
Winners?
(*multi-national industry*)



Sea level
rise,
amplified
warming

Better access
to resources -
- oil and gas, -
- mines, - -
- fish?

new shipping
routes



AMAP

Arctic Monitoring and Assessment Programme



From Science to Policy:

- Radioactivity reduced risk
- Food advice to Arctic peoples
- UNECE Århus protocol (1998)
- UNEP Stockholm Convention on POPs (2001)
- UN FCCC COP & IPCC (2004 - 2014)
- UNEP Global Mercury Minimization agreement (signed 2013)



AMAP

Arctic Monitoring and Assessment Programme

Arctic – the Barometer of the Globe



AMAP

Arctic Monitoring and Assessment Programme

From Knowledge to Action

- a long road



Substance to Market	2-5 y
Substance to Problem	5-10 y
Market to Problem	10-20 y
Problem to Regulation	20-30 y
Regulation to Effect	5-10 y

Ramon Guardans 2010