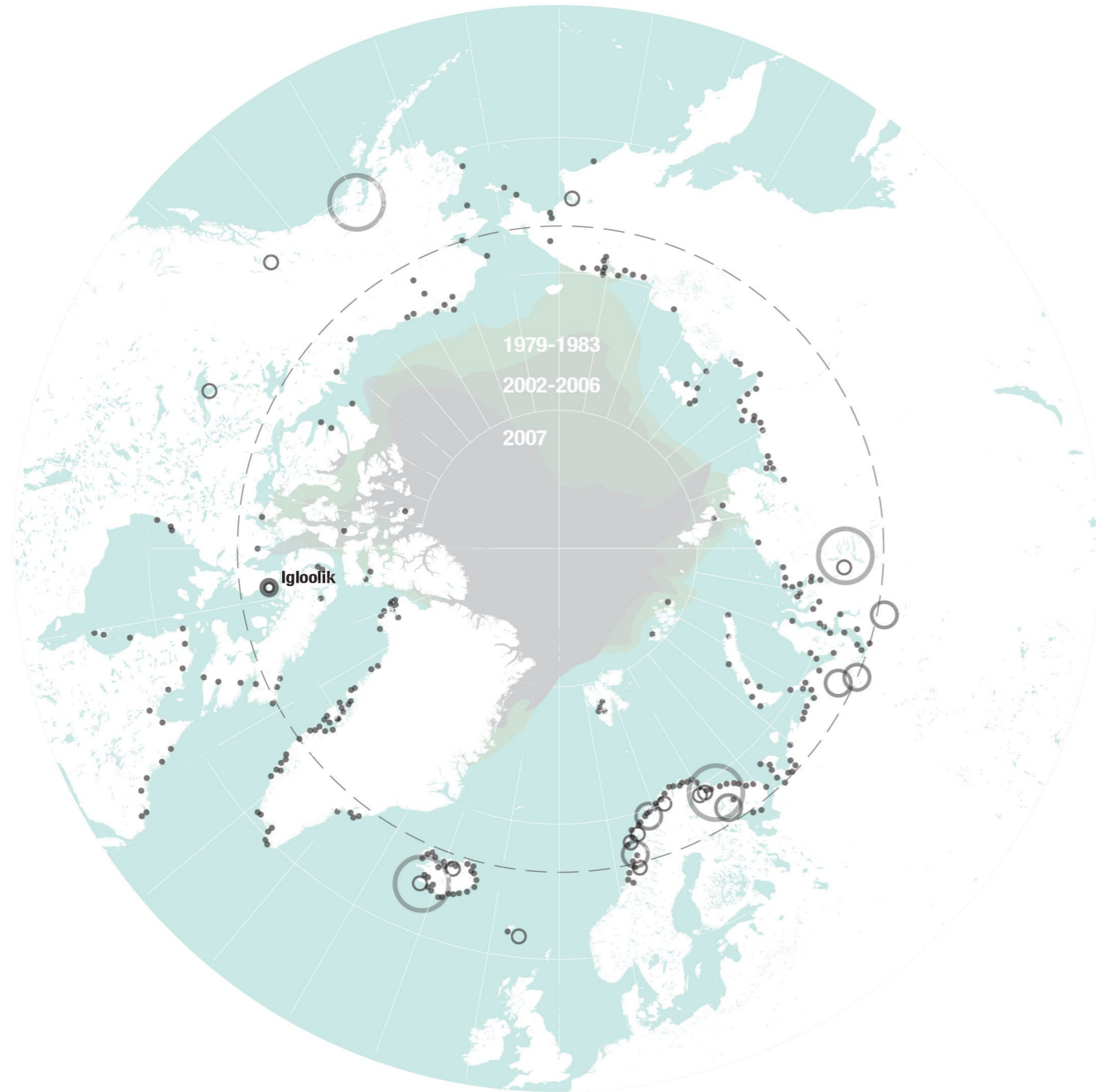


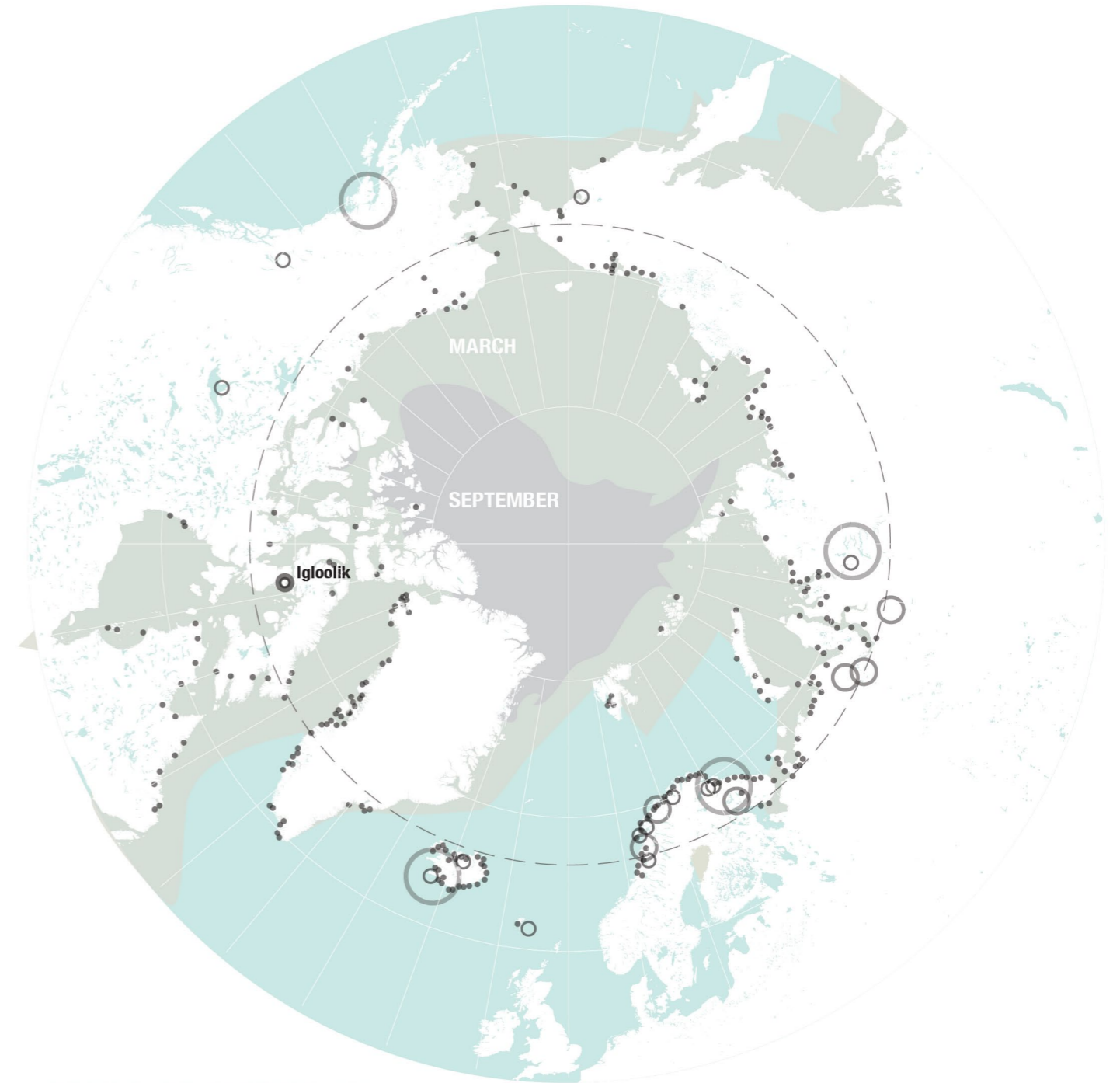
ARCTIC POPULATION 2006

Nordregio, National Statistics Institutions
<http://www.nordregio.se/Maps/08-Urban-and-regional-divisions/Cities-and-Regions-in-the-Arctic-2006/>



MINIMUM SEA ICE EXTENT

Data from AMSR-E and SMMR
<http://www.iup.uni-bremen.de/seaiace/amr/SealceMinimum2007-contour50.png>



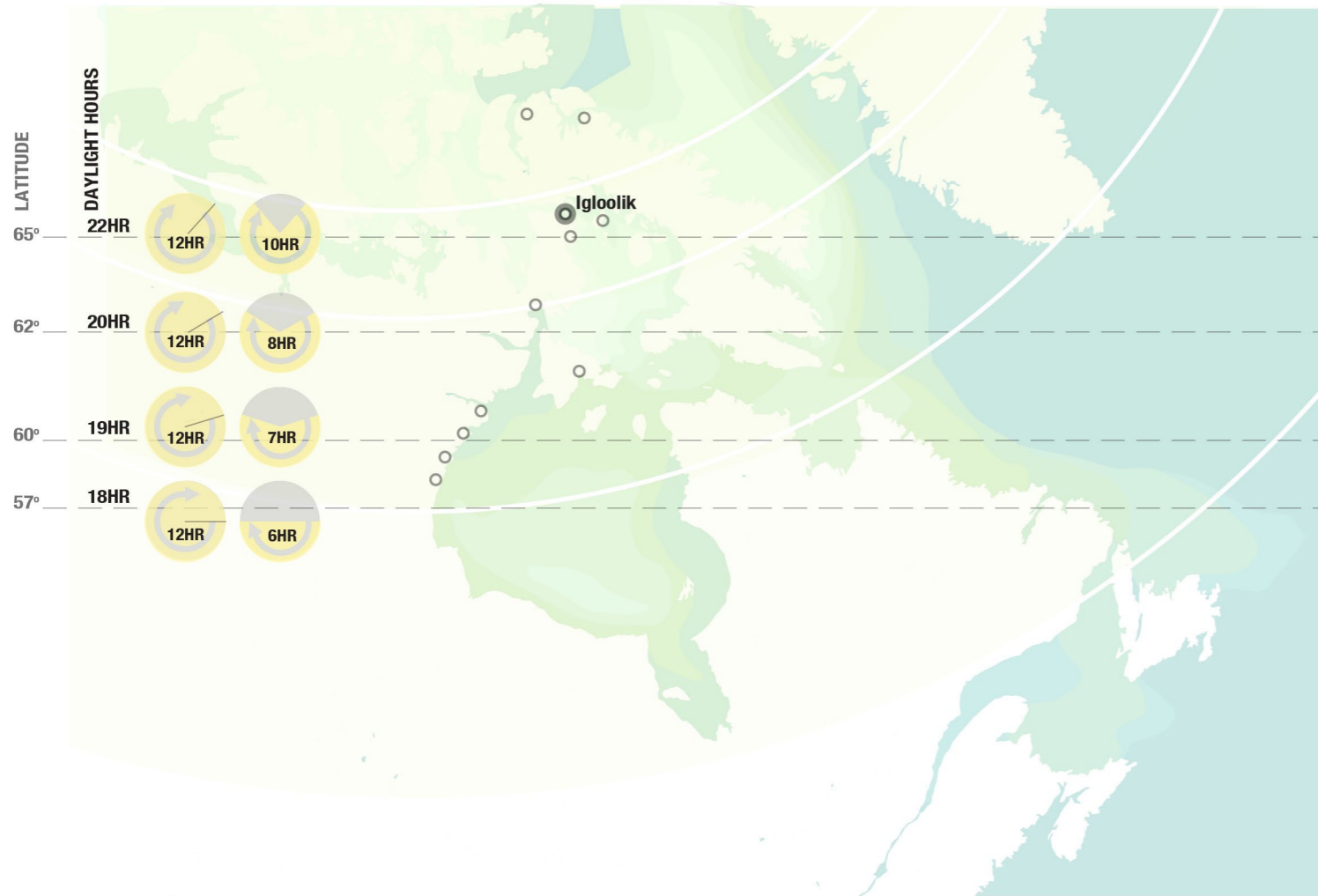
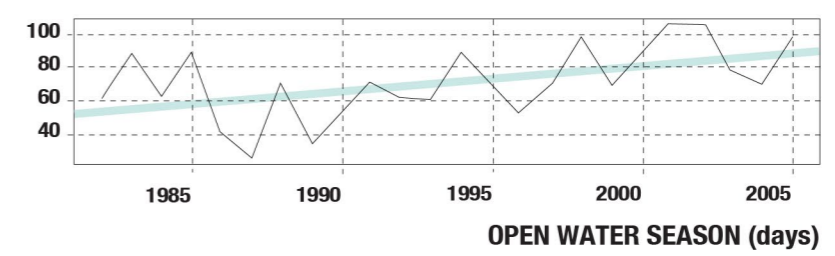
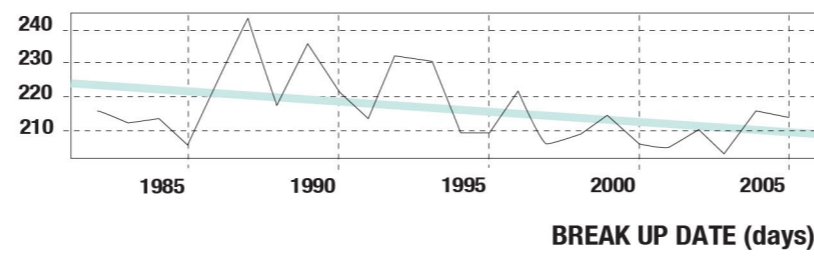
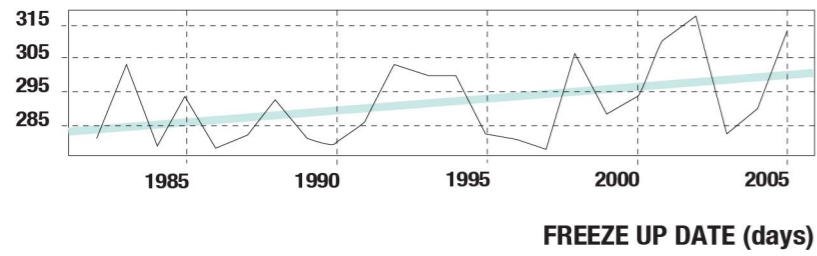
SEASONAL SEA ICE EXTENT 2016

Data from NASA Earth Observatory
http://earthobservatory.nasa.gov/Features/WorldOfChange/sea_ice.php

The extent of sea ice has changed drastically in the last few decades and its impact on sea level in the Arctic is still to be understood. **Buoyant Light** envisions a network across Arctic settlements that will serve local communities while also collecting data for global research on key environmental issues.

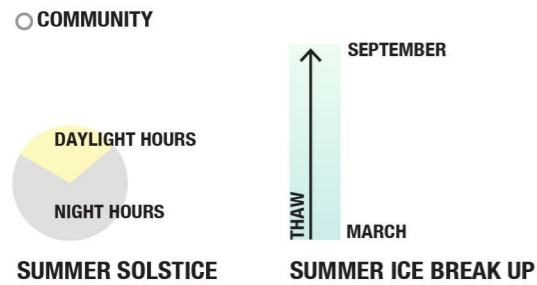
RECENT CHANGES IN IGLOOLIK'S FREEZE/THAW CYCLE

Natural Resources Canada, "National Permafrost Databases"
http://gsc.nrcan.gc.ca/permafrost/database_e.php#1a.



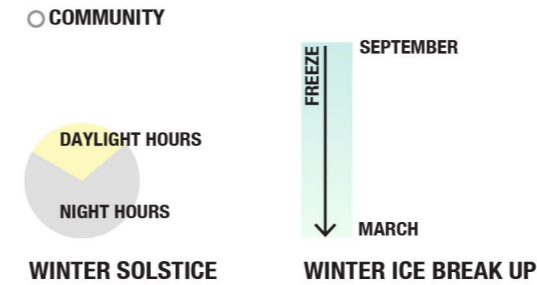
SUMMER ICE EXTENTS AND DAYLIGHT

Natural Resources Canada, "Sea Ice",
<http://atlas.nrcan.gc.ca/site/english/maps/environment/seaice/break-up>.



SUMMER ICE EXTENTS AND DAYLIGHT

Natural Resources Canada, "Sea Ice",
<http://atlas.nrcan.gc.ca/site/english/maps/environment/seaice/freeze-up>.



Seasonal cycles of freeze-thaw ice and sea level are increasingly less predictable in the Arctic. **Buoyant Light** frames light as a constant within the rapidly changing Arctic climate, where the solar path acts as a datum to track changes in other seasonal cycles.

COMMUNITY HALL
 ARENA
 HEALTH CARE CENTRE
 SCHOOL
 RESEARCH STATION
 CO-OP STORE
 NORTHERN STORE
 OLD STONE CHURCH
 ISUMA FILM PRODUCTION

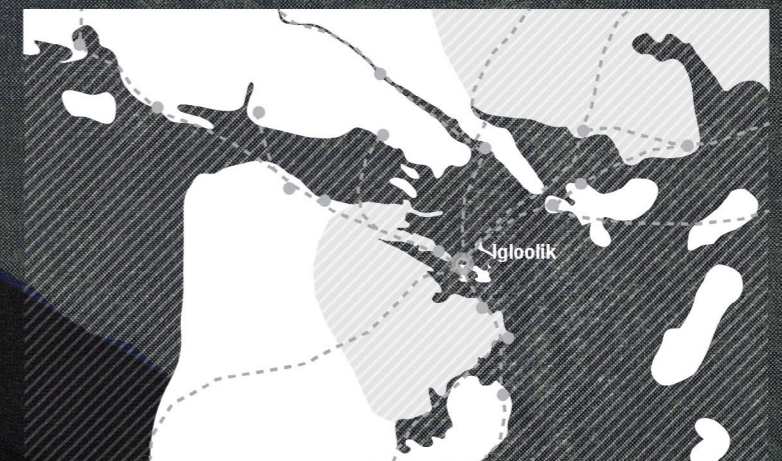
1 Larger balloons close to the shore, provide the community with immediate visual access to information. Lowered in the winter to protect them from higher winds the balloons cast light onto the ice, delineating a space for meetings and celebrations.

2 Balloons further out in the open waters, act as way-finding devices for hunters and travelers.

3 Smaller balloons on land are used to delineate gathering spaces around key buildings in the town. A few clusters measure the change in permafrost (frozen soil) detrimental to the structural stability of buildings.

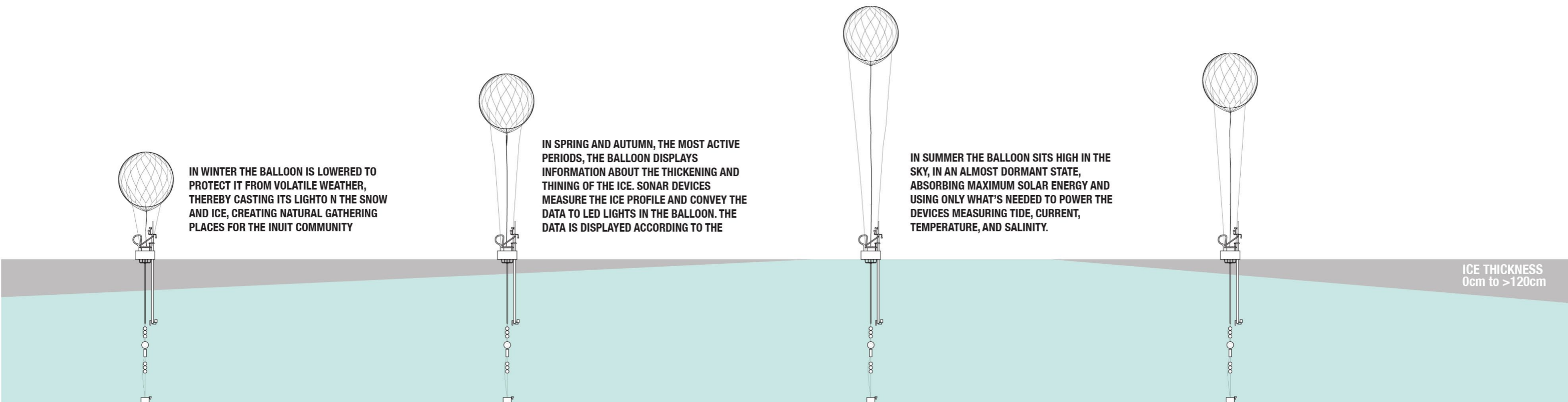
TRADITIONAL HUNTING ROUTES AROUND IGLOOLIK

Atlas of Inuit Sea Ice Knowledge and Use, "Igloolik Sea Ice Map"
http://sikuatlas.ca/sea_ice_map.html?module=2
 Gita J. Laidler, "Travelling and hunting in a changing Arctic: assessing Inuit vulnerability to sea ice change in Igloolik, Nunavut", *Climate Change* (94): 379

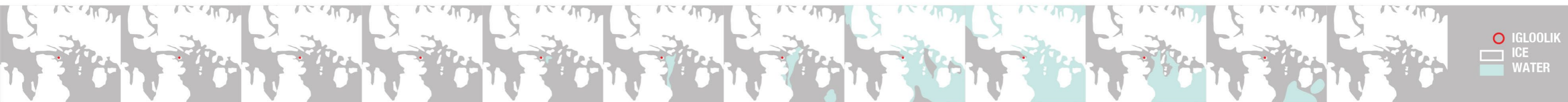
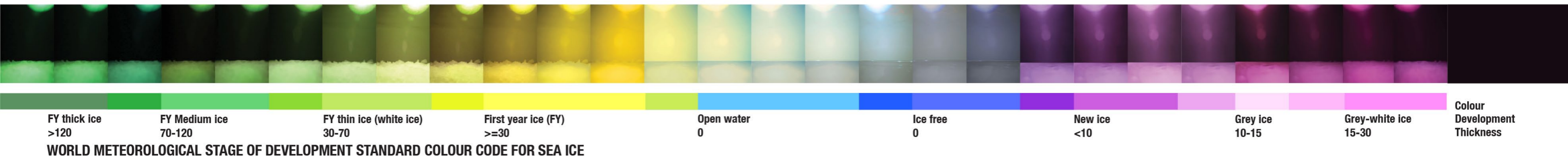


● SEASONAL CAMP
 ···· HUNTING/TRAVELLING ROUTE

Buoyant Light collects environmental data which is fundamental to the study of the effects of global warming and to the ability of the Inuit to survive. The balloons makes this data accessible to the community, providing real time updates on traditional hunting and travelling routes.

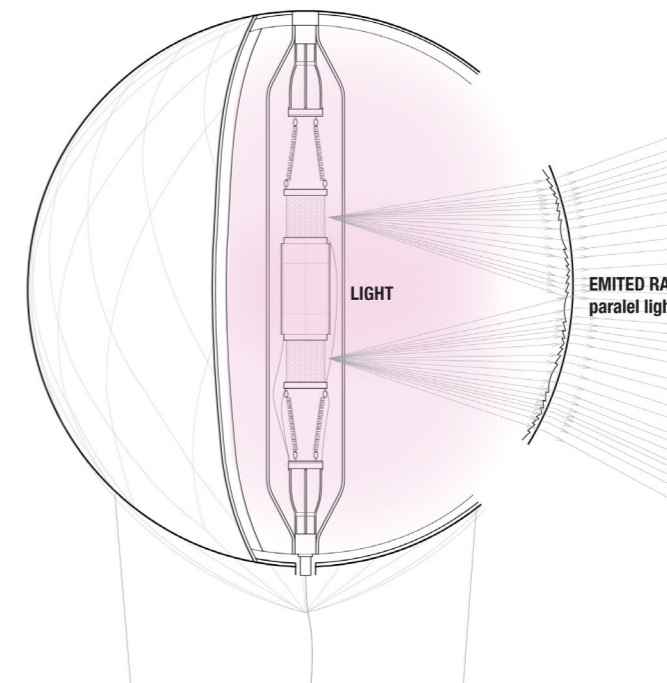
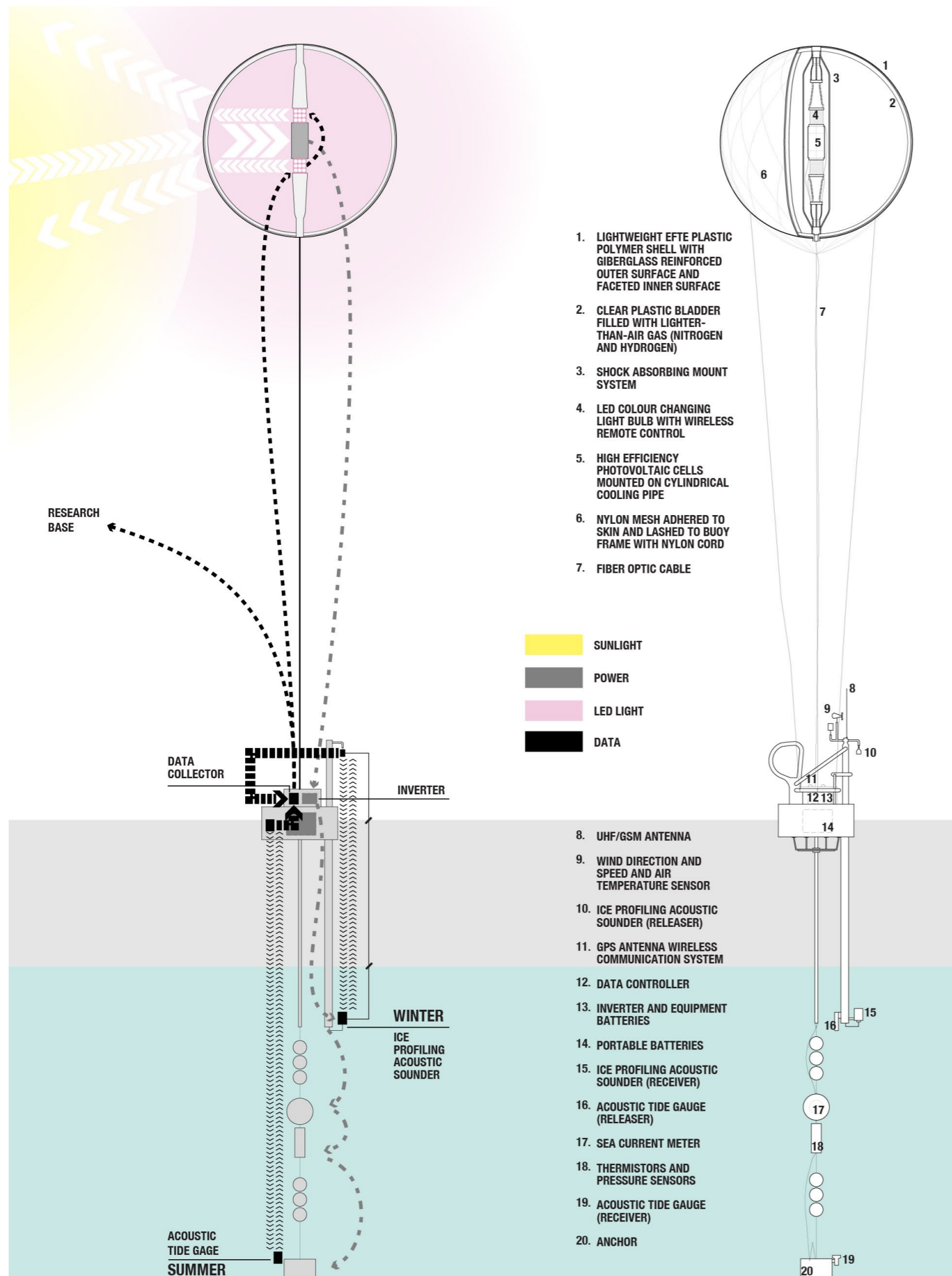


RELATIVE SEASONAL THICKNESS OF SEA ICE AND HEIGHT OF BALLOONS

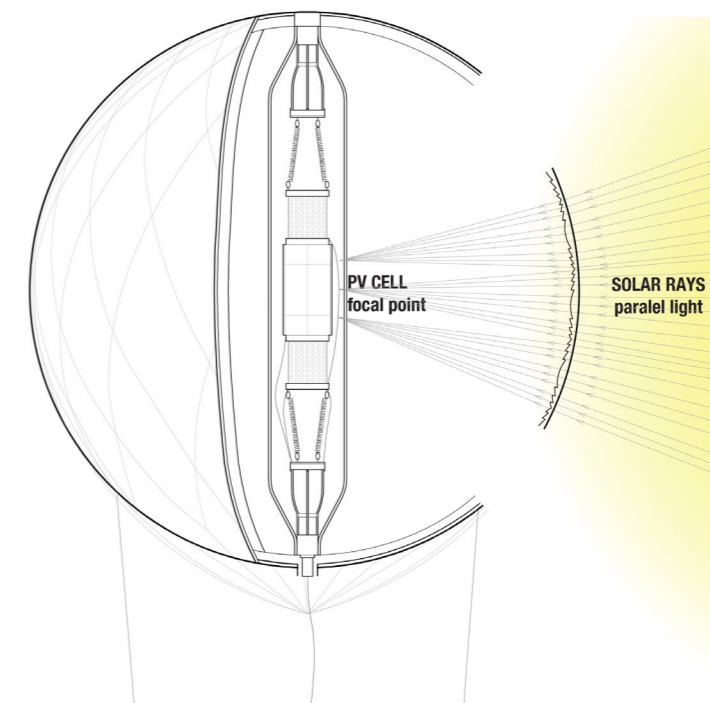


JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER

Solar balloons are paired with buoys, used by researchers to gather data on sea level change, currents, temperature, salinity, sedimentation and ice profile. Information regarding sea ice profile--colour coded according to an international standard--is transmitted to the balloon via fiber optics and communicated through the corresponding colour.



FRESNEL LENSES IN THE BALLOON SKIN FOCUS THE SUN'S RAYS ON HIGH-EFFICIENCY PHOTOVOLTAIC CELLS. THE LENSES ACT AS SOLAR COLLECTORS THAT CONCENTRATE LIGHT BY REFRACTION USING CANTED FACETS THAT REQUIRE LESS MATERIAL THAN REGULAR LENSES.



FRESNEL LENSES MAXIMISE THE AMOUNT OF LIGHT EMITTED. THE LENSES REFRACT THE LIGHT AND DIRECT IT FORWARDS THUS ALLOWING THE BALLOON TO BE VISIBLE OVER MUCH LONGER DISTANCES

Buoyant Light combines various existing technologies: research buoys, lighting balloons and photovoltaics. Information collected by sonar devices in the buoy is conveyed via a fiber optic cable to the LEDs in the balloon, programmed according the International Ice Development Colour Code.



The visual impact of the balloon is diminished in the spring. During this season, the equipment is available for maintenance after the long winter.



Balloons along traditional hunting trails act as way finding devices and mark the location of the town for approaching travelers and vessels. Once distributed throughout Arctic waters, they act as a soft network connecting remote communities, while also providing widespread data collection points for international researchers



Lowered in the winter to protect them from higher winds and more frequent storms, the balloons cast light onto the ice, forming a space for meetings, celebrations or performances.



The balloons on land delineate gathering spaces around key building in town. A few clusters measure the change in permafrost detrimental to the structural stability of buildings. Over time, smaller solar balloons could be used to provide a new sustainable lighting solution for Arctic communities, improving energy consumption costs and the safety of inhabitants and reducing the use of diesel.