



T-MOSAiC

Terrestrial Multidisciplinary distributed Observatories for the Study of Arctic Connections

<https://www.t-mosaic.com>



Diogo Folhas, João Canário and Warwick F. Vincent



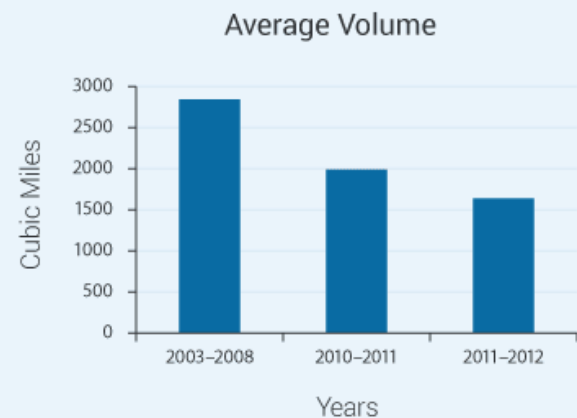
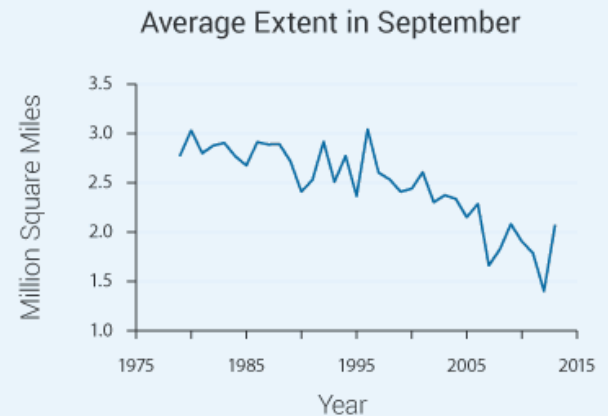
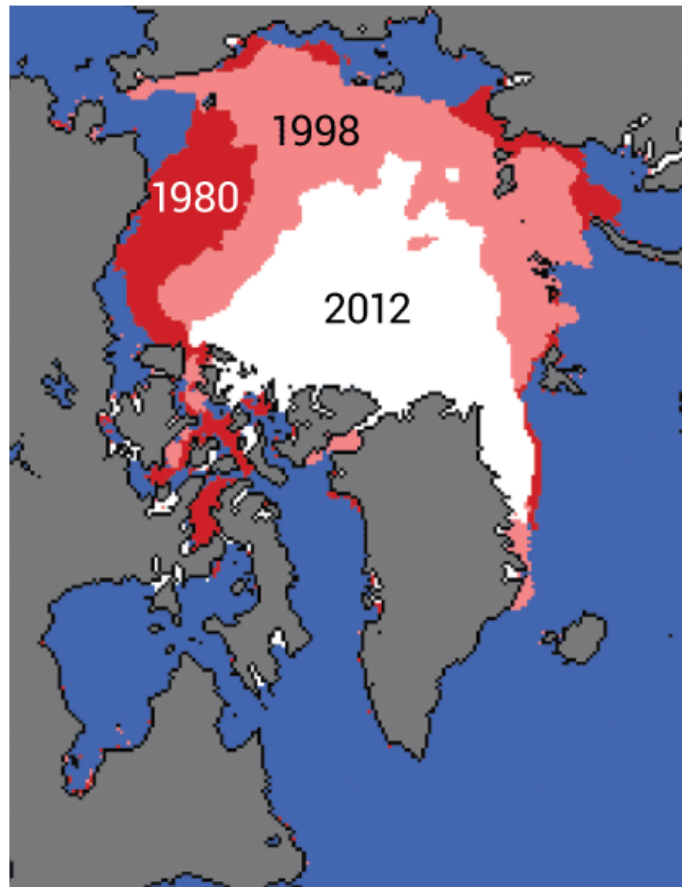
T-MOSAIc - Background

Terrestrial Multidisciplinary distributed Observatories
for the Study of Arctic Connections

Arctic Sea Ice Loss

**Sea Ice
Decrease:**

- Extent
- Volume
- Duration





T-MOSAiC - Background

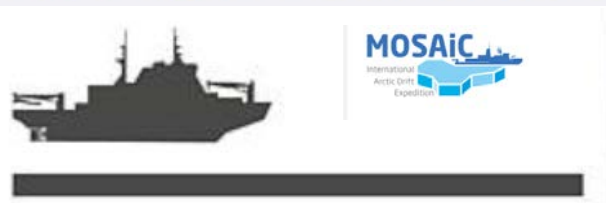
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An entire year trapped in the Arctic ice

The largest Central Arctic expedition ever

The following **17 nations** will participate in the expedition:



600 participants

During the expedition, RV Polarstern will be resupplied by **4 icebreakers**: Akademik Fedorov (RUS), Admiral Makarov (RUS), Oden (SWE), Xue Long (CHN).



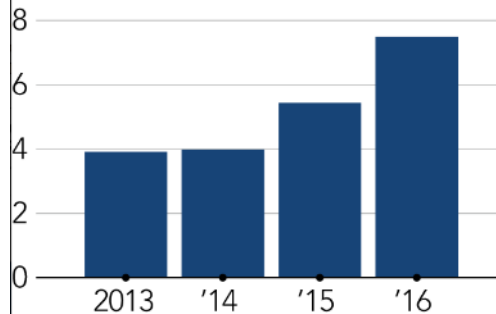
T-MOSAiC - Background

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Terrestrial consequences:

- geosystems
- ecosystems
- human systems

Total cargo volume using
Northern Sea Route reaches
record level (in millions of tons)





T-MOSAiC – Relationship to MOSAiC

MOSAiC: “What are the causes and consequences of an evolving and diminished Arctic sea ice cover?”

T-MOSAiC: “What are the implications of changing sea ice, oceanography and climate of Arctic seas for the surrounding land-based geosystems, ecosystems and human systems?”



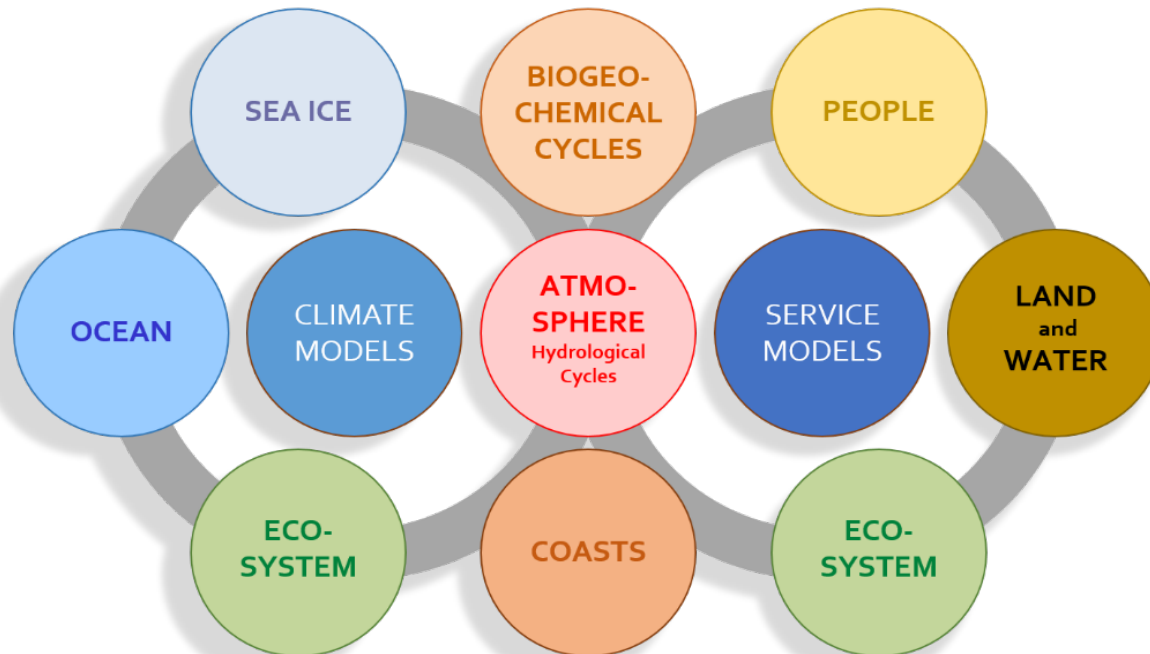
T-MOSAiC – Relationship to MOSAiC

MOSAiC

Multidisciplinary **drifting** Observatory
for the Study of **Arctic Climate**

T-MOSAiC







Terrestrial Multidisciplinary **distributed** Observatories for
the Study of Arctic Connections

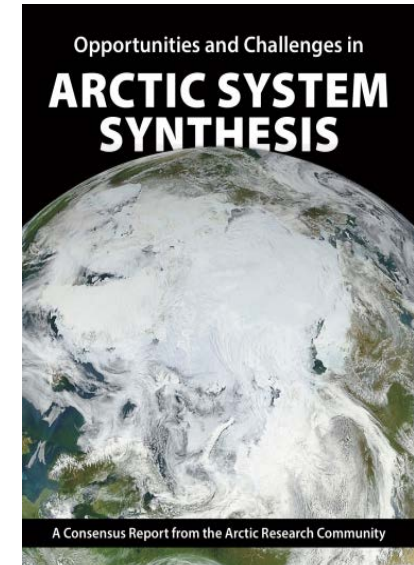
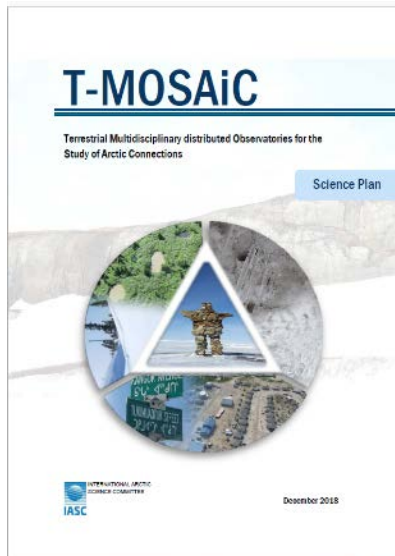




T-MOSAiC Science Plan

System-level themes

-  **Connectivity**
-  **Gradients**
-  **Discontinuities & Thresholds**
-  **Extreme events**
-  **Legacy effects**
-  **Emergent properties**



Vorosmarty, Rawlins, Hinzman et al. (2018). ARCUS

<https://www.t-mosaic.com/science-plan.html>



T-MOSAIc Science Plan

Example topics & questions

- Can land-based stations be used to improve radiation models and remote sensing products for Arctic seas and the surrounding lands?
- How does the connectivity between sea, atmosphere & land affect terrestrial components such as water, permafrost, ice, contaminants and biota (including microbiota)?
- What are the coastal and inland gradients in these components of the Arctic system; how do those gradients differ among Arctic sectors?



T-MOSAIc - Implementation

Implementation (2019-**2020**-2021)



Indigenous priorities & participation



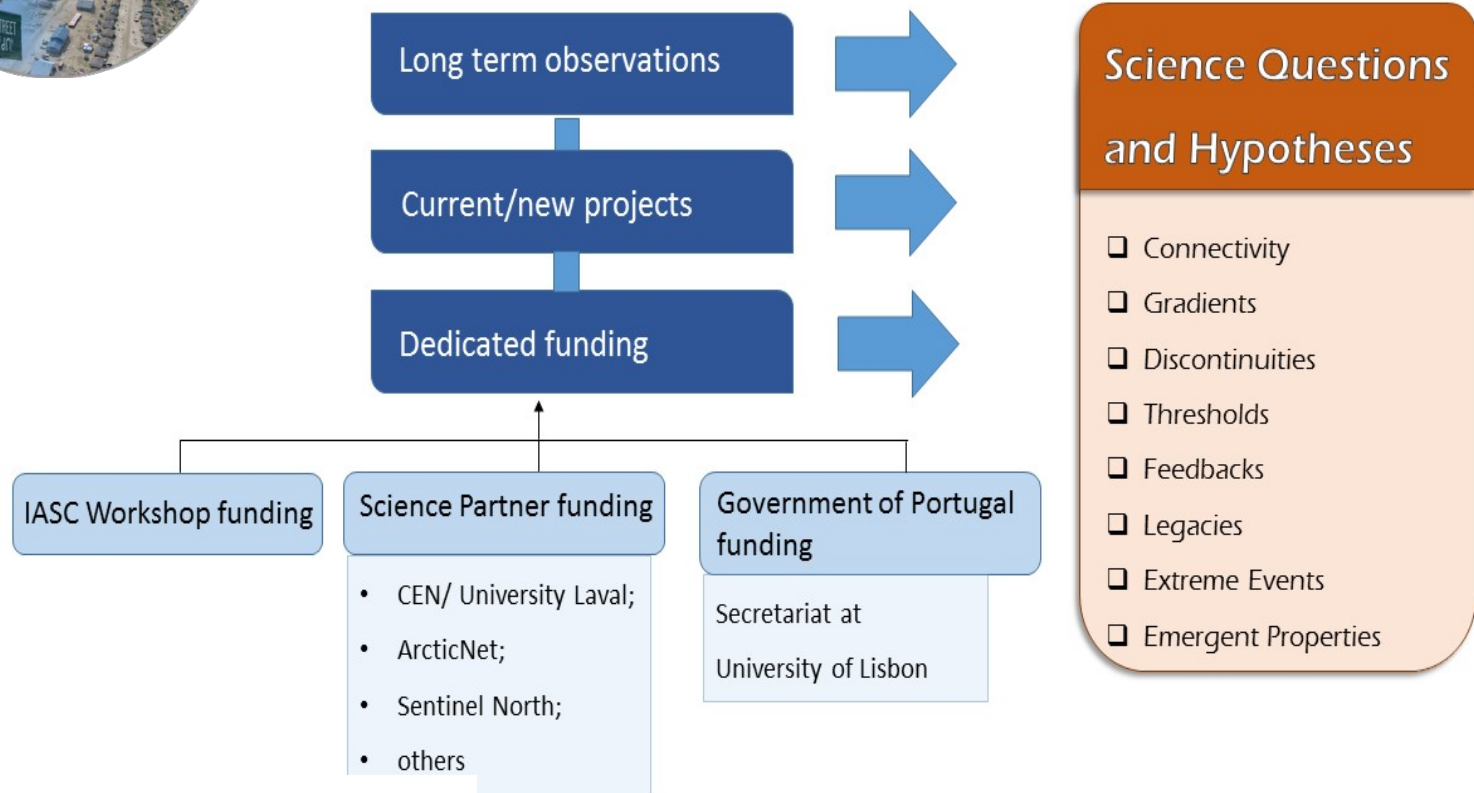
Data archiving and sharing strategies

CCADI





T-MOSAIc - Implementation



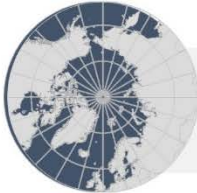


T-MOSAiC – Action Groups



Arctic Gas Fluxes

Chair: Torben Christensen (DNK)

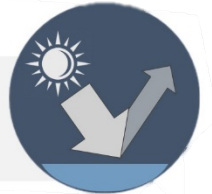


Arctic Transects

Chair: Sergey Kirpotin (RUS)

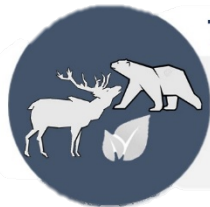
Arctic Radiation Balance

Chair: Taneil Uttal (USA)



Coastal Processes

Chair: Hugues Lantuit (GER)

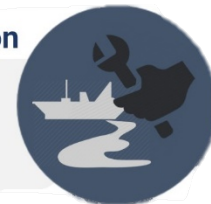


Terrestrial Ecosystems and Biodiversity

Chair: Phil Wookey (GBR)

Pollution, Mitigation and Remediation

Chair:





T-MOSAiC – Action Groups



Freshwater Processes

Chair:



Remote Sensing

Chair: Gonçalo Vieira (PRT)



Northern Communities' Issues

Chair: Maribeth Murray (CAN)

Microbiome Diversity and Function

Chair: Anne Jungblut (GBR)



Paleoclimatology/ Paleoecology

Chair: John Smol (CAN)



Northern Infrastructures

Chair: Skip Walker (USA)





T-MOSAiC – Action Groups



Data Systems and Modelling





Chair: Peter Pulsifer (CAN)

Permafrost Thaw

Chair: Julia Boike (GER)



Total of 14 Action Groups across a wide range of disciplines

-  Curated data sets
-  Review / synthesis articles
-  Model development
-  Measurements and analysis



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Thank you !!