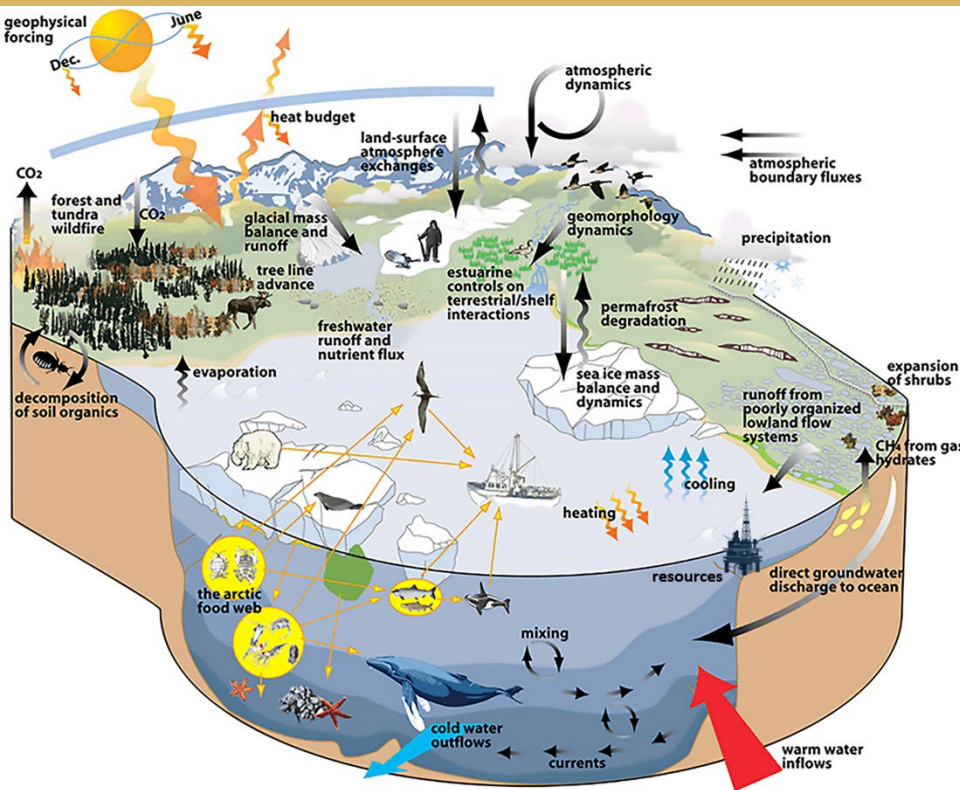


SCIENCE DIPLOMACY WITH INFORMED DECISIONMAKING EMPOWERS ARCTIC SUSTAINABLE DEVELOPMENT



WHO is involved with the Arctic system?
WHEN are the urgencies of the Arctic system?
WHY do we need to sustain the Arctic system?



WHAT is the Arctic system?
WHERE are the boundaries of the Arctic system?
HOW do we manage the Arctic system?

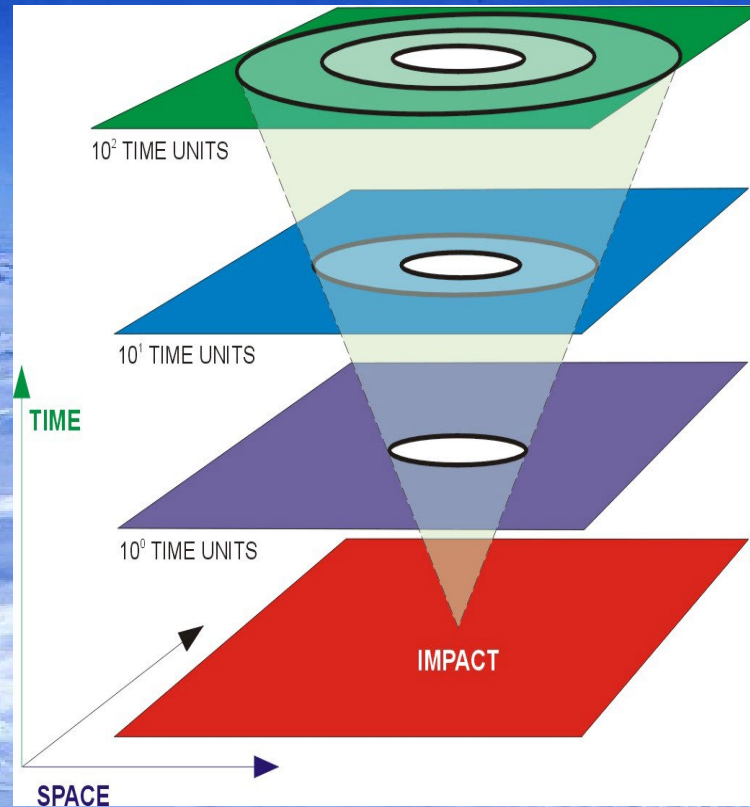


LANGUAGE OF HOPE

SCIENCE DIPLOMACY is an holistic (international, interdisciplinary and inclusive) process – involving informed decisionmaking to balance national interests and common interests for the benefit of all on Earth across generations.



SCIENCE AS THE 'STUDY OF CHANGE' (Δ)



REVEALING PATTERNS, TRENDS AND PROCESSES THAT BECOME THE BASES FOR DECISIONS WITH **INCLUSION** (WHO, WHAT, WHEN, WHERE, WHY AND HOW)

Natural
Sciences

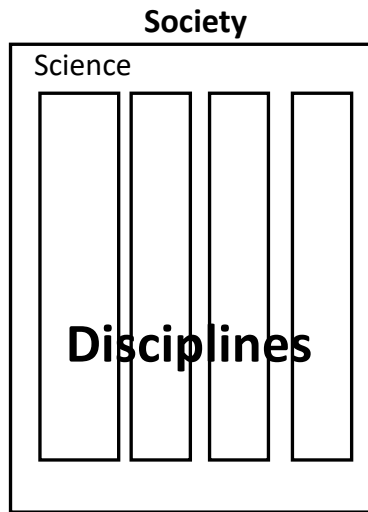
Indigenous
Knowledge

Social
Sciences



EVOLUTION OF KNOWLEDGE SYSTEM INTEGRATION

DISCIPLINARY



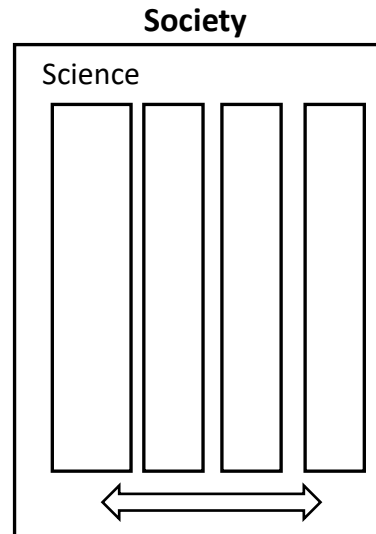
Key characteristics

- Disciplines function in silos
- Science to Society

Exclusive boundaries

Inclusive boundaries

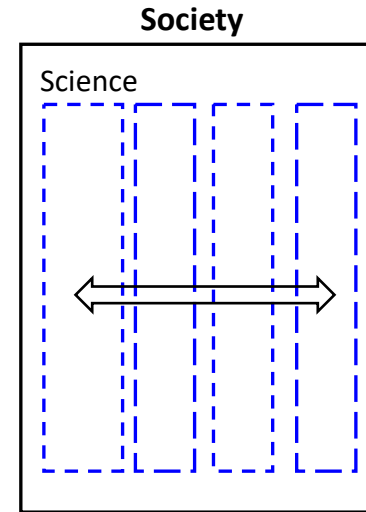
MULTIDISCIPLINARY



Key characteristics

- Multidisciplinary science teams
- Disciplines still function in silos
- Inputs from multiple disciplines
- Integration after the fact
- Science to Society

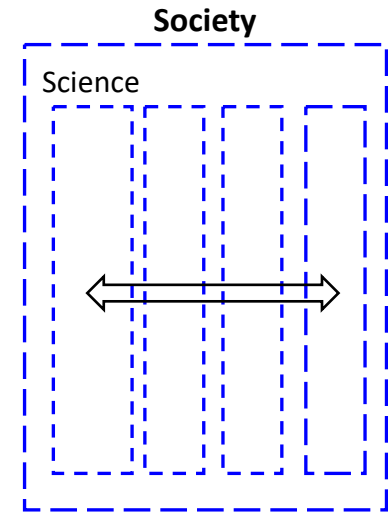
INTERDISCIPLINARY



Key characteristics

- Research across disciplines
- Integration throughout process
- Science to Society

TRANSDISCIPLINARY



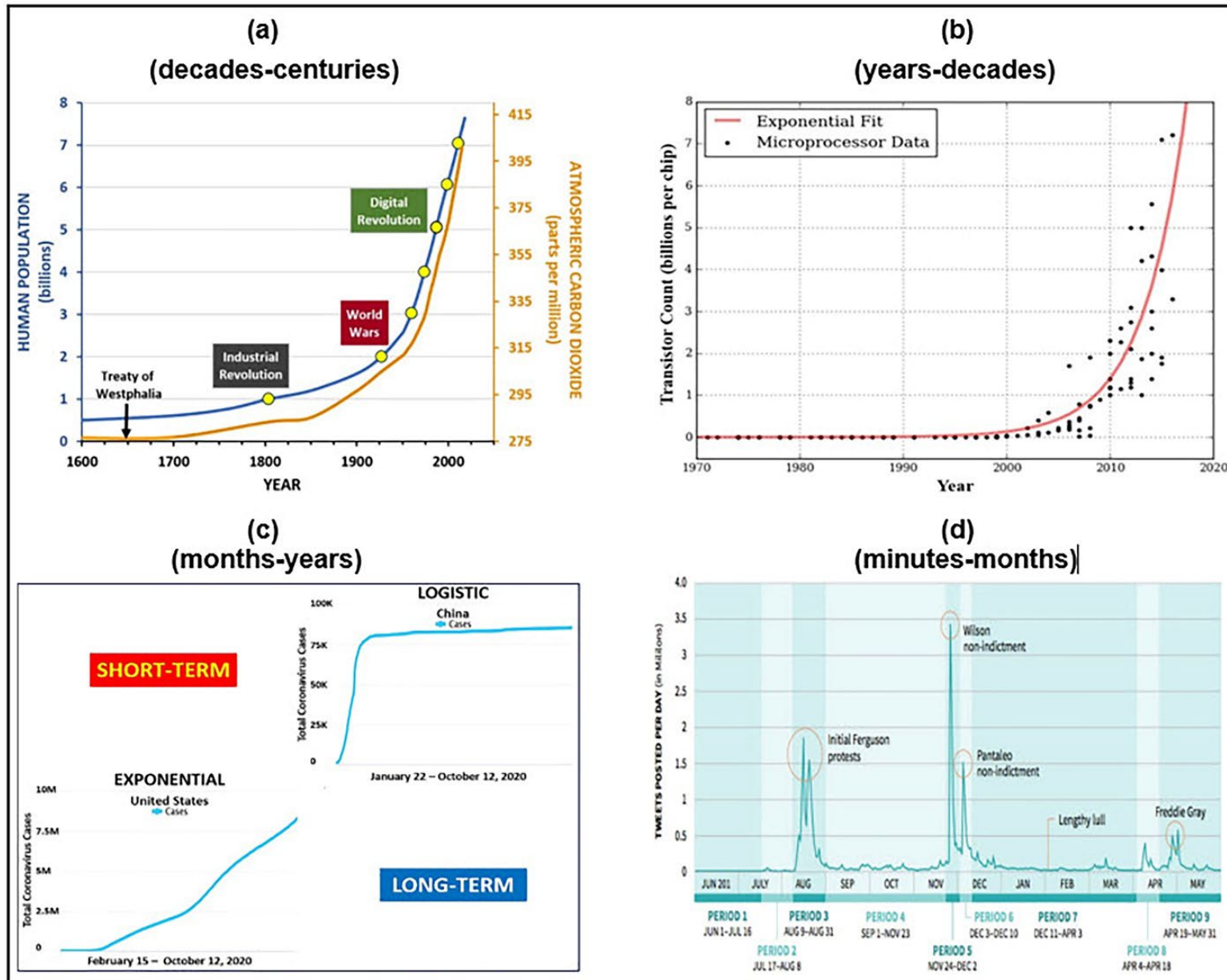
Key characteristics

- Co-development
- Co-production
- Co-implementation
- Science to Society

Adapted from Joske Bunders

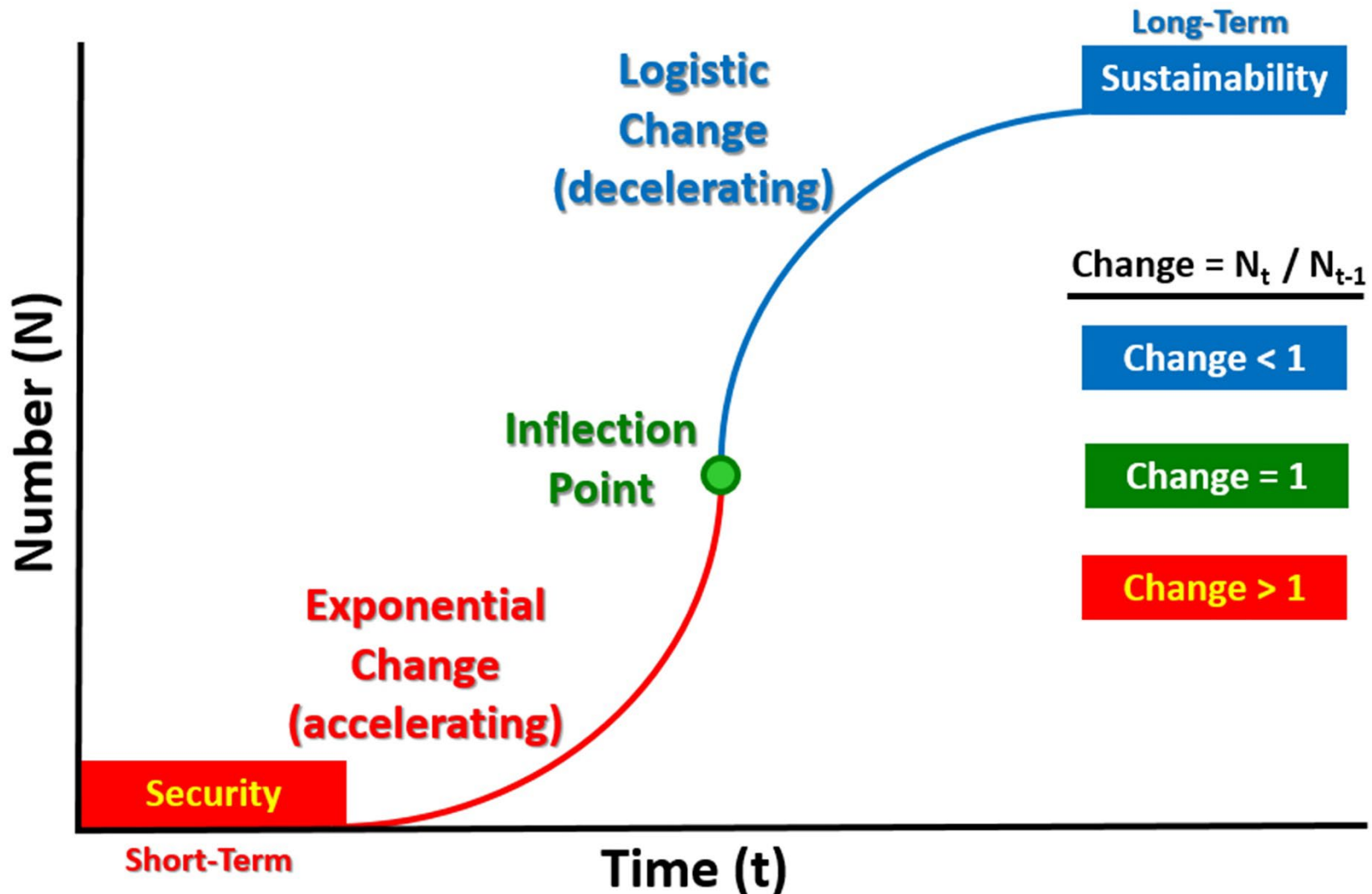


EXPONENTIAL CHANGE IN OUR WORLD



Responding to Change (Δ) with Informed Decisions

bending the curve



BALANCING INTERESTS

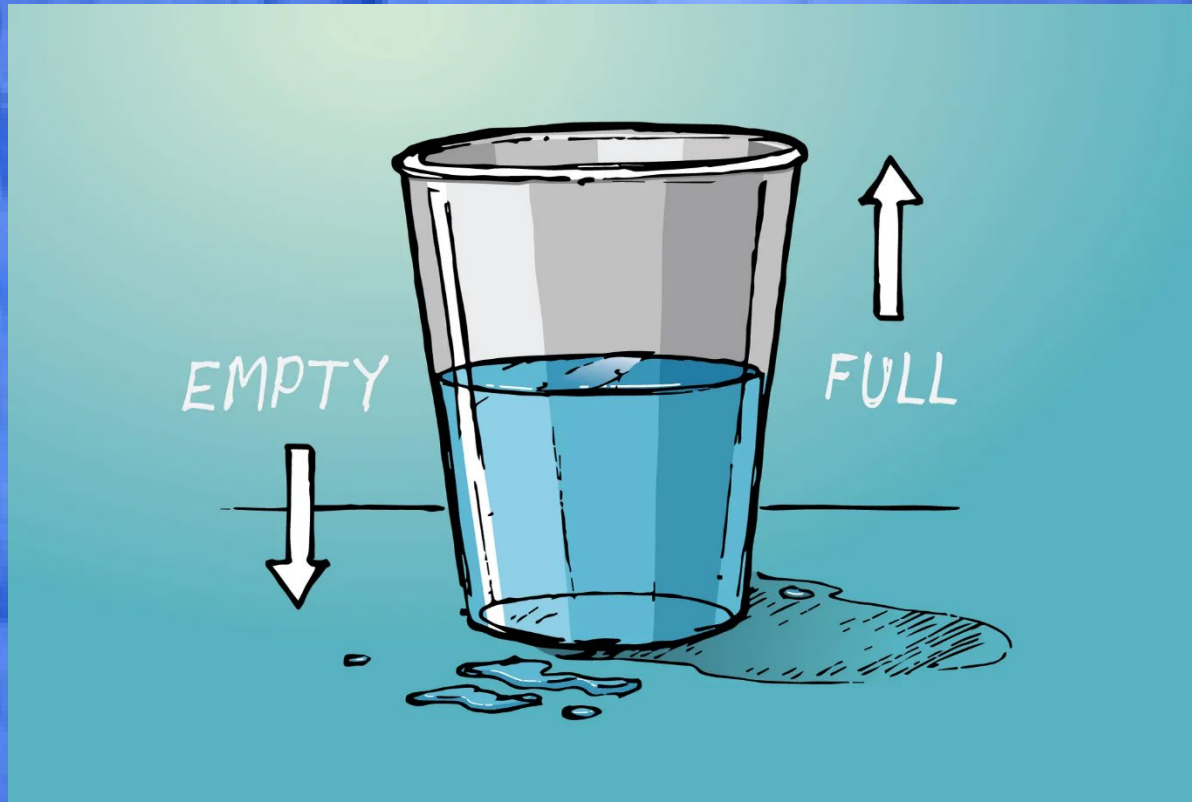


NATIONS, PEOPLES and Our World – Urgencies exist simultaneously across **security time scales** (mitigating immediate risks of political, economic, societal and environmental instabilities) and **sustainability times scales** (balancing societal, economic and environmental considerations across generations)

“INFORMED DECISIONS” OPERATE ACROSS A ‘CONTINUUM OF URGENCIES’



COMMON-INTEREST BUILDING IS A CHOICE

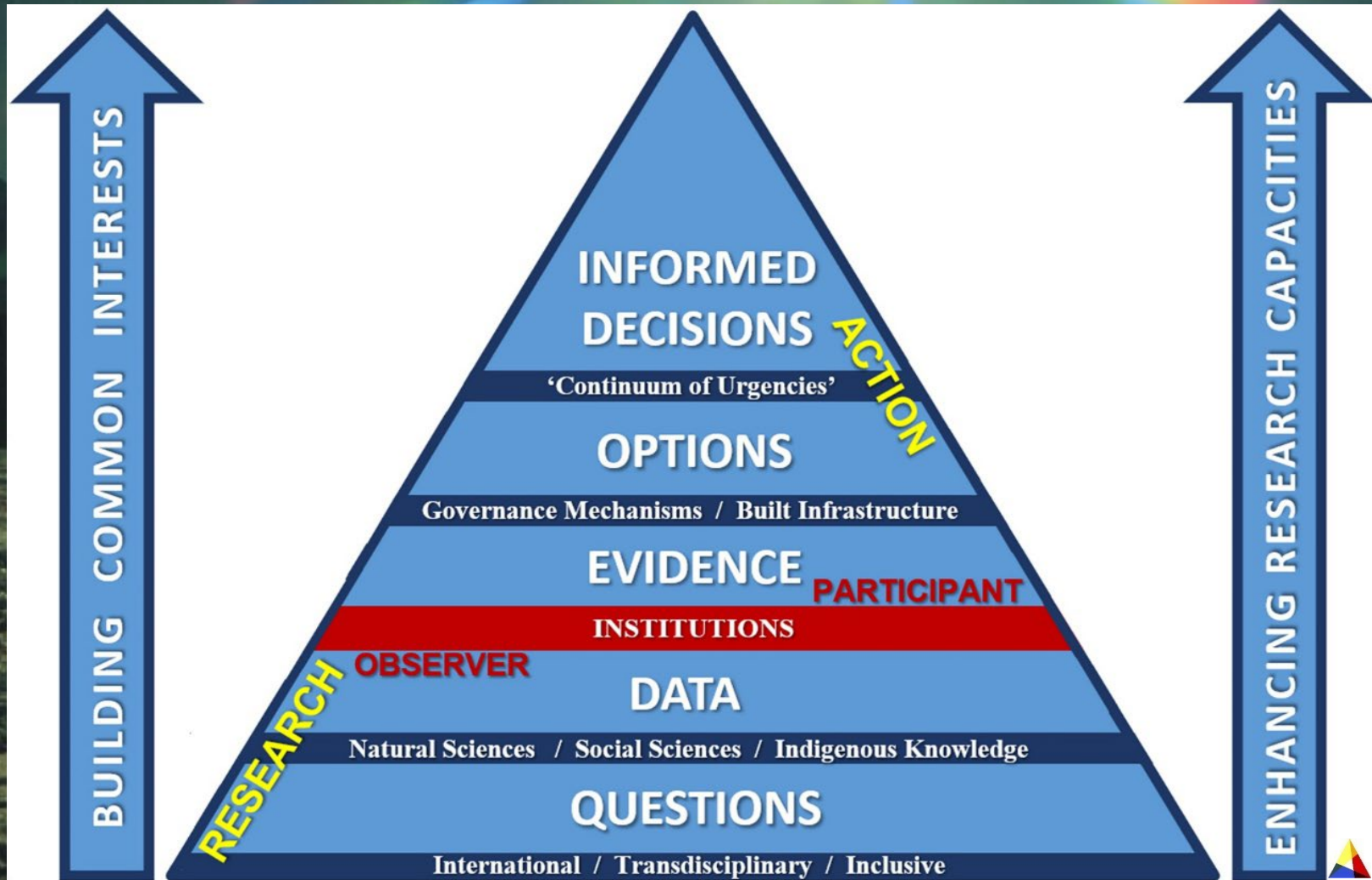


CHOICE AT THE START OF EVERY NEGOTIATION
CONFLICT OR COMMON INTERESTS

**Starting Point Determines the Journey
To Promote Cooperation and Prevent Conflict**



PYRAMID OF INFORMED DECISIONMAKING

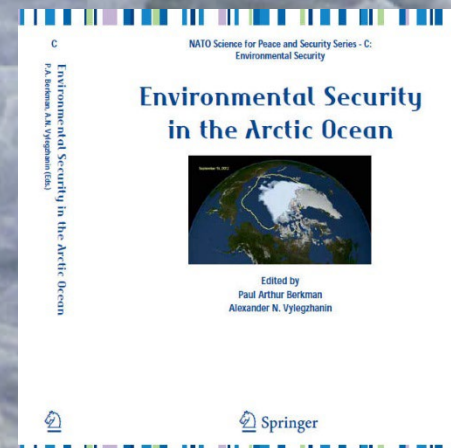


SCIENCE DIPLOMACY

Options (without advocacy), which can be used or ignored explicitly

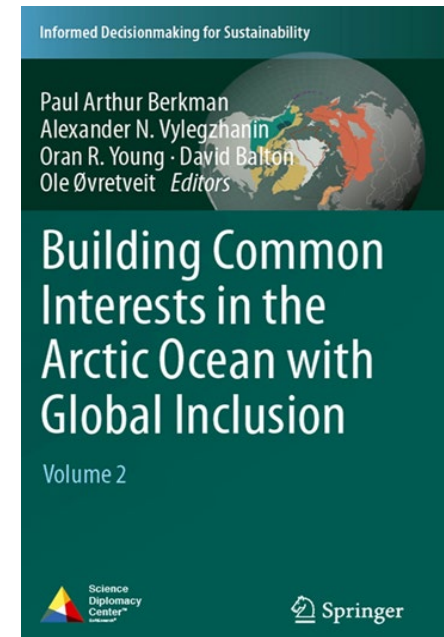
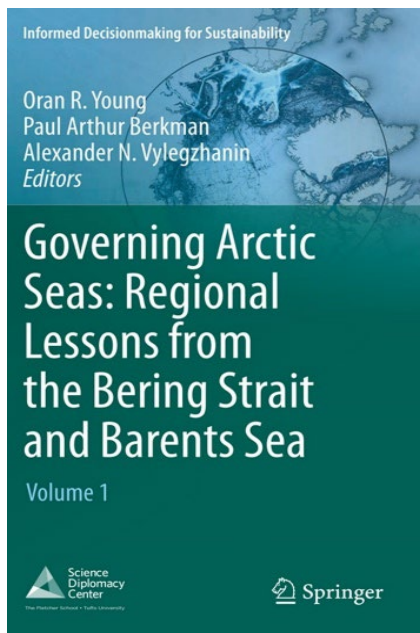


DIALOGUES AMONG ALLIES AND ADVERSARIES ALIKE



The publication
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The NATO Science for Peace
and Security Programme



GOVERNANCE MECHANISMS

(laws, agreements and policies as well as regulatory strategies, including insurance, at diverse jurisdictional levels)

+

BUILT INFRASTRUCTURE

(fixed, mobile and other assets, including communication, research, observing, information and other systems that require technology plus investment)

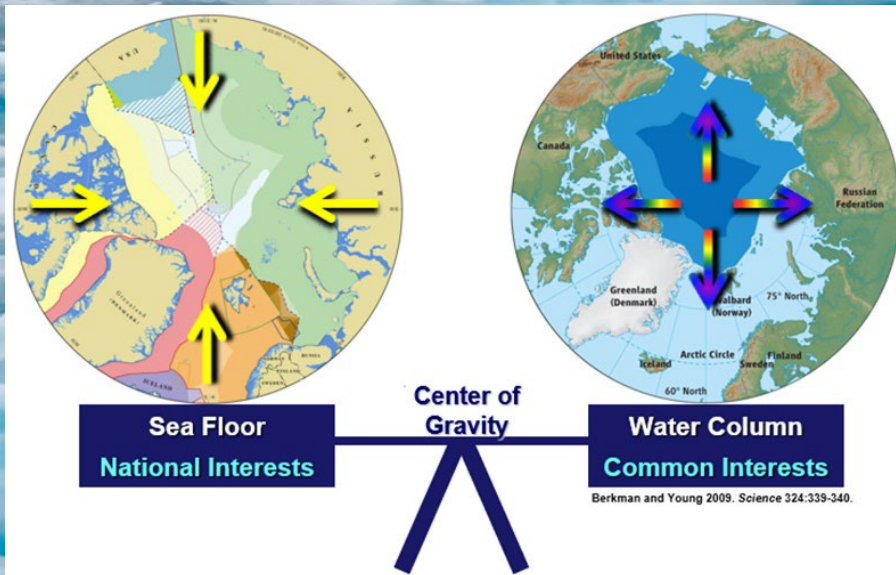
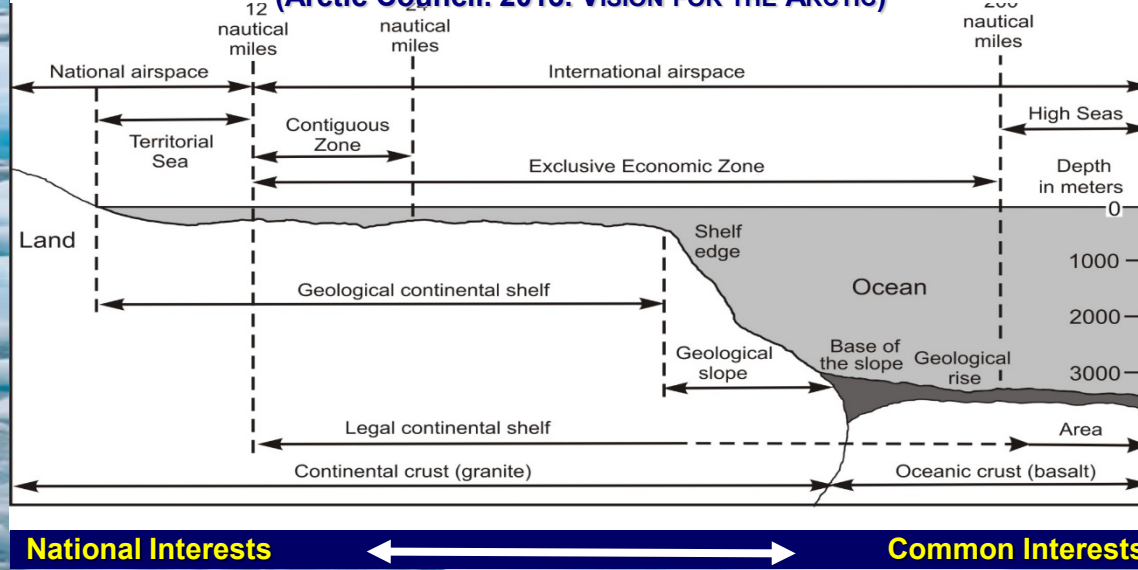
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SUSTAINABLE DEVELOPMENT

(across generations)

LAW OF THE SEA

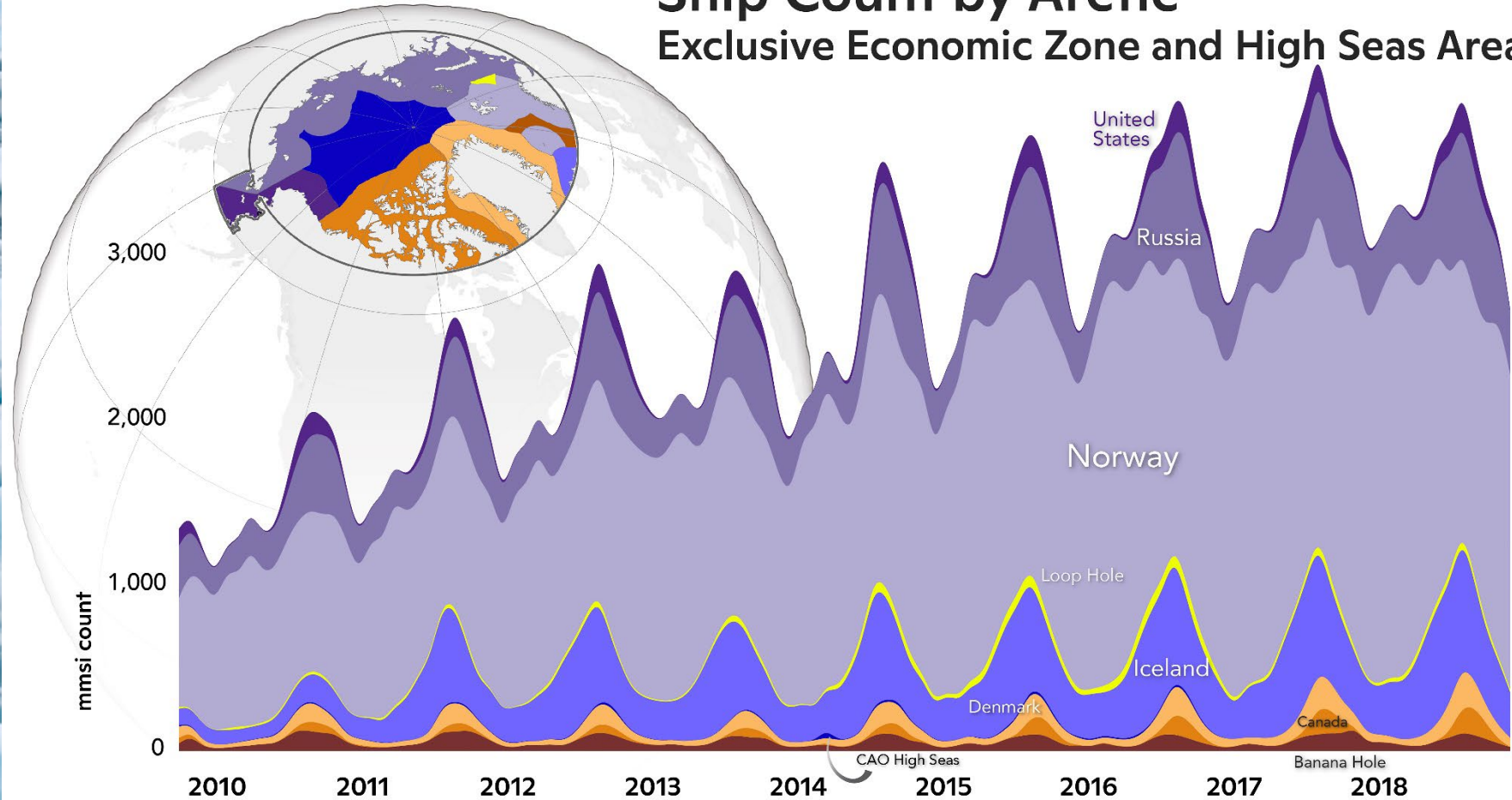
"We remain committed to the framework of the Law of the Sea..."
(Arctic Council. 2013. VISION FOR THE ARCTIC)



PAN-ARCTIC MARITIME SHIP TRAFFIC IN LAW OF THE SEA ZONES

Biogeophysical

Ship Count by Arctic Exclusive Economic Zone and High Seas Areas



Socio-Economic

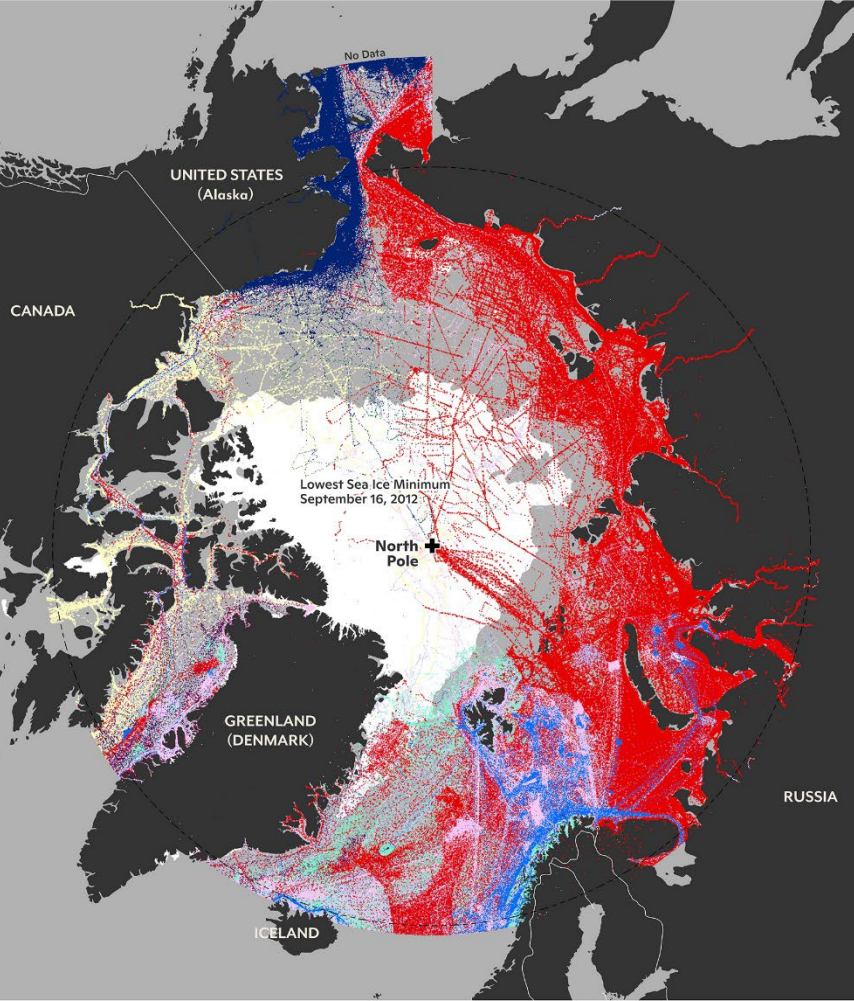


ARCTIC MARITIME SHIP TRAFFIC COMMUNITY BY NATIONS

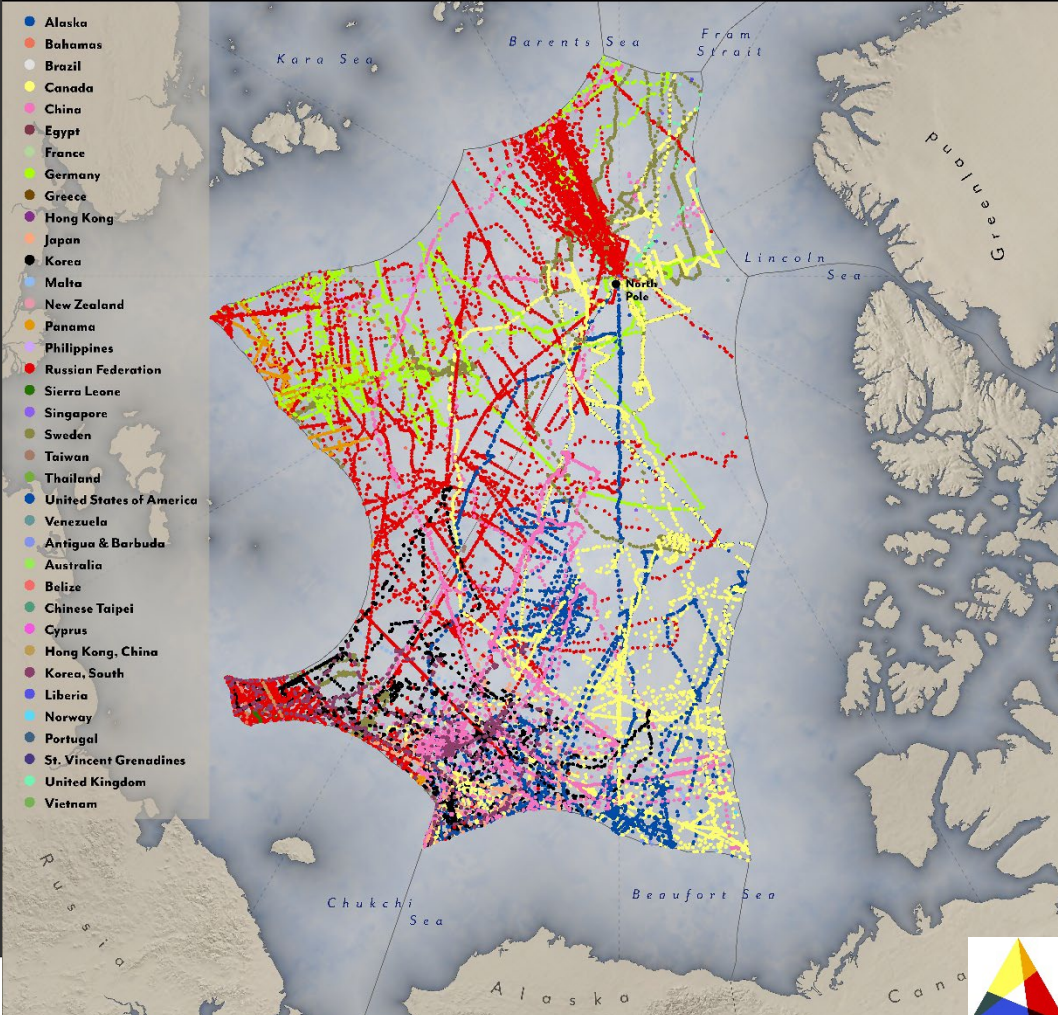
TOP 5 NATIONS IN THE ARCTIC OCEAN

AIS derived nation flag that most commonly occupied each pixel location 2009-2018

- Russia
- United States
- United Kingdom
- Canada
- Norway
- Other



Ships in the Central Arctic Ocean (CAO) High Seas by Flag State 2009-2018

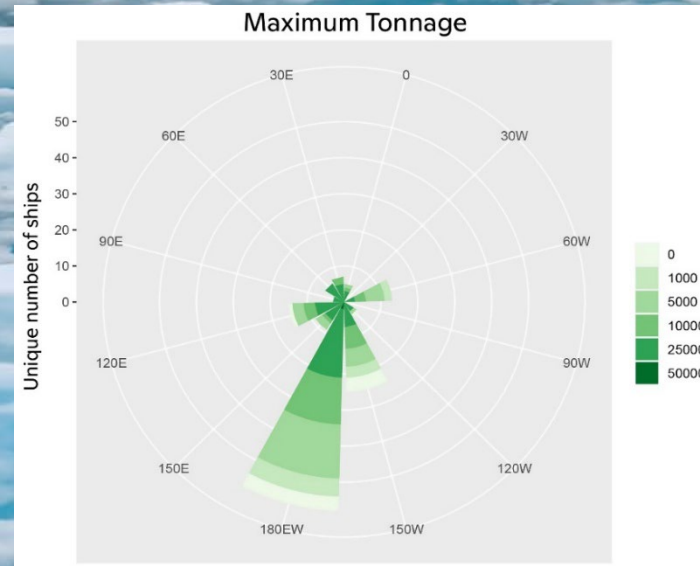
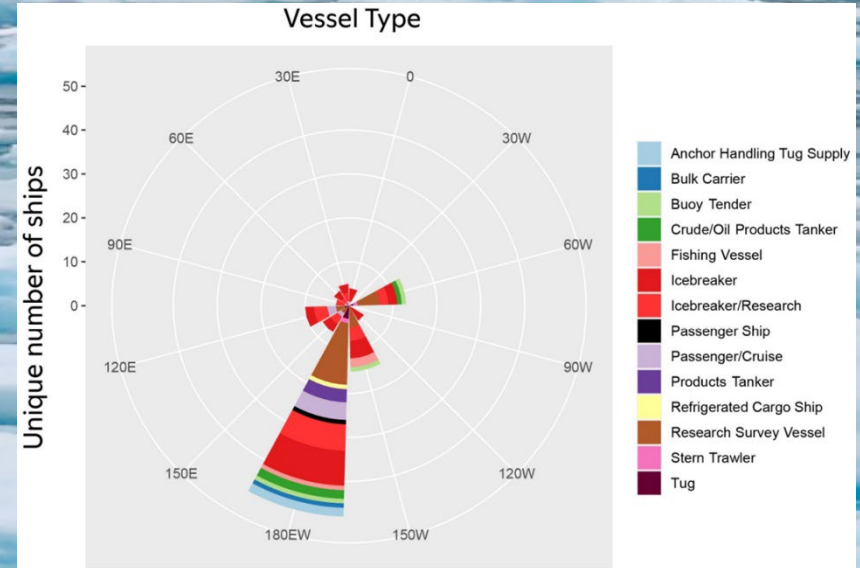
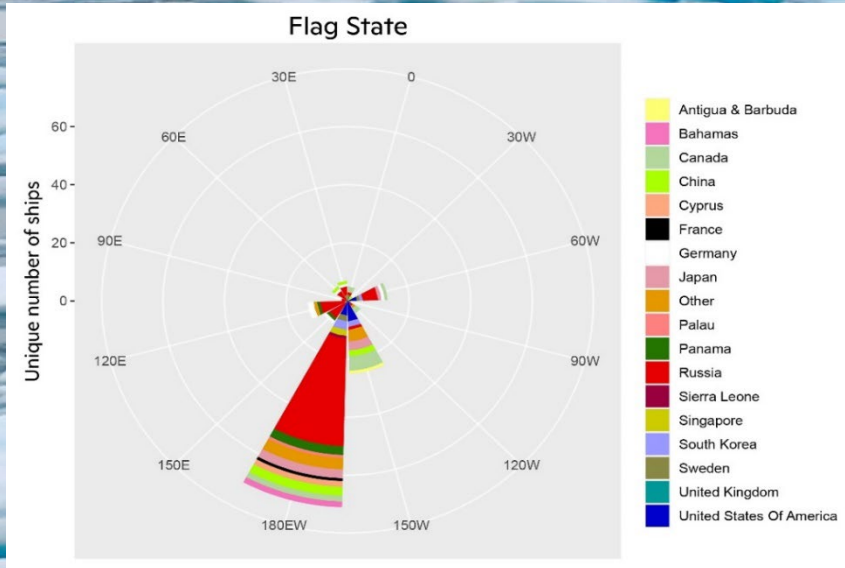


Data: Next Generation Arctic Marine Shipping Assessment Berkman et al. 2020 <https://doi.org/10.18739/A2BV79W4V>

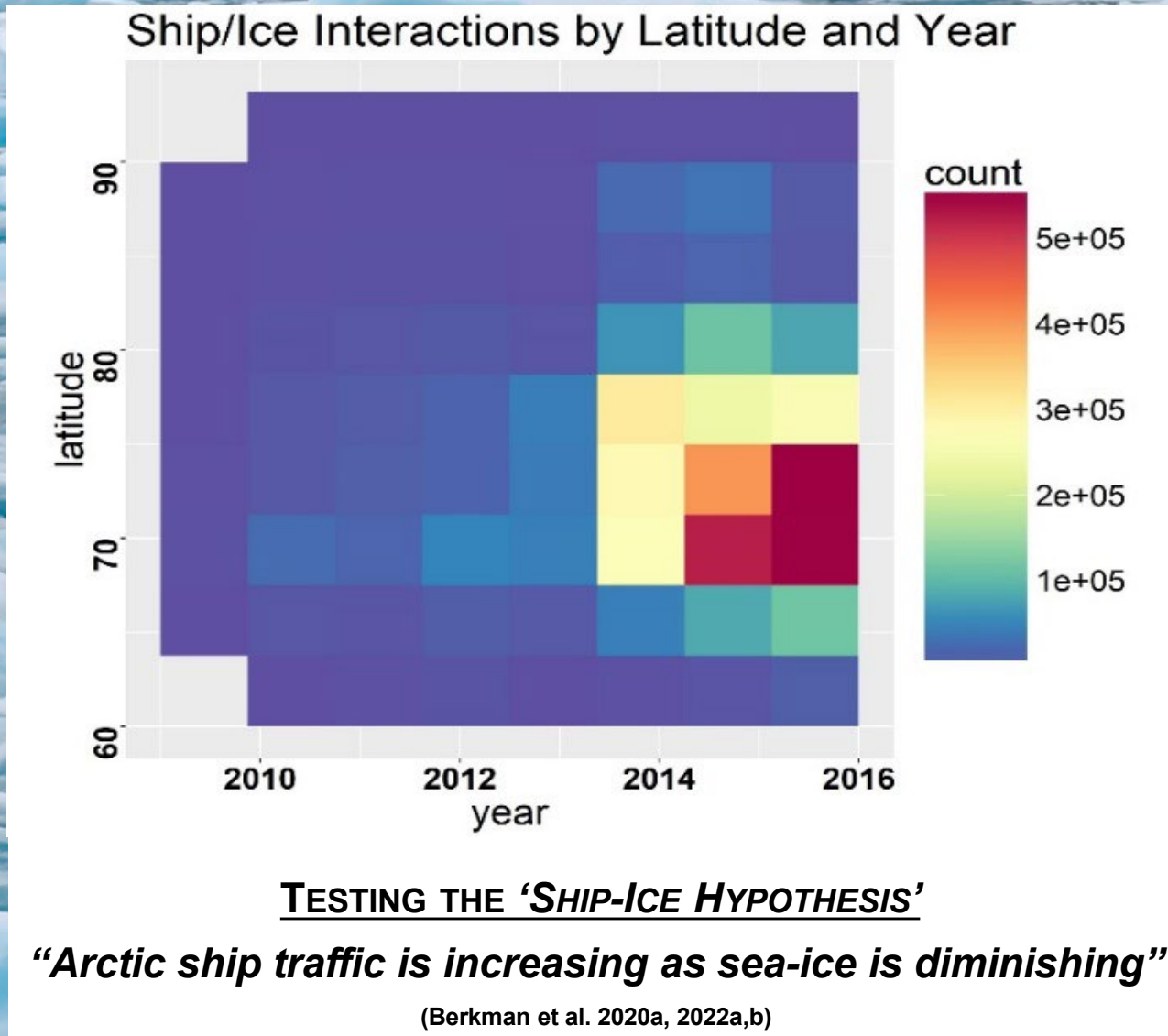


SHIP TRAFFIC INTO THE CAO HIGH SEAS (2009-2018)

Predominates from the Pacific Sector



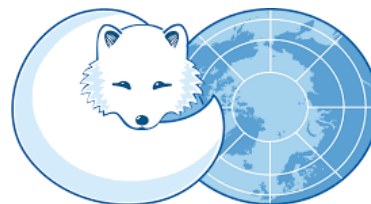
PAN-ARCTIC SHIP-ICE INTERACTIONS OVER TIME AND SPACE



PAN-ARCTIC TRANSDISCIPLINARY INTEGRATION WITH MARITIME SHIP TRAFFIC

TABLE 1: INTERNATIONAL ARCTIC GOVERNANCE MECHANISMS EMERGING AFTER 2009 ¹			
BINDING AGREEMENT			
Number	Name	Done At	Entry into Force
1	<i>Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic</i> (https://oaarchive.arctic-council.org/handle/11374/531)	Nuuk May 12, 2011	January 19, 2013
2	<i>Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic</i> (https://oaarchive.arctic-council.org/handle/11374/529)	Kiruna May 15, 2013	March 25, 2016
3	<i>Agreement on Enhancing International Arctic Scientific Cooperation</i> https://oaarchive.arctic-council.org/handle/11374/1916	Fairbanks May 11, 2017	May 23, 2018
4	<i>International Code for Ships Operating in Polar Waters (Polar Code)</i> (http://www.imo.org/en/MediaCentre/HotTopics/polar/Pages/default.aspx)	appending IMO Conventions	January 1, 2017
5	<i>Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean</i> (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2018:453:FIN)	Ilulissat October 3, 2018	25 June, 2021

¹ Adapted from Berkman (2020).

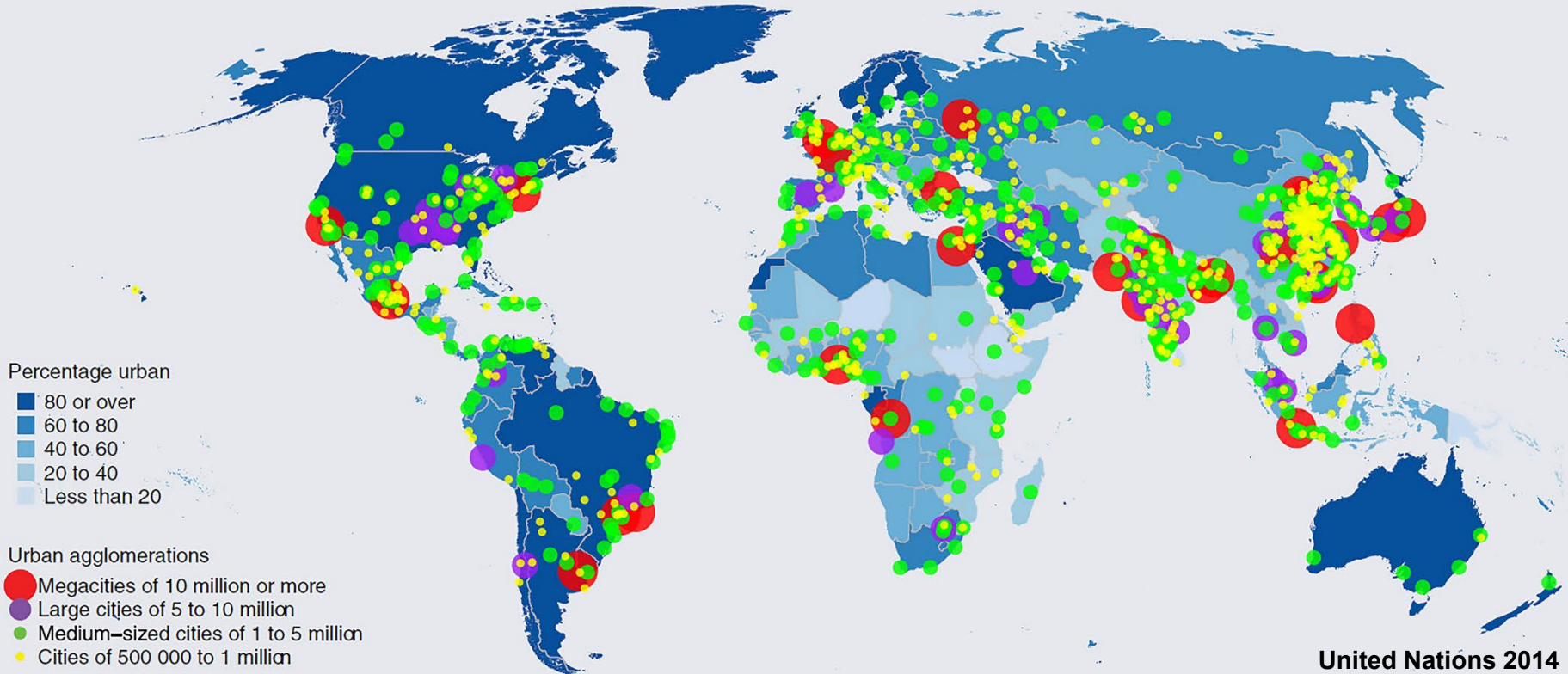


ARCTIC COUNCIL



OPERATING ON A PLANETARY SCALE

SUBNATIONAL ↔ **NATIONAL** ↔ **INTERNATIONAL**
JURISDICTIONAL SPECTRUM FOR GLOBAL SUSTAINABILITY



Awakening a Global Era of Science Diplomats With Lifelong Learning



**Reading, Writing and Arithmetic
with Informed Decisionmaking**

