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Centennial scale environmental change at key arctic observational sites

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The Arctic is changing in response to ongoing warming. Multiple effects have been documented in terms of sea-ice distribution, land-ice volume and ecosystems both in the marine and terrestrial realm, which are clear responses to the overall global warming. Targeted efforts documenting individual components of the arctic system build the base-line for quantification of these effects.

Comprehensive ecosystem observational programs covering both glacial, terrestrial and marine components are rare in the Arctic but one such, the Greenland Ecosystem Monitoring (GEM) program, has now been operational for nearly 25 years at three main sites in Greenland. Zackenberg valley and Young Sund in NE Greenland is representing the high-arctic environment, Disko Island on the central west coast of Greenland at the border between the high and the low-arctic and Nuuk-Kobbefjord in SW Greenland the low-arctic.

The GEM program at all three sites cover inter-annual variation in ecosystem dynamics of glacial, terrestrial and marine ecosystems with data gathered from more than 2000 parameters some of which being automatically recorded at very high frequencies (up to 20 Hz for micro-meteorological measurements). This present-day detailed, comprehensive and high-frequency monitoring of ecosystem dynamics calls for the question: Which historical sources may be used in order to anchor the environmental status of the monitored areas back in time?

For the composite landscape dynamics including glacier, terrestrial and near-coastal environments it is of great value to study visual, mainly photographic evidences that are available from different parts of the portfolio of arctic exploration during the 19th and 20th centuries. We will in this presentation review available historical archival data (early photographs, paintings, drawings) from the GEM monitoring locations and their immediate surroundings.

The different historical setting over the centennial timescale is briefly discussed and particular illustrative records from the individual sites are shown. The evidence of change hereby shown at

the centennial time scale is evaluated in the perspective of results from decadal scale present day monitoring.