20th century climate warming and tree-limit rise in the southern Scandes of Sweden.

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Sweden
Trees - growth & development

Abstract: Climate warming by ca. 0.8 degree C between the late-19th and late-20th century, although with some fluctuations, has forced multispecies elevational tree-limit advance by > 100 m for the principal tree species in the Swedish part of the Scandinavian mountain range. Predominantly, these processes imply growth in height of old-established individuals and less frequently upslope migration of new individuals. After a slight retardation during some cooler decades after 1940, a new active phase of tree-limit advance has occurred with a series of exceptionally mild winters and some warm summers during the 1990s. The magnitude of total 20th century tree-limit rise varies with topoclimate and is mainly confined to wind-sheltered and snow-rich segments of the landscape. Thickening of birch tree stands in the "advance belt" has profoundly altered the general character of the subalpine/low alpine landscape and provides a positive feedback loop for further progressive change and resilience to short-term cooling episodes. All upslope tree-limit shifts and associated landscape transformations during the 20th century have occurred without appreciable time lags, which constitutes knowledge fundamental to the generation of realistic models concerning vegetation responses to potential future warming. The new and elevated pine tree-limit may be the highest during the past 4000 14C years. Thus, it is tentatively inferred that the 20th century climate is unusually warm in a late-Holocene perspective.

PubMed ID: 11374309 View in PubMed
A 300-million-year record of atmospheric carbon dioxide from fossil plant cuticles.

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Cold Climate
Fossils
Ginkgo biloba - cytology - growth & development - metabolism
Greenhouse Effect
Ice
Methane - metabolism
Phylogeny
Plant Leaves - cytology - growth & development - metabolism
Plants, Medicinal
Pollen
Seasons
Water - metabolism

Abstract: To understand better the link between atmospheric CO2 concentrations and climate over geological time, records of past CO2 are reconstructed from geochemical proxies. Although these records have provided us with a broad picture of CO2 variation throughout the Phanerozoic eon (the past 544 Myr), inconsistencies and gaps remain that still need to be resolved. Here I present a continuous 300-Myr record of stomatal abundance from fossil leaves of four genera of plants that are closely related to the present-day Ginkgo tree. Using the known relationship between leaf stomatal abundance and growing season CO2 concentrations, I reconstruct past atmospheric CO2 concentrations. For the past 300 Myr, only two intervals of low CO2 (2,000 p.p.m.v.) concentrations. These results are consistent with some reconstructions of past CO2 (refs 1, 2) and palaeotemperature records, but suggest that CO2 reconstructions based on carbon isotope proxies may be compromised by episodic outbursts of isotopically light methane. These results support the role of water vapour, methane and CO2 in greenhouse climate warming over the past 300 Myr.

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A 700-year paleoecological record of boreal ecosystem responses to climatic variation from Alaska.

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Recent observations and model simulations have highlighted the sensitivity of the forest-tundra ecotone to climatic forcing. In contrast, paleoecological studies have not provided evidence of tree-line fluctuations in response to Holocene climatic changes in Alaska, suggesting that the forest-tundra boundary in certain areas may be relatively stable at multicentennial to millennial time scales. We conducted a multiproxy study of sediment cores from an Alaskan lake near the altitudinal limits of key boreal-forest species. Paleoecological data were compared with independent climatic reconstructions to assess ecosystem responses of the forest tundra boundary to Little Ice Age (LIA) climatic fluctuations. Pollen, diatom, charcoal, macrofossil, and magnetic analyses provide the first continuous record of vegetation fire-climate interactions at decadal to centennial time scales during the past 700 years from southern Alaska. Boreal-forest diebacks characterized by declines of Picea mariana, P. glauca, and tree Betula occurred during the LIA (AD 1500-1800), whereas shrubs (Alnus viridis, Betula glandulosa/nana) and herbaceous taxa (Epilobium, Aconitum) expanded. Marked increases in charcoal abundance and changes in magnetic properties suggest increases in fire importance and soil erosion during the same period. In addition, the conspicuous reduction or disappearance of certain aquatic (e.g., Isoetes, Nuphar, Pediastrum) and wetland (Sphagnum) plants and major shifts in diatom assemblages suggest pronounced lake-level fluctuations and rapid ecosystem reorganization in response to LIA climatic deterioration. Our results imply that temperature shifts of 1-2 degrees C, when accompanied by major changes in moisture balance, can greatly alter high-altitudinal terrestrial, wetland, and aquatic ecosystems, including conversion between boreal-forest tree line and tundra. The climatic and ecosystem variations in our study area appear to be coherent with changes in solar irradiance, suggesting that changes in solar activity contributed to the environmental instability of the past 700 years.
The 2007 Royal Colloquium, Narsaq, Greenland: in summary.

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Keywords: Crops, Agricultural
         Culture
         Greenhouse Effect
         Greenland
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Aalborg, Denmark: a role model for waste management practices to mitigate greenhouse gas emissions.

https://arctichealth.org/en/permalink/ahliterature98696

Author: Jens Aage Hansen
Date: Nov-2009
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Publication Type: Article
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         Air Pollution - prevention & control
         Carbon Dioxide - analysis
         Cities
         Denmark
         Greenhouse Effect
         Models, Chemical
         Waste Management - methods
         Waste Products - classification
PubMed ID: 19940023 View in PubMed
Adaptation as a political process: adjusting to drought and conflict in Kenya's drylands.

https://arctichealth.org/en/permalink/ahliterature95503

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           Social Environment
           Socioeconomic Factors

Abstract: In this article, we argue that people's adjustments to multiple shocks and changes, such as conflict and drought, are intrinsically political processes that have uneven outcomes. Strengthening local adaptive capacity is a critical component of adapting to climate change. Based on fieldwork in two areas in Kenya, we investigate how people seek to access livelihood adjustment options and promote particular adaptation interests through forming social relations and political alliances to influence collective decision-making. First, we find that, in the face of drought and conflict, relations are formed among individuals, politicians, customary institutions, and government administration aimed at retaining or strengthening power bases in addition to securing material means of survival. Second, national economic and political structures and processes affect local adaptive capacity in fundamental ways, such as through the unequal allocation of resources across regions, development policy biased against pastoralism, and competition for elected political positions. Third, conflict is part and parcel of the adaptation process, not just an external factor inhibiting local adaptation strategies. Fourth, there are relative winners and losers of adaptation, but whether or not local adjustments to drought and conflict compound existing inequalities depends on power relations at multiple geographic scales that shape how conflicting interests are negotiated locally. Climate change adaptation policies are unlikely to be successful or minimize inequity unless the political dimensions of local adaptation are considered; however, existing power structures and conflicts of interests represent political obstacles to developing such policies.

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Adaptation to climate change is given increasing international attention as the confidence in climate change projections is getting higher. Developing countries have specific needs for adaptation due to high vulnerabilities, and they will in this way carry a great part of the global costs of climate change although the rising atmospheric greenhouse gas concentrations are mainly the responsibility of industrialized countries. This article provides a status of climate change adaptation in developing countries. An overview of observed and projected climate change is given, and recent literature on impacts, vulnerability, and adaptation are reviewed, including the emerging focus on mainstreaming of climate change and adaptation in development plans and programs. The article also serves as an introduction to the seven research articles of this special issue on climate change adaptation in developing countries. It is concluded that although many useful steps have been taken in the direction of ensuring adequate adaptation in developing countries, much work still remains to fully understand the drivers of past adaptation efforts, the need for future adaptation, and how to mainstream climate into general development policies.
Air quality, health and climate change are closely connected. Ozone depends on temperature and the greenhouse gas methane from cattle and biomass. Pollen presence depends on temperature and CO2. The effect of climate change on particulate air pollution is complex, but the likely net effect is greater health risks. Reduction of greenhouse-gas emissions by reduced livestock production and use of combustion for energy production, transport and heating will also improve air quality. Energy savings in buildings and use of CO2 neutral fuels should not deteriorate indoor and outdoor air quality.
Alaska's climate: too hot to handle.

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Date: Sep-25-2003
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Greenhouse Effect
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Pollen allergy currently affects a fifth of the population. A warmer climate will lead to a longer pollen season and more days with high pollen counts. In addition, a warmer climate increases the risk of proliferation of new plants with well-known allergenic pollens like ragweed, plane tree and wall pellitory, which have not previously caused allergy in Denmark. The consequences will be more people with hay fever and pollen asthma, longer allergy seasons and an increase in the severity of symptoms, disease-related costs and demands on health care for diagnosis and treatment of more complex allergies.