Окружающая среда, здоровье и изменение климата: опыт стран Евросоюза

научно-методический вебинар

Arctic Ecology Program (AEP)

ARCTIC ECOLOGY

https://www.gvsu.edu/aep/

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MEASURES COLLECTED

Plant Phenology and Growth
Species Composition and Abundance
Screen Height Temperature
Canopy Temperature
Soil Temperature
Precipitation
Canopy Relative Humidity
Soil Moisture
Light Intensity
Wind Speed
Thaw Depth

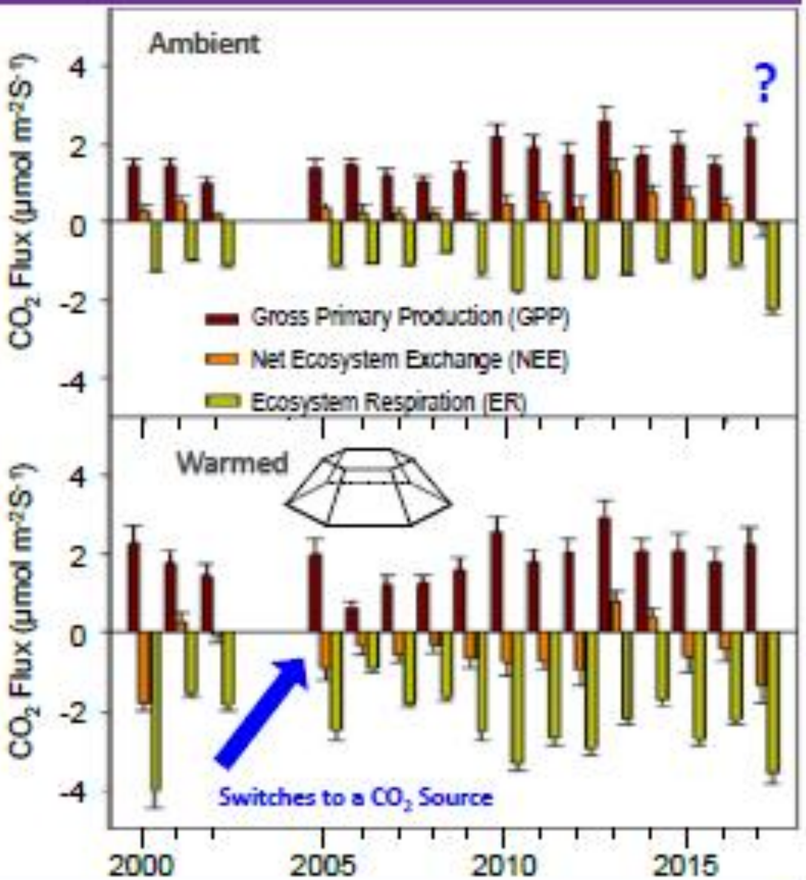
Research in Atqasuk

Location: 70°29'N, 157°25'W

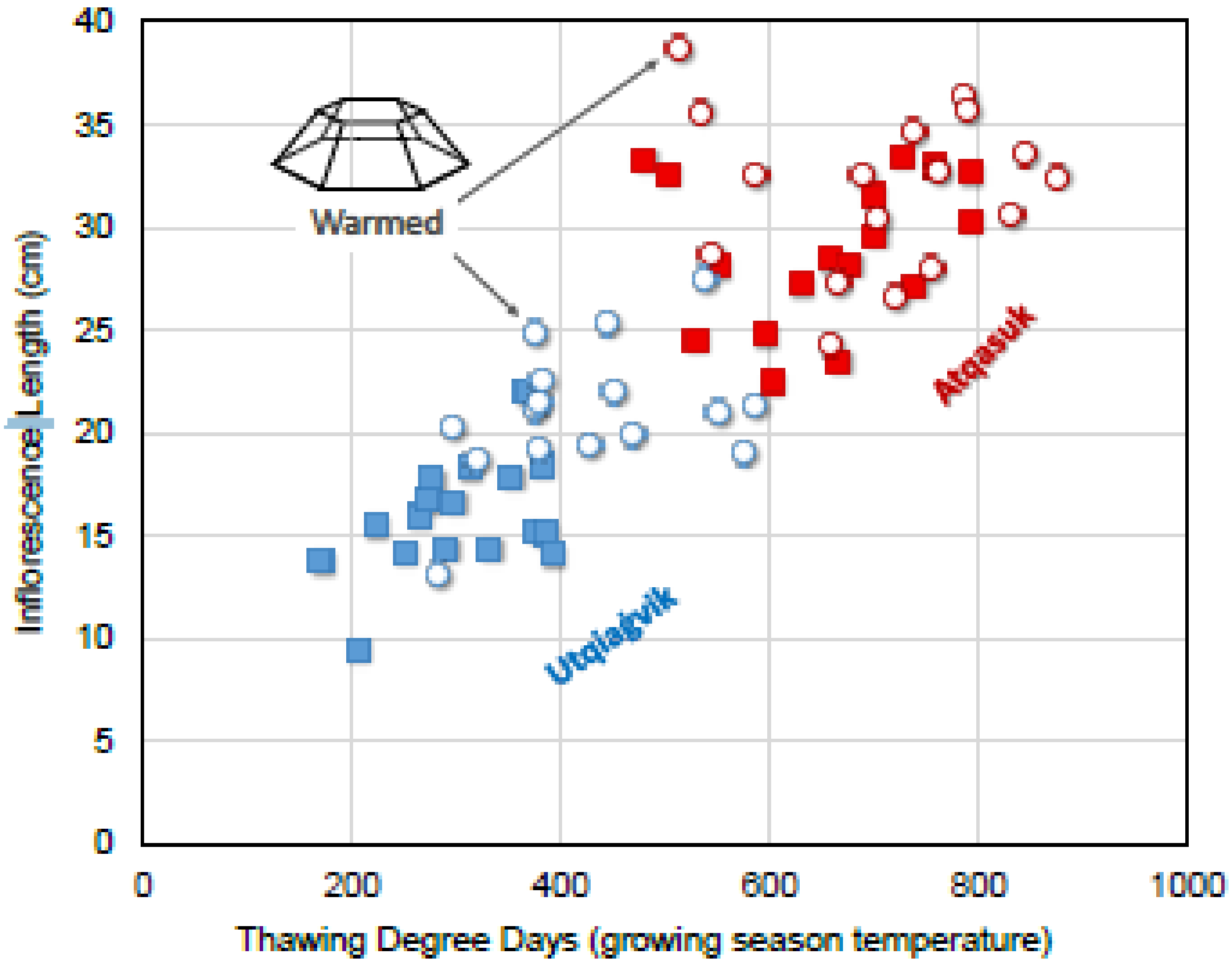
Research in Utqiagvik

Location: 71°18’N, 156° 44’W

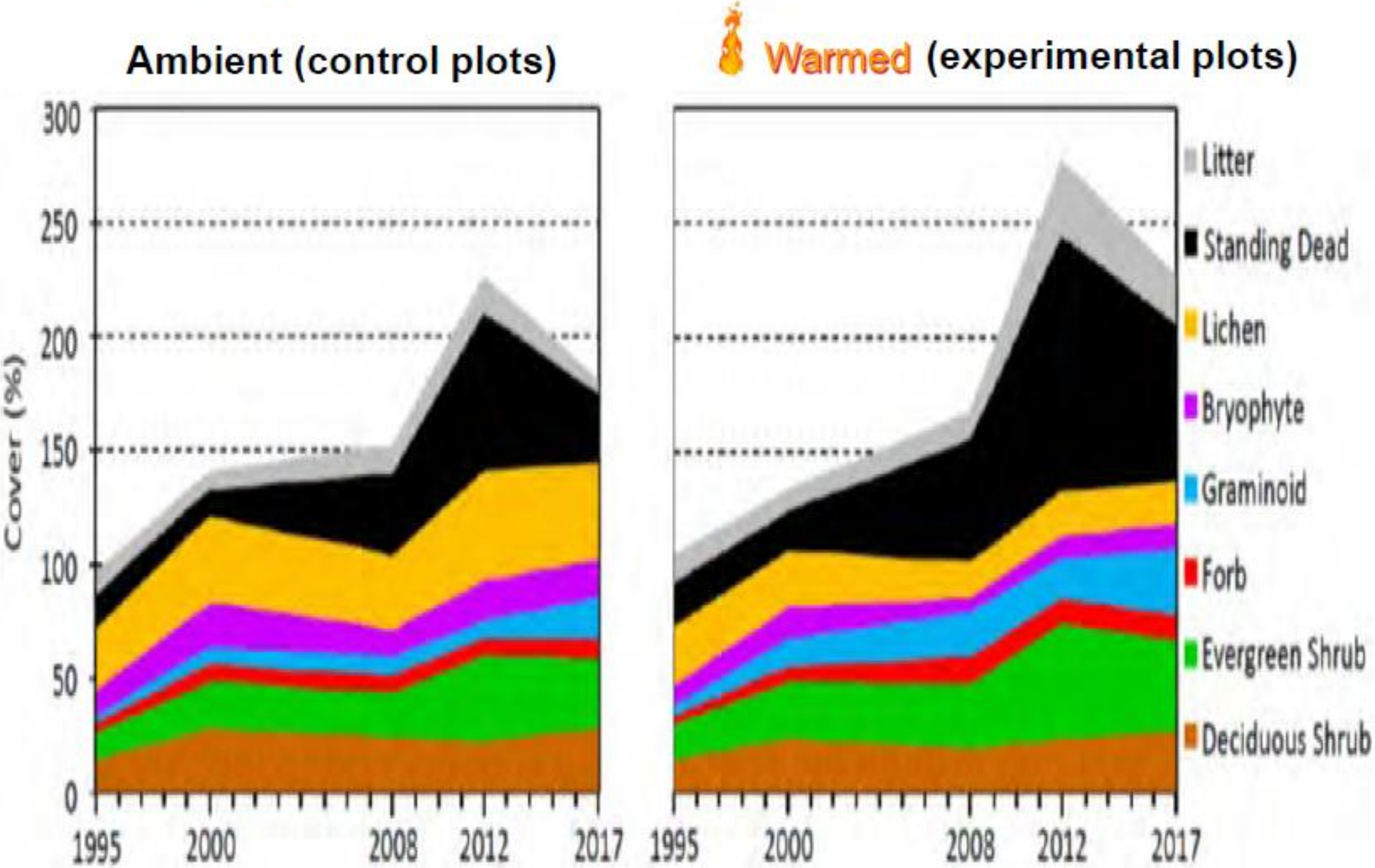
Release of Stored Carbon



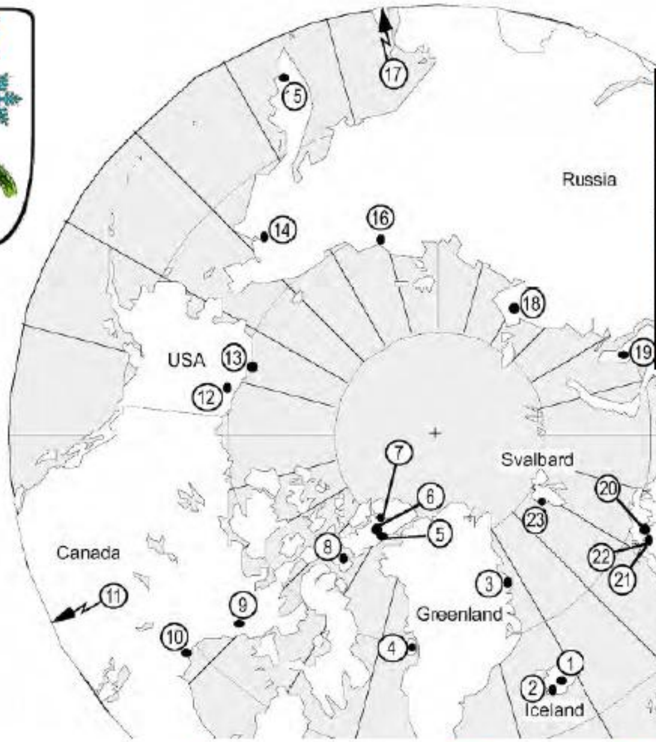
Increase in Plant Stature



Utqiaġvik Dry Site



ITEX
MaB

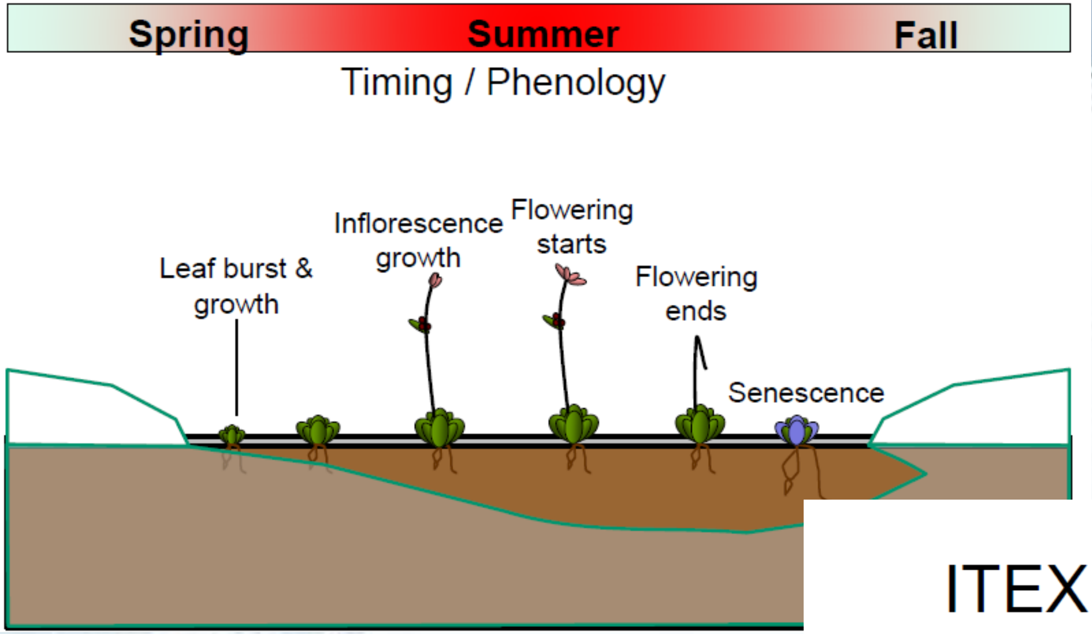


Proposed in 1990

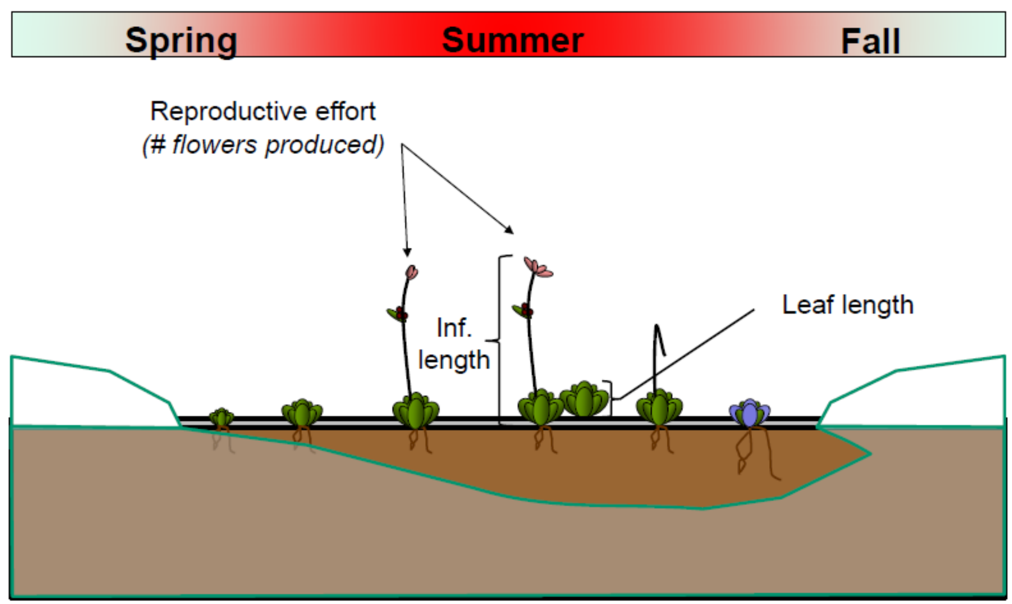
The original **I**nternational **T**undra **Ex**periment sites

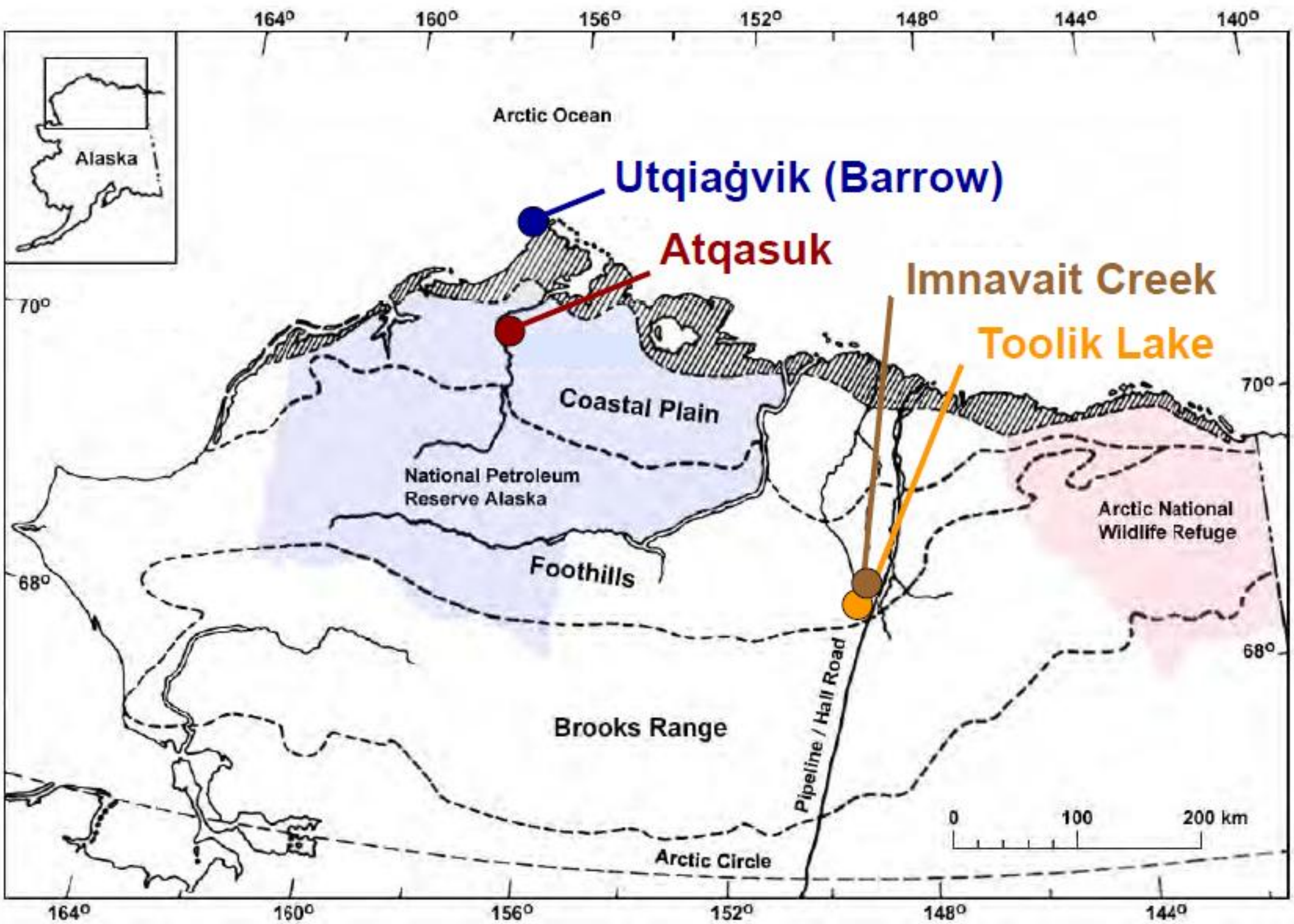
agreed on a common warming manipulation
to simulate climate change

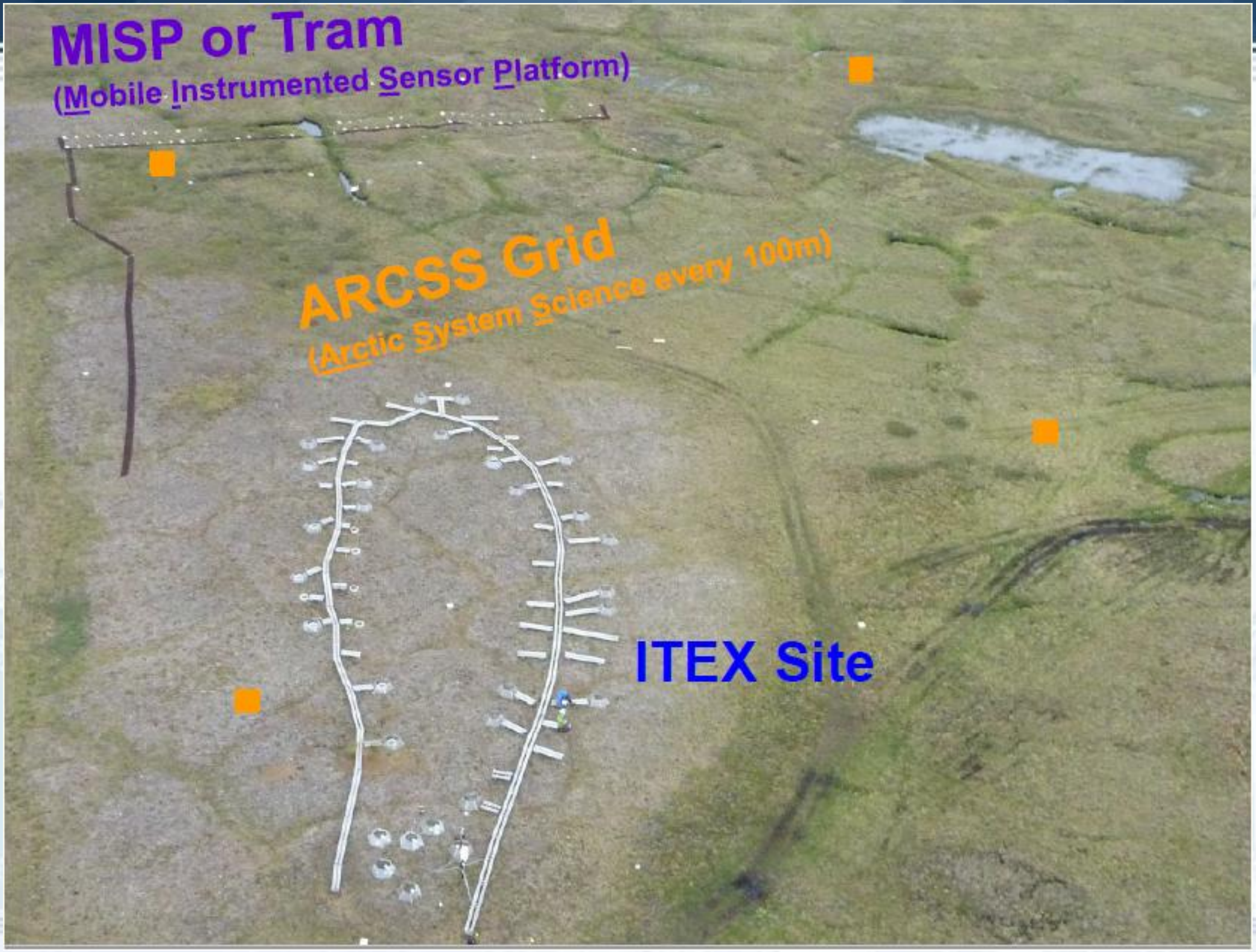
ITEX Plant Measurements



ITEX Plant Measurements




164°
160°
156°
152°
148°
144°
140°
Alaska
Arctic Ocean
Utqiaġvik (Barrow)
Atqasuk
Imnavait Creek
Toolik Lake
70°
Coastal Plain
National Petroleum
Reserve Alaska
Arctic National
Wildlife Refuge
Foothills
68°
Brooks Range
Pipeline / Hall Road
0
100
200 km
Arctic Circle


MISP or Tram
(Mobile Instrumented Sensor Platform)
ARCSS Grid
(Arctic System Science every 100m)
ITEX Site

PERSPECTIVE
https://doi.org/10.1038/s41558-019-0688-1

nature climate change

Complexity revealed in the greening of the Arctic

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As the Arctic warms, vegetation is responding, and satellite measures indicate widespread greening at high latitudes. This 'greening of the Arctic' is among the world's most important large-scale ecological responses to global climate change. However, a consensus is emerging that the underlying causes and future dynamics of so-called Arctic greening and browning trends are more complex, variable and inherently scale-dependent than previously thought. Here we summarize the complexities of observing and interpreting high-latitude greening to identify priorities for future research. Incorporating satellite and proximal remote sensing with in-situ data, while accounting for uncertainties and scale issues, will advance the study of past, present and future Arctic vegetation change.

The Arctic has warmed at more than twice the rate of the rest of the planet in recent decades[1,2]. Over the past 40 years, satellite-derived vegetation indices have indicated widespread change at high latitudes[3–14,16]. Satellite records allow the quantification of change in places that are otherwise unevenly sampled by in-situ ecological observations[17]. Positive trends in satellite-derived vegetation indices (often termed Arctic greening)[15] are generally interpreted as signs of in-situ increases in vegetation height, biomass, cover and abundance[5,18,19] associated with warming[5,14]. In the most recent report by the Intergovernmental Panel on Climate Change, tundra vegetation change, including greening trends derived from satellite records[20], was identified as one of the clearest examples of the terrestrial impacts of climate change. Large-scale vegetation–climate feedbacks at high latitudes associated with greening could

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