



23.06. - 04.07.2014 in Potsdam, Germany

## ARCTIC IN THE ANTHROPOCENE

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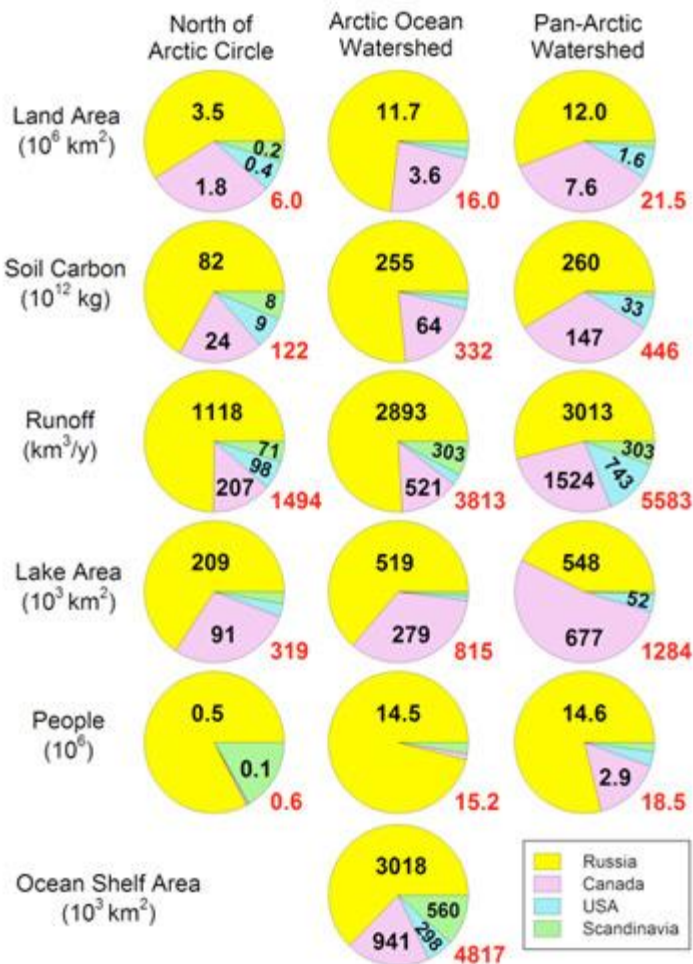
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Linking Science and Policy  
Freshwatersystems in the Arctic  
and how they are endangered  
Dr. Fritz Holzwarth, Bonn  
Former German Water- and Marine Director

Potsdam, 30. June 2014



*Watersheds of the six largest arctic rivers, all of which were part of the original PARTNERS project (2003-2007) and are now included in the Arctic Great Rivers Observatory. Map by Greg Fiske, WHRC.*



*Russia is the "dominant player" when using several diverse measures of high latitude biogeophysical and human systems over several regional expressions of the Arctic. The values within the figures represent the contribution from each nation or region, and the value to the lower right of each pie gives the total. The Arctic Ocean Watershed represents the land area whose rivers drain directly into the Arctic Ocean, and the Pan-Arctic Watershed is a larger region covering all land area whose rivers flowing north including the entire Arctic Ocean Watershed as well as most of Alaska and the Hudson and James Bay catchments*

## Constituents analyzed

<i>Constituent group</i>	<i>PARTNERS 2003-2007</i>	<i>Arctic-GRO, comprehensive 2009-2012</i>	<i>Arctic-GRO, high frequency 2009-2012</i>
<i>Dissolved organic carbon</i>	DOC, DO <sup>13</sup> C, DO <sup>14</sup> C	DOC, DO <sup>13</sup> C, DO <sup>14</sup> C	DOC
<i>Dissolved organic carbon, lignin phenols</i>	Σ8	Σ8, C/V, S/V, (Ad/Al)v, (Ad/Al)s	
<i>Dissolved organic carbon, fractionation</i>		% HPOA, HPON, HPI, HPIA, SUVA for each fraction	
<i>CDOM</i>	a(375), SUVA	Spectral scans (200-800 nm), EEMs, synchronous fluorescence, fluorescence index	Spectral scans (200-800 nm)
<i>Dissolved inorganic carbon</i>	Alkalinity	Alaklinity, DIC, DI <sup>13</sup> C, DI <sup>14</sup> C	
<i>Dissolved nutrients</i>	NH <sub>4</sub> , NO <sub>3</sub> , TDN, TDP, Si	NH <sub>4</sub> , NO <sub>3</sub> , TDN, TDP, PO <sub>4</sub> , Si	NH <sub>4</sub> , NO <sub>3</sub> , TDN, TDP, PO <sub>4</sub> , Si
<i>Particulates</i>	TSS, POC, PO <sup>13</sup> C, PON, PO <sup>15</sup> N	TSS, POC, PO <sup>13</sup> C, PO <sup>14</sup> C, PON, PO <sup>15</sup> N	
<i>Major ions</i>	Cl, SO <sub>4</sub> , Na, K, Mg, Ca	Cl, SO <sub>4</sub> , Na, K, Mg, Ca	
<i>H<sub>2</sub>O isotopes</i>	H <sub>2</sub> <sup>18</sup> O, <sup>2</sup> H <sub>2</sub> O	H <sub>2</sub> <sup>18</sup> O	
<i>Trace elements</i>	As, Ba, Cd, Ce, Co, Cr, Cs, Cu, Fe, La, Li, Mn, Mo, Nd, Ni, Pb, Pr, Rb, Re, Sr, Tl, U, V, Zn	As, Ba, Mn, Mo, Ni, Rb, Sb, Sr, U	

# Science Policy Interface

## Three common myths about science

1. Complex systems can be fully understood and described
2. Uncertainty is always reducible or quantifiable
3. Simple cause-effect relationships can be always established (deterministic)

# Science Policy Interface

Three myths about policy are also common

1. A socio-ecological system must be fully understood before making decisions that affect it (positively or negatively)
2. With enough effort and knowledge, complex systems are fully controllable
3. A decision is the endpoint of a linear process of reasoning which includes neutral weighting of pros and cons and optimisation

# Science policy interface

## Three common myths about SPIs

1. Science and policy are two independent domains of human activity
2. Science Policy Interface are all about a one-way flow in which 'truth' (science) speaks to 'power' (policy)
3. Science Policy Interface are simple forums through which reporting science knowledge results in development of policy grounded in evidence, in clear controllable ways

More information about Science Policy Interface: [www.spiral-project.eu](http://www.spiral-project.eu)

For more information about overhead 2-4 please visit [www.arcticgreatrivers.org](http://www.arcticgreatrivers.org) and Arctic Monitoring and Assessment Programme [www.amap.no](http://www.amap.no)

Thank you very much