Greenland Integrated Observing System

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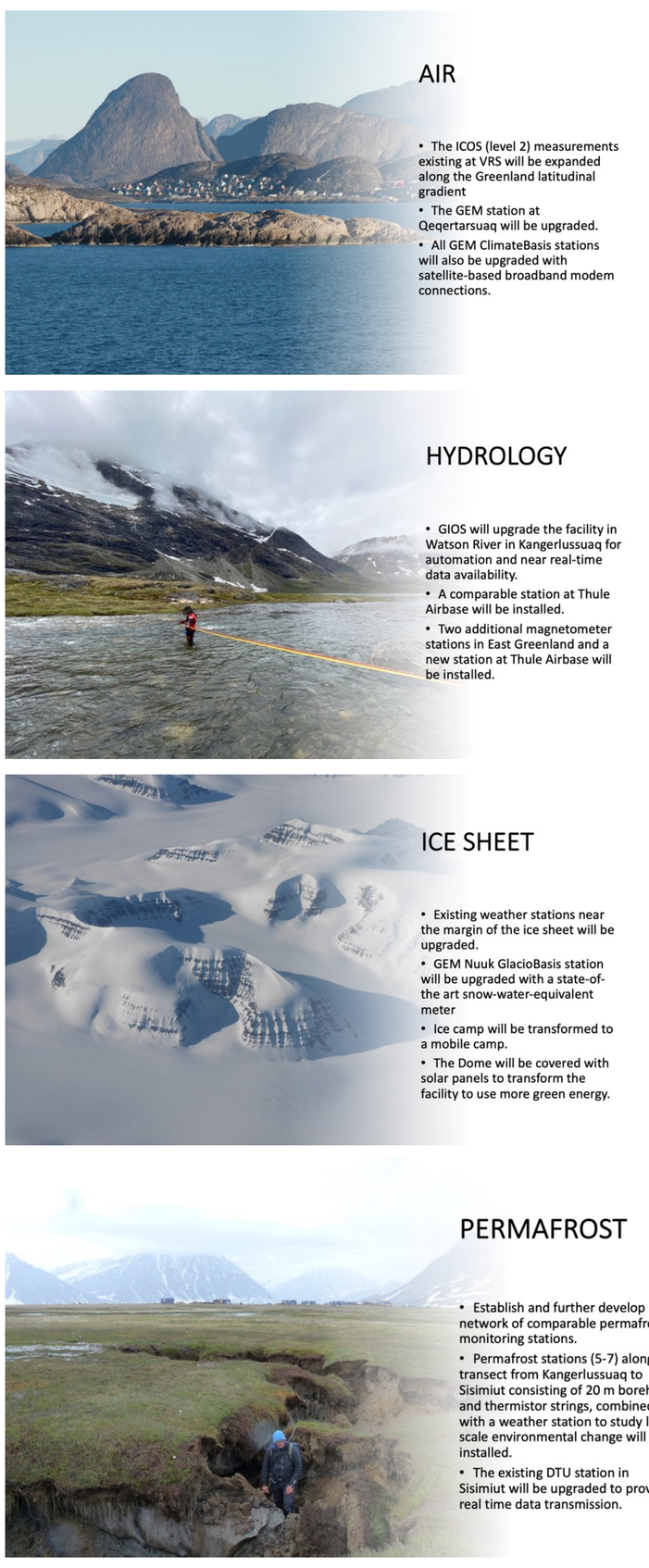
Introduction to infrastructure:

Greenland plays a unique and central role in the global climate system. The purpose of the Greenland Integrated Observing System (GIOS) is to resolve and understand the mechanisms behind climate and environmental change in Greenland and beyond by establishing a long-term observation network of central climate, ecosystem and societal variables at a number of key sites around Greenland representing not only the entire Greenland but also a climate gradient representing the Arctic as a whole. GIOS is an important national research infrastructure linking all institutions and universities currently carrying out Arctic research in the Danish Realm.



AIR

- The ICOS (level 2) measurements existing at VRS will be expanded along the Greenland latitudinal gradient
- The GEM station at Qeqertarsuaq will be upgraded.
- All GEM ClimateBasis stations will also be upgraded with satellite-based broadband modem connections.

SPACE WEATHER

- GIOS will upgrade and expand the network of observatories to increase the data measurement frequency and coverage.
- A new observatory in Thule Air Base will enable us to continue the index derivation and together with the two new magnetometer installations, provide a unique dataset that enables development of space weather applications and improvement of our knowledge of space weather impacts in Greenland

HYDROLOGY

- GIOS will upgrade the facility in Watson River in Kangerlussuaq for automation and near real-time data availability.
- A comparable station at Thule Airbase will be installed.
- Two additional magnetometer stations in East Greenland and a new station at Thule Airbase will be installed.

LAND

- Deploy autonomous operating measurement units in comparable vegetation types to make continuous measurements of key climate and biogeochemical parameters from North to South Greenland.
- Reducing carbon emission by updating research stations to use sun and wind energy

ICE SHEET

- Existing weather stations near the margin of the ice sheet will be upgraded.
- GEM Nuuk GlacioBasis station will be upgraded with a state-of-the art snow-water-equivalent meter
- Ice camp will be transformed to a mobile camp.
- The Dome will be covered with solar panels to transform the facility to use more green energy.

SEA ICE AND SNOW

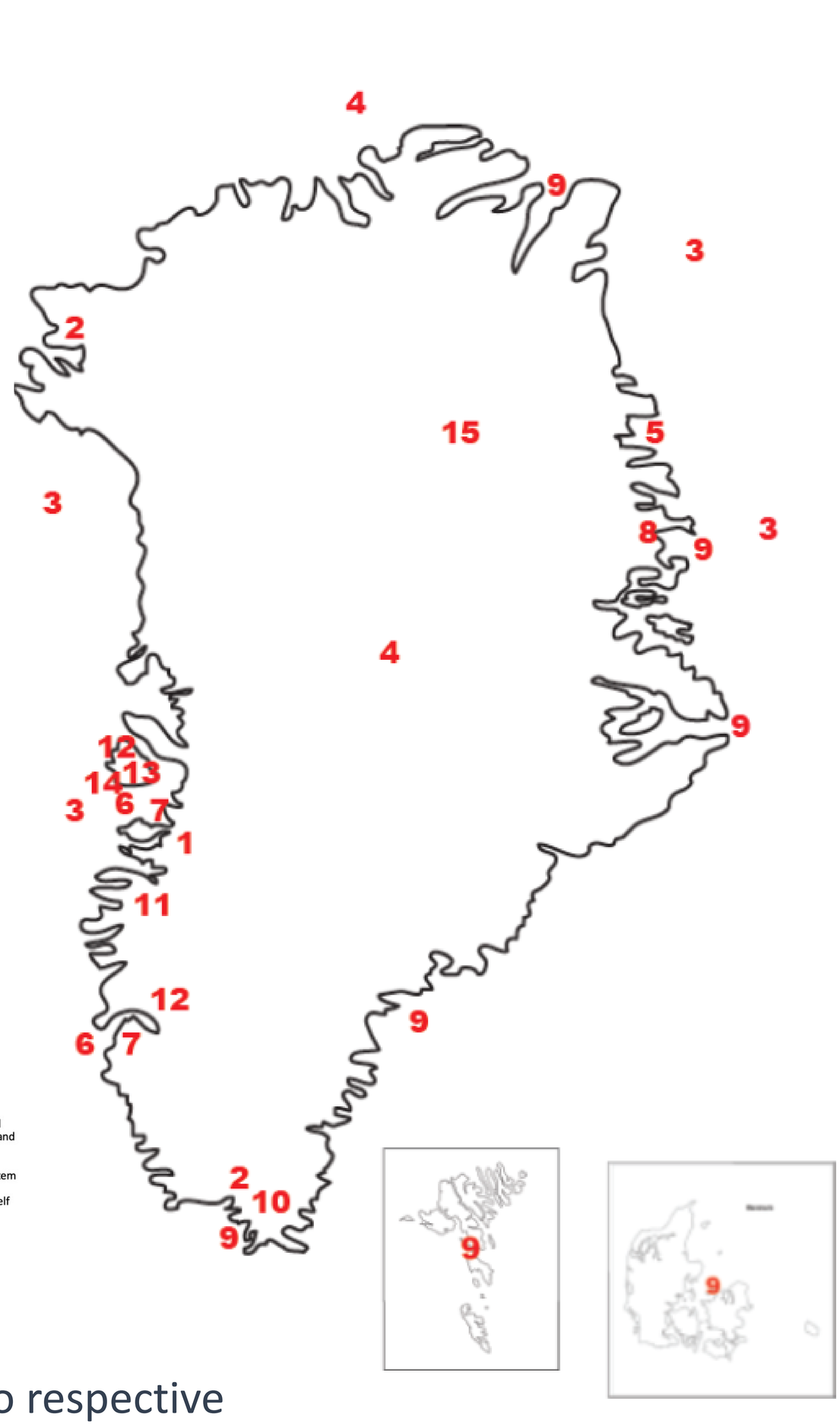
- GIOS we will extend snow and sea ice thickness measurements to the localities of our mobile measuring units to cover a larger part of Greenland.
- GIOS will install snow radar on a twin-otter instrument package deployed for ice sheet mapping as part of an international cryosphere monitoring program.

PERMAFROST

- Establish and further develop a network of comparable permafrost monitoring stations.
- Permafrost stations (5-7) along a transect from Kangerlussuaq to Sisimiut consisting of 20 m boreholes and thermistor strings, combined with a weather station to study local scale environmental change will be installed.
- The existing DTU station in Sisimiut will be upgraded to provide real time data transmission.

MARINE

- Installing tide gauge (sea level) stations in Northeast Greenland.
- Installing autonomous mobile units to improve the geographical and temporal coverage in Greenland coastal and shelf waters.
- A profiling on-line mooring system for autonomous oceanographic measurements in Greenlandic shelf sea and fjord waters will be developed.



DATA from GIOS are FAIR

Data access is being facilitated by a continuous feed into respective relevant international repositories. https://gios.org/

The **ISAAFFIK arctic gateway portal (www.isaaffik.org**) will provide an updated summary of the data available and links to these repositories

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