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The Arctic Biodiversity Congress 2018

Geomorphology matrix as a base of Arctic coastal zone monitoring in Global change dynamic

Dmitriy Dobrynin Mariya Dobrynina

Rovaniemi

October 9-12, 2018



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The main problems of Arctic coastal ecosystems dynamic

- high diversity of bioclimatic zones
- high diversity of climatic continental sectors
- High diversity of fresh/sea water gradient
- High diversity of sea ice period
- High diversity of human impact



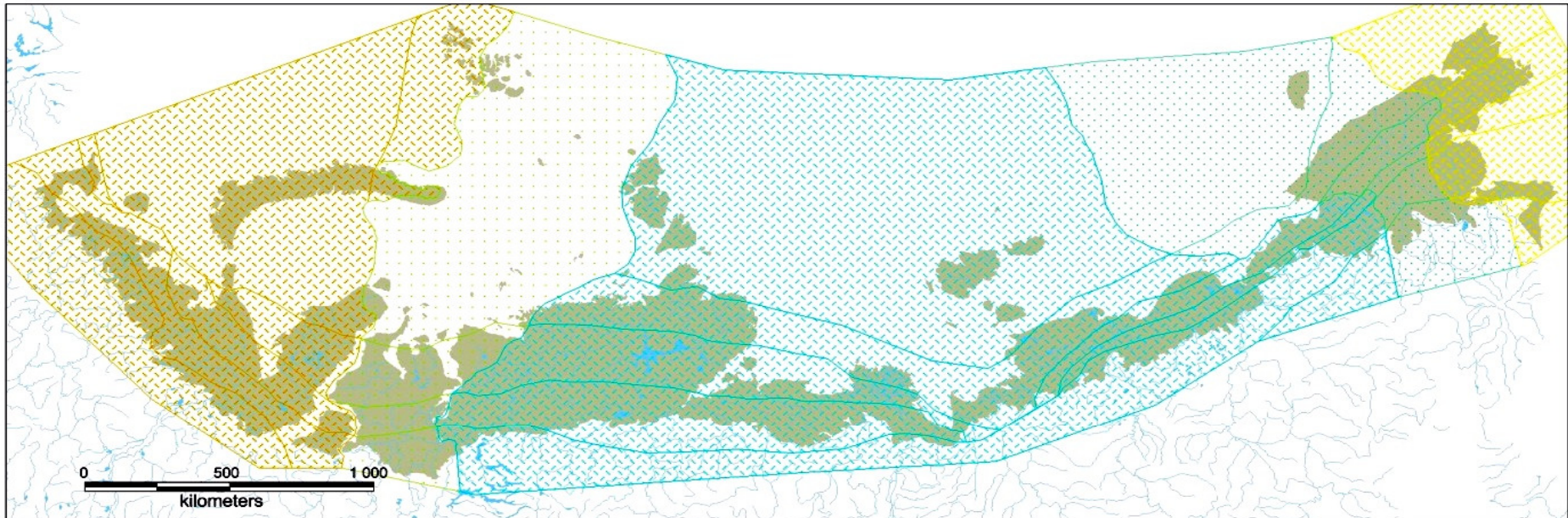
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The complex of bioclimatic borders in the Arctic shore zone



-  Continental
-  Medium
-  Sub ocean



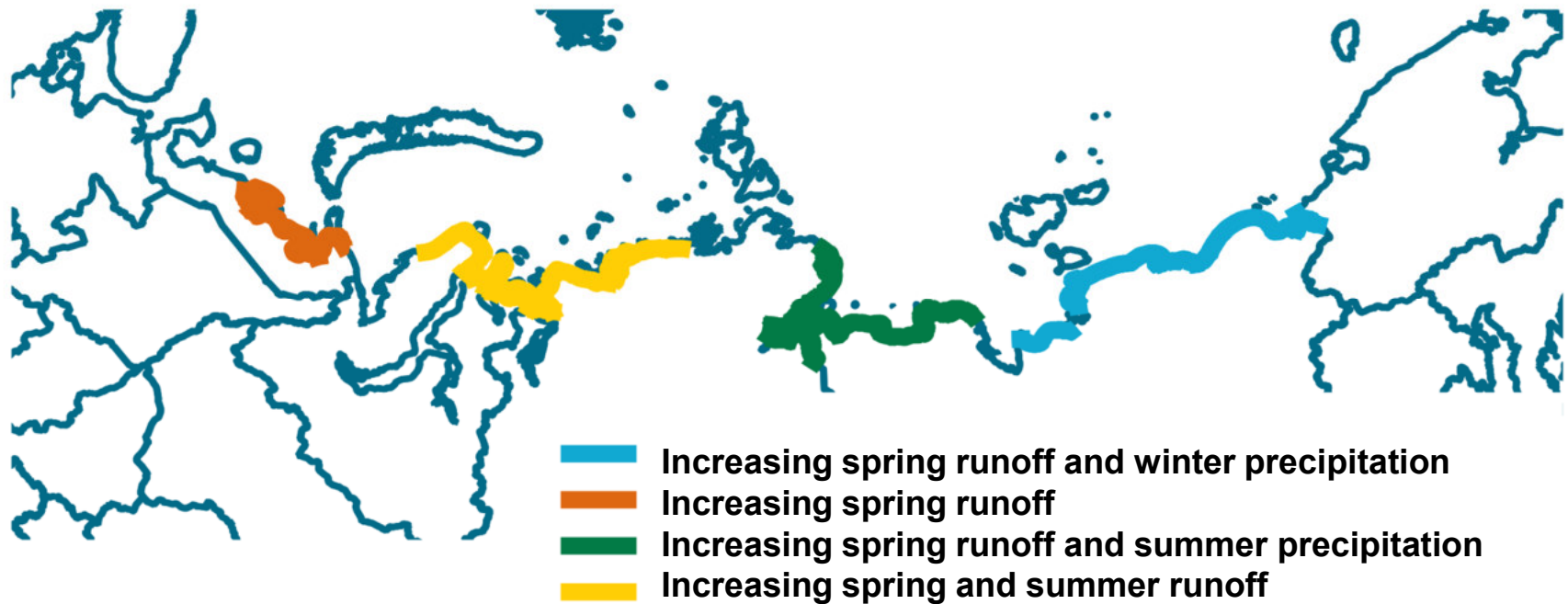
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Freshwater runoff dynamics sectors in Arctic shore zone





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Shore zone dynamic factors

Climate and Hydrology

- increase the period of positive temperatures
- increase of iceless period
- increase freshwater runoff
- power and direction of the prevailing winds
dynamic
- change in temperature and direction of the
prevailing sea currents



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Shore zone dynamic factors Geomorphology

- shoreline shape and orientation
- geological structure of the coastal zone
- permafrost regime of the coastal zone
- the presence of relict and modern exogenous processes
- tectonic activity of coastal zone bedrocks



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Field investigations are very local...





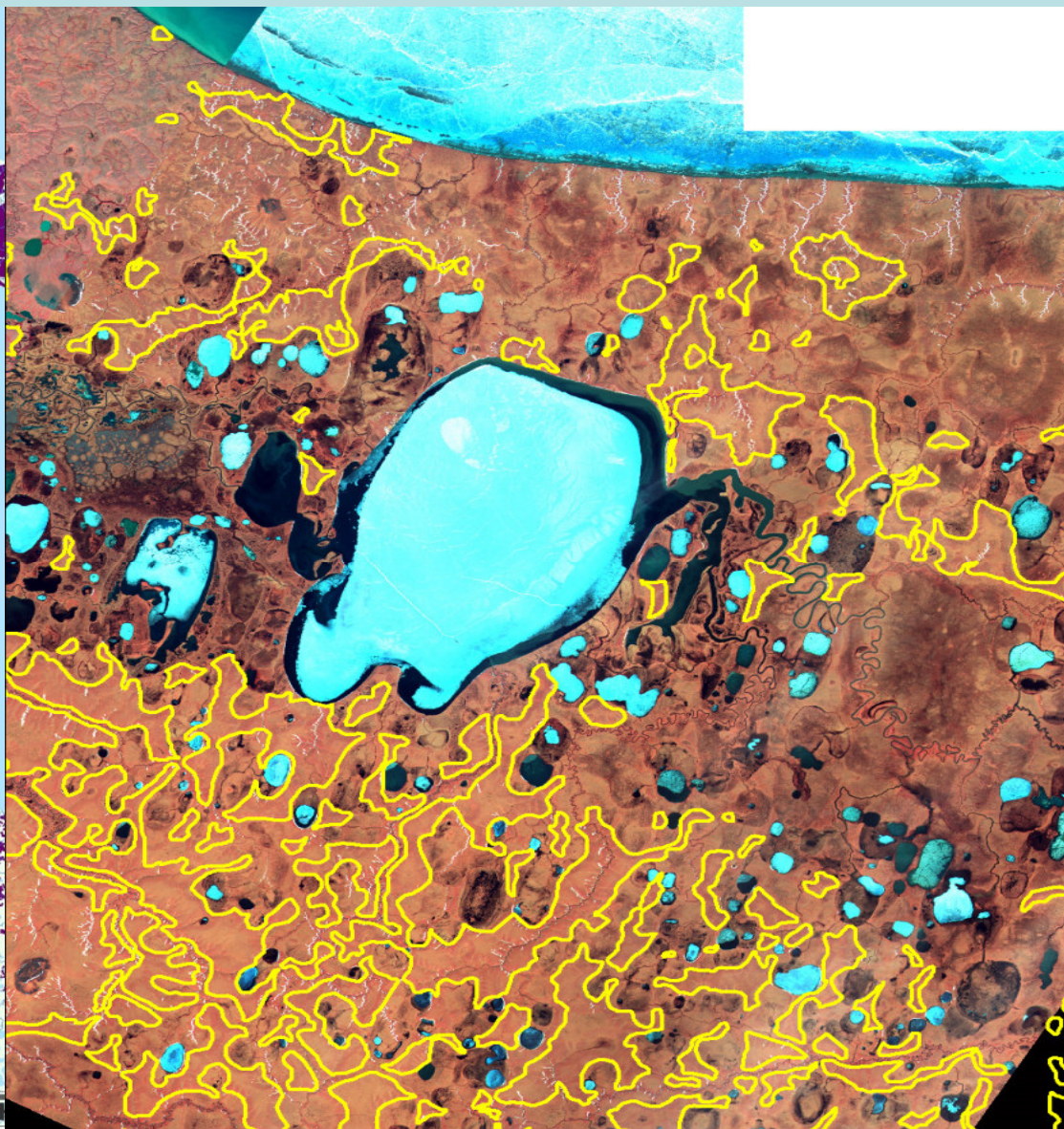
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... and for accurate predictions we
need more widespread information





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Satellite images series are the way to widespread information about Arctic seas shore zone!!!

Barents Sea



Kara Sea



Laptev Sea





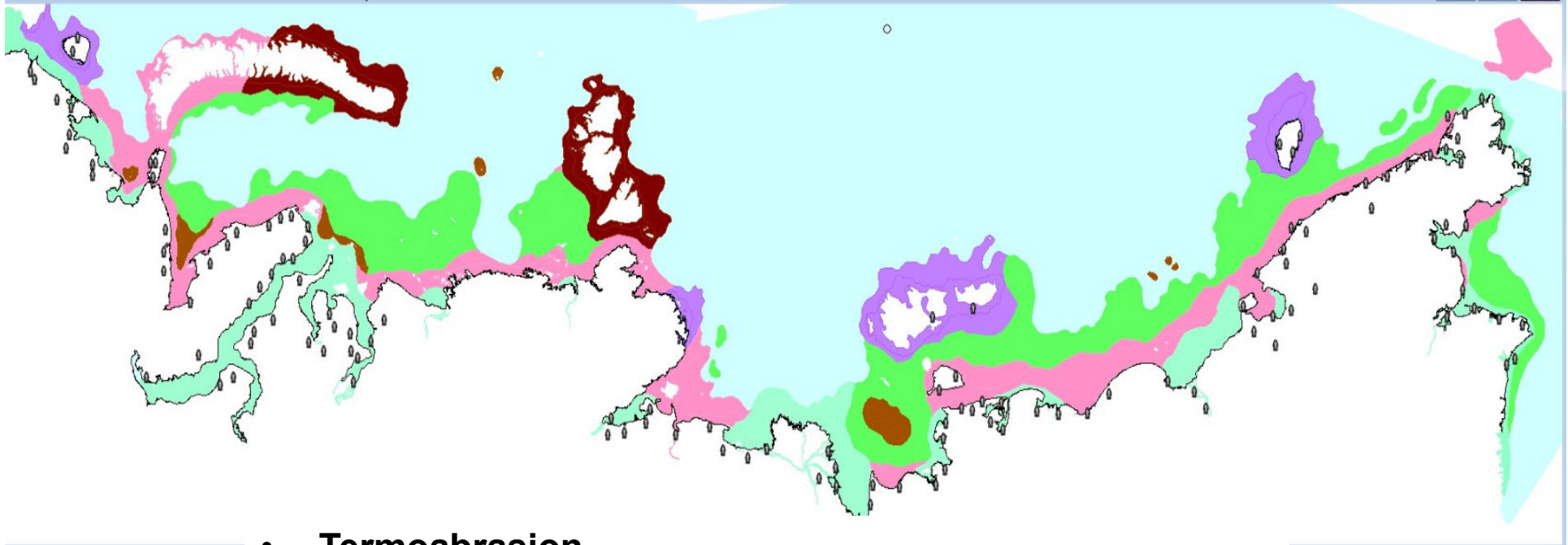
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The overview map of Arctic coast types, build on the remote sensing data



- **Termoabrasion**
- **Termoabrasion and freshwater runoff**
- **Abrasion**
- **Abrasion and freshwater runoff**
- **Bottom erosion**
- **Bottom accumulative sedimentation**
- **Glacial processes and iceberg bottom erosion**



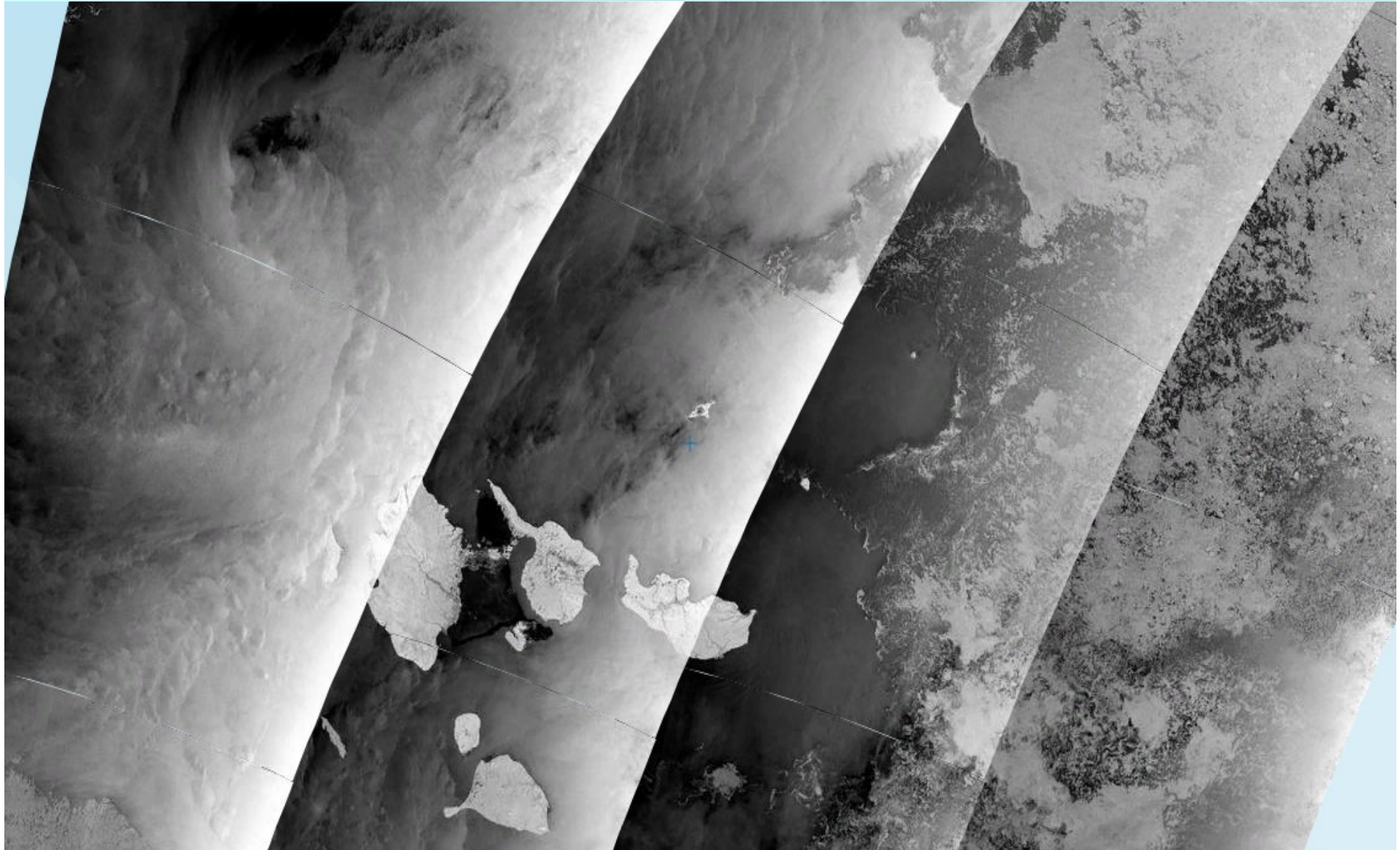
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Warm freshwater flow detection on SAR Sentinel 1A images





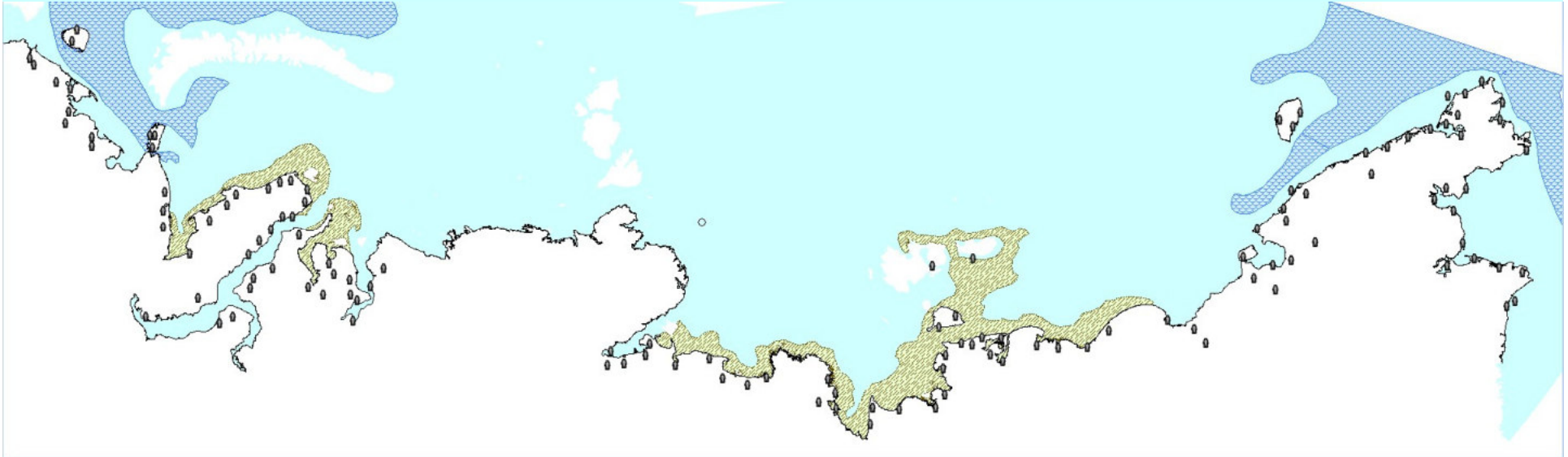
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Freshwater and worm water floods map build on the base of satellite images





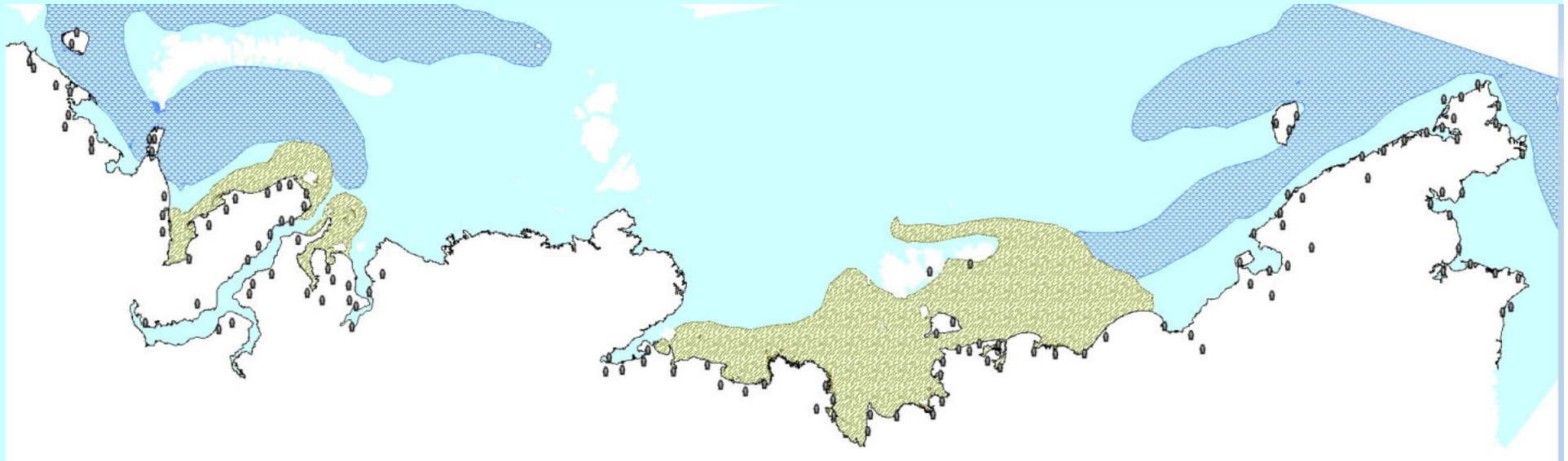
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Freshwater and worm water floods map prognoses till 2035





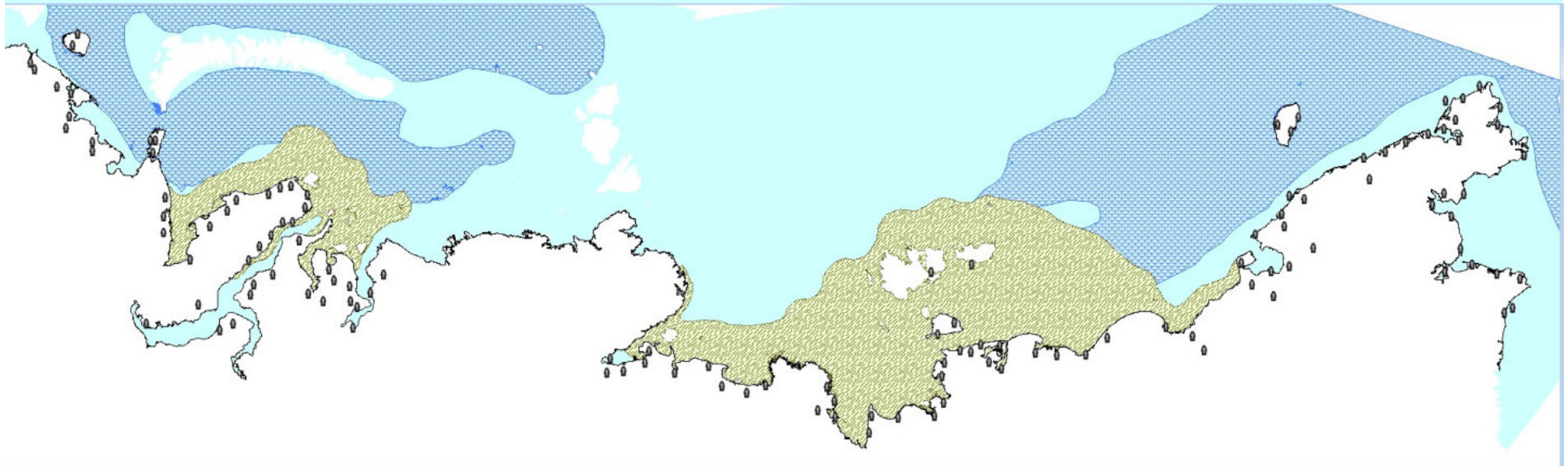
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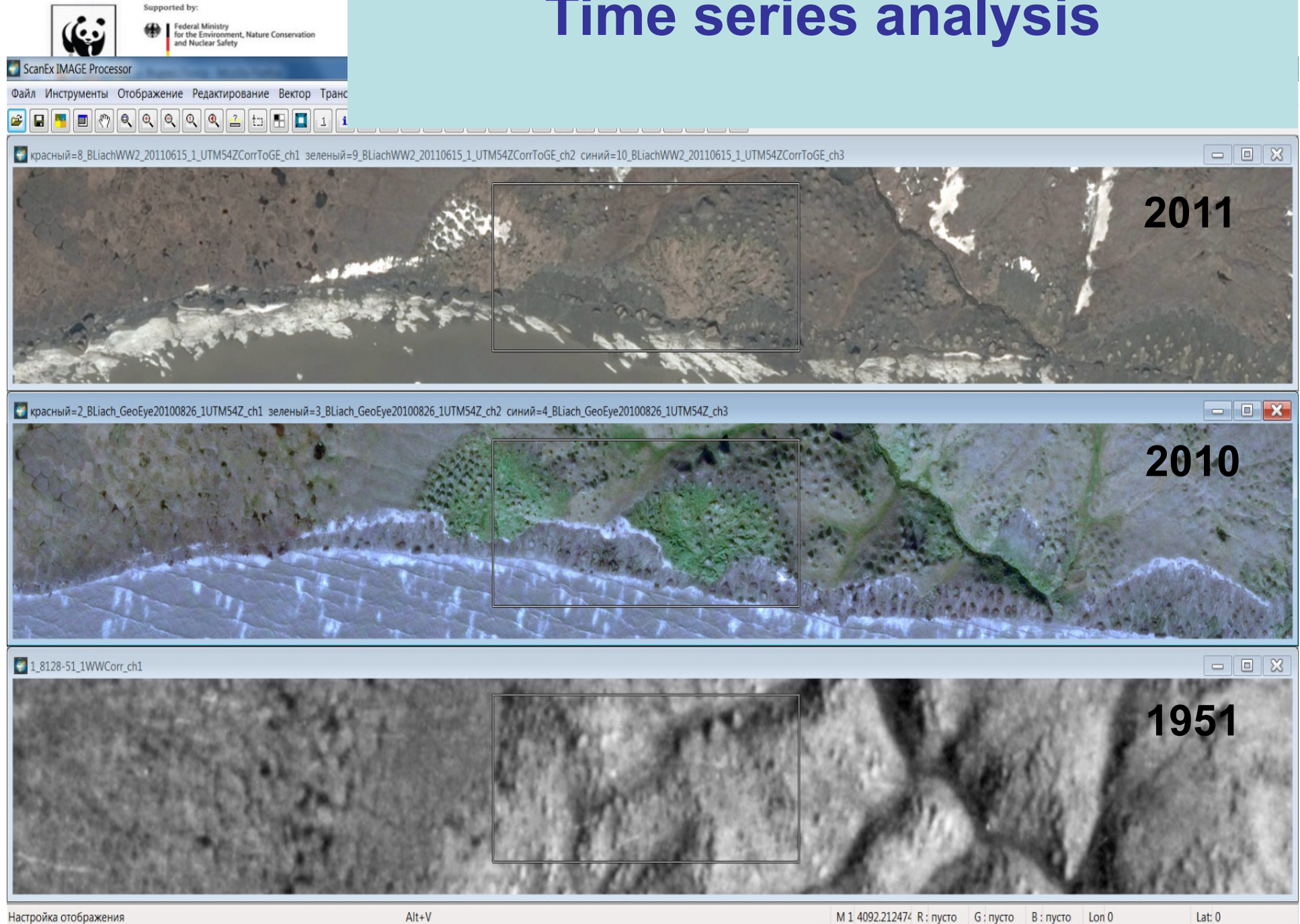
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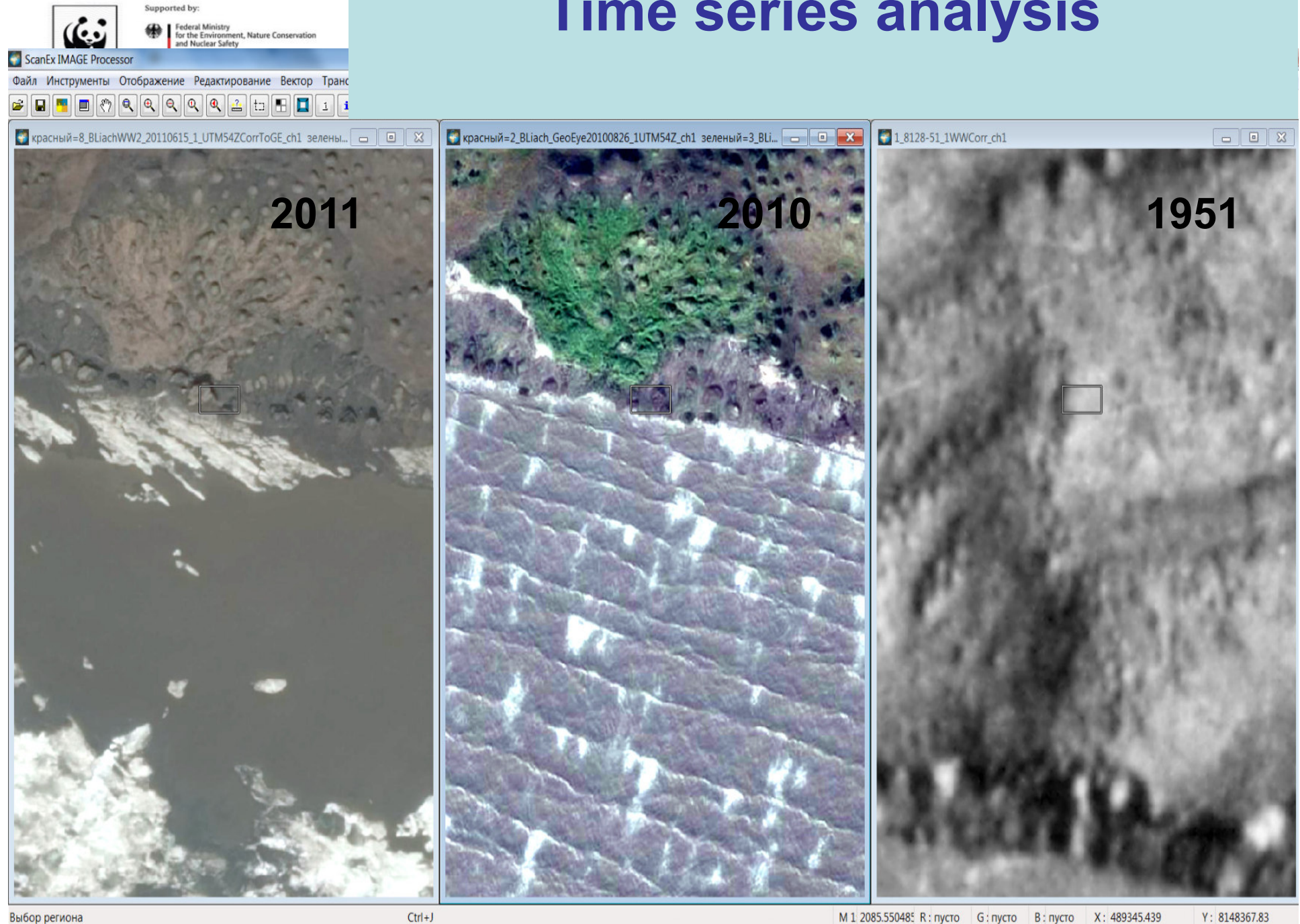
Freshwater and worm water floods map prognoses till 2055



Time series analysis



Time series analysis





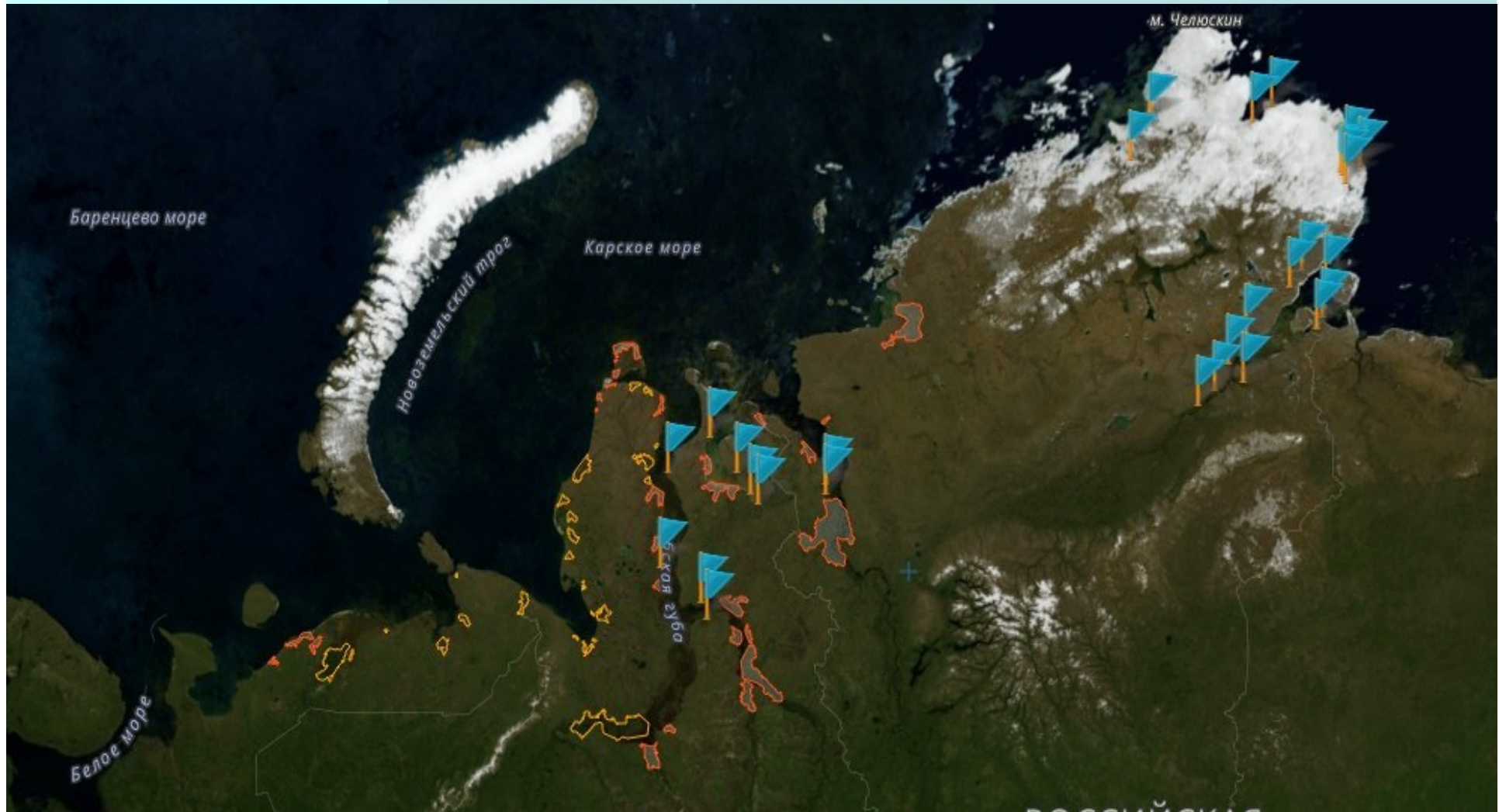
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The result of satellite images interpretation





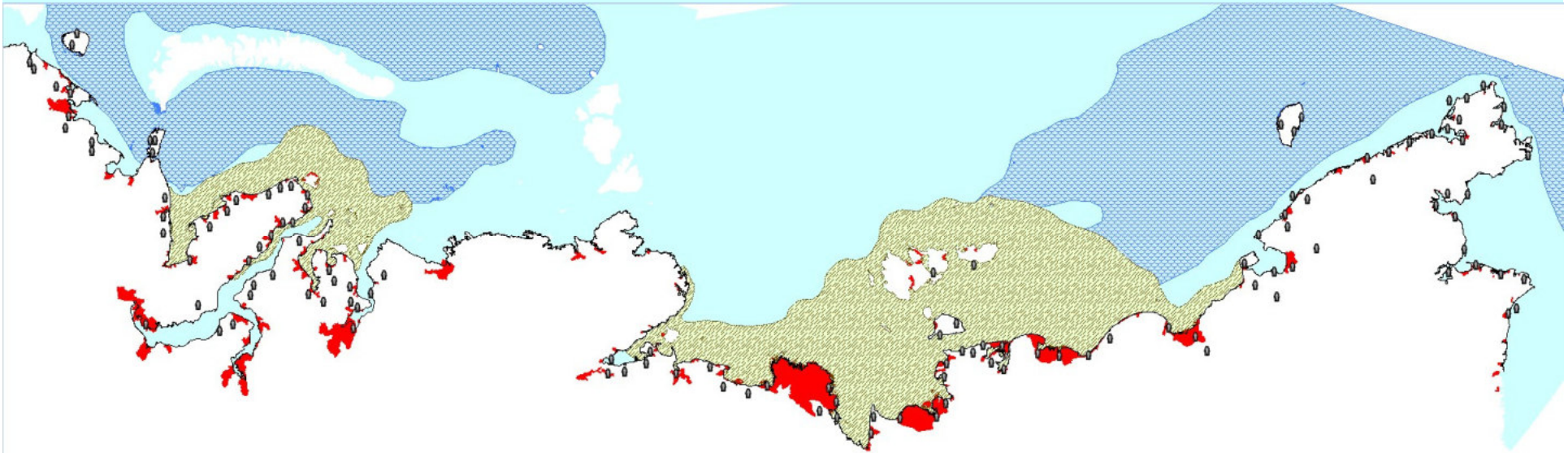
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Sections of the coast with the risks of ecosystems dynamics because of flooding





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Sections of the coast with the risks of hydrogen sulfide pollution





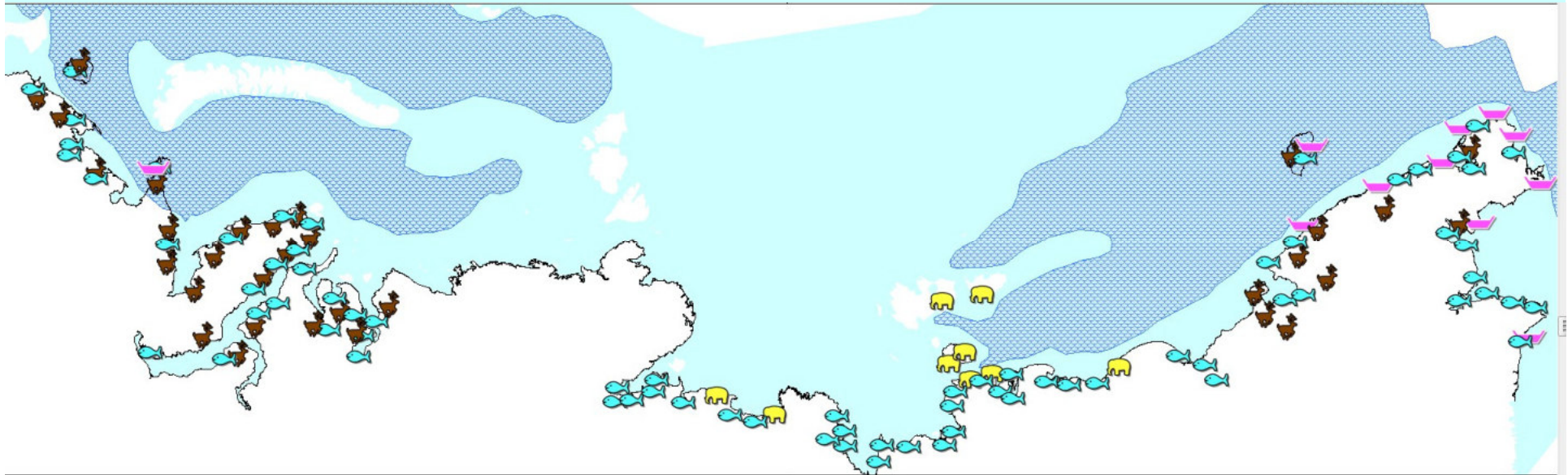
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For whom we do it?





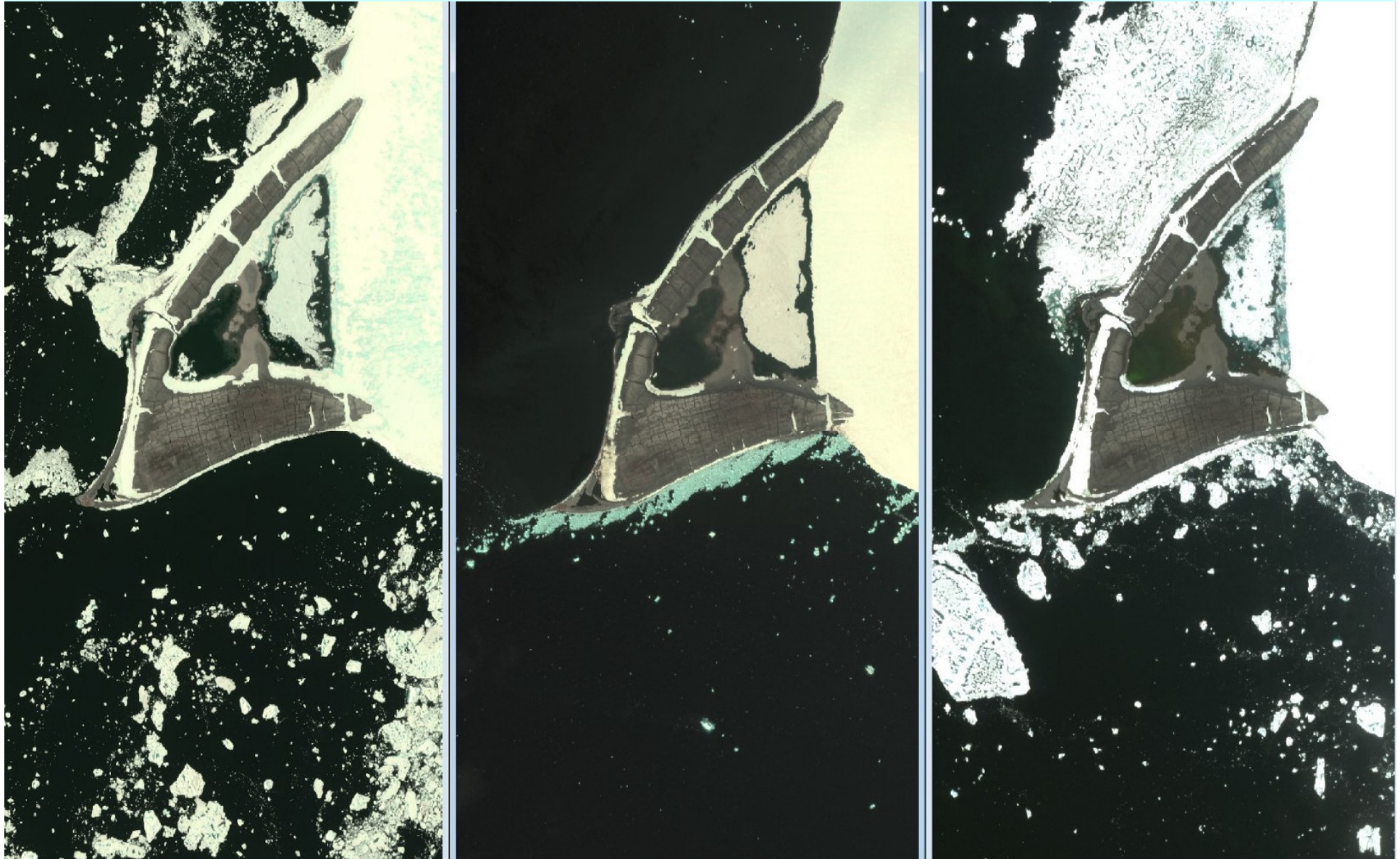
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For whom we do it?





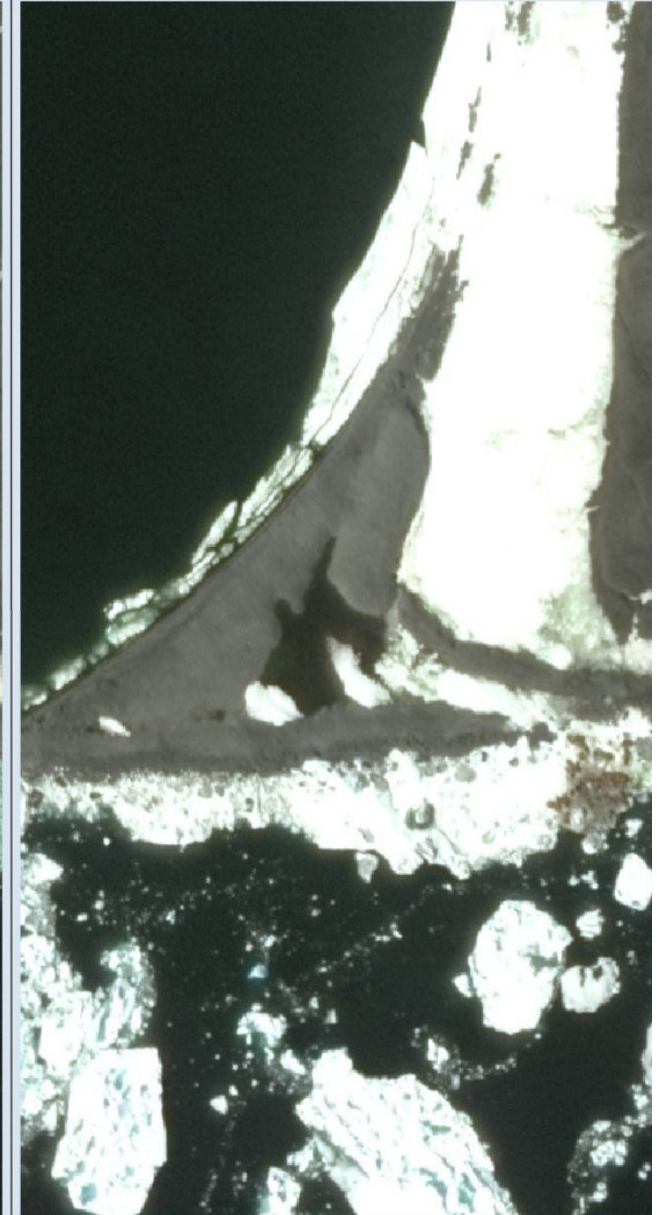
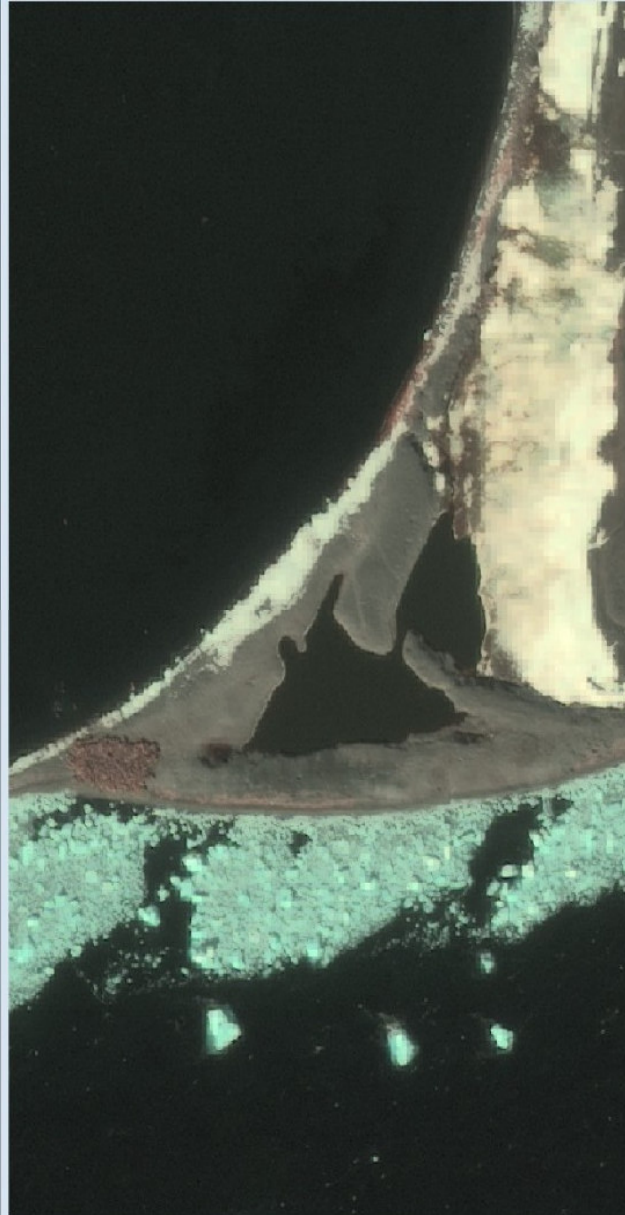
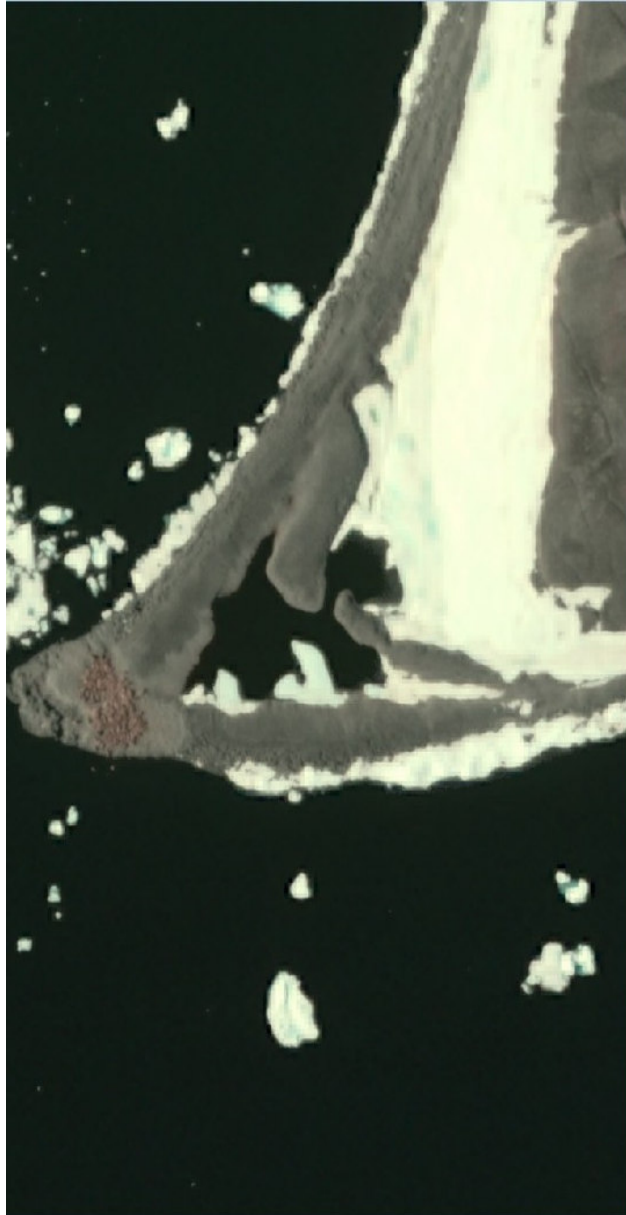
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**Thank you for
attention**