

Arctic Environment Variability In The Context Of Global Change

Page 1/139

arctic-environment-variability-in-the-context-of-global-change

Arctic Climate Impact Assessment was prepared by an international team of over 300 scientists, experts, and knowledgeable members of indigenous communities, and is the most comprehensive

Page 2/139

volume on Arctic climate change available. Illustrated in full color throughout. The current warming trends in the Arctic may shove the Arctic system into a seasonally ice-free state not

Page 3/139

seen for more than one million years. The melting is accelerating, and researchers were unable to identify natural processes that might slow the deicing of the Arctic. Such

Page 4/139

substantial additional melting of Arctic and Antarctic glaciers and ice sheets would raise the sea level worldwide, flooding the coastal areas where many of the world's population lives.

Page 5/139

Studies, led by scientists at the National Center for Atmospheric Research (NCAR) and the University of Arizona, show that greenhouse gas increases over the next century could

Page 6/139

warm the Arctic by 3-5°C in summertime. Thus, Arctic summers by 2100 may be as warm as they were nearly 130,000 years ago, when sea levels eventually rose up to 6 m higher than today.

Page 7/139

In this book the eminent authors analyse the ice cover variability in the Arctic Seas during the 20th and early 21st centuries. In the first two chapters, they show that multi-year changes of

Page 8/139

the sea-ice extent in the Arctic Seas were formed by linear trends and long-term (climatic) cycles lasting about 10, 20 and 60 years. The structure of temporal variability of the western

Page 9/139

region (Greenland – Kara) differs significantly from the eastern region seas (Laptev and Chukchi). In the latter region, unlike the former area, relatively short-period cycles (up to 10 years)

Page 10/139

predominate. The linear trends can be related to a super-secular cycle of climatic changes over about 200 years. The most significant of these cycles, lasting 60 years, is most

Page 11/139

*pronounced in the western
region seas.*

*The Climate of the Arctic
When the Ice Breaks*

*Antarctic Sea Ice Variability
in the Southern Ocean-
Climate System*

Page 12/139

*Effects of Climate Variation
on the Breeding Ecology of
Arctic Shorebirds
The ACSYS Decade and
Beyond*

High-Arctic Ecosystem
Dynamics in a Changing

Page 13/139

Climate is based on data collected during the past 10 years by Zackenberg Ecological Research Operations (ZERO) at Zackenberg Research Station in Northeast

Page 14/139

arctic-environment-variability-in-the-context-of-global-change

Greenland. This volume covers the function of Arctic ecosystems based on the most comprehensive long-term data set in the world from a well-defined Arctic ecosystem. Editors

Page 15/139

arctic-environment-variability-in-the-context-of-global-change

offer a comprehensive and authoritative analysis of how climate variability is influencing an Arctic ecosystem and how the Arctic ecosystems have inherent feedback

Page 16/139

arctic-environment-variability-in-the-context-of-global-change

mechanisms interacting
with climate variability
or change. The latest
research on the
functioning of Arctic
ecosystems Supplements
current books on arctic

Page 17/139

arctic-environment-variability-in-the-context-of-global-change

climate impact assessment
as a case study for
ecological specialists
Discusses the complex
perpetuating effects on
Earth Vital information on
modeling ecosystem

Page 18/139

arctic-environment-variability-in-the-context-of-global-change

responses to understand
future climates

The Arctic can be viewed
as an integrated system,
characterised by intimate
couplings between its
atmosphere, ocean and

Page 19/139

arctic-environment-variability-in-the-context-of-global-change

land, linked in turn to the larger global system. This comprehensive, up-to-date assessment begins with an outline of early Arctic exploration and the growth of modern research.

Page 20/139

arctic-environment-variability-in-the-context-of-global-change

Using an integrated systems approach, subsequent chapters examine the atmospheric heat budget and circulation, the surface energy budget, the

Page 21/139

arctic-environment-variability-in-the-context-of-global-change

hydrologic cycle and interactions between the ocean, atmosphere and sea ice cover. Reviews of recent directions in numerical modelling and the characteristics of

Page 22/139

arctic-environment-variability-in-the-context-of-global-change

past Arctic climates set the stage for detailed discussion of recent climate variability and trends, and projected future states. Throughout, satellite remote sensing

data and results from recent major field programs are used to illustrate key processes. The Arctic Climate System provides a comprehensive and accessible overview of

Page 24/139

arctic-environment-variability-in-the-context-of-global-change

the subject for
researchers and advanced
students in a wide range
of disciplines.

Combining
multidisciplinary
perspectives and new

Page 25/139

arctic-environment-variability-in-the-context-of-global-change

research, this volume goes beyond broad discussions of the impacts of climate change and reflects on the current and historical mediations and narratives that are part of creating

Page 26/139

arctic-environment-variability-in-the-context-of-global-change

this new social and
scientific reality.
Centennial Ice Cover
Observations
The Arctic Climate System
Climate Change and
Variability

Page 27/139

arctic-environment-variability-in-the-context-of-global-change

Changes in the Arctic
Environment and the Law of
the Sea

Influence of Climate
Change on the Changing
Arctic and Sub-Arctic
Conditions

Page 28/139

arctic-environment-variability-in-the-context-of-global-change

The sea ice surrounding Antarctica has increased in extent and concentration from the late 1970s, when satellite-based measurements began, until 2015. Although this increasing trend is modest, it is surprising given the overall warming of the global climate and the region.

Page 29/139

Indeed, climate models, which incorporate our best understanding of the processes affecting the region, generally simulate a decrease in sea ice. Moreover, sea ice in the Arctic has exhibited pronounced declines over the same period, consistent with global climate model simulations. For these

Page 30/139

reasons, the behavior of Antarctic sea ice has presented a conundrum for global climate change science. The National Academies of Sciences, Engineering, and Medicine held a workshop in January 2016, to bring together scientists with different sets of expertise and perspectives to further

Page 31/139

explore potential mechanisms driving the evolution of recent Antarctic sea ice variability and to discuss ways to advance understanding of Antarctic sea ice and its relationship to the broader ocean-climate system. This publication summarizes the presentations and discussions from

Page 32/139

the workshop.

Climate change is emerging as one of the most important issues of our time, with the potential to cause profound cascading effects on ecosystems and society. However, these effects are poorly understood and our projections for climate change trends and effects

Page 33/139

have thus far proven to be inaccurate. In this collection of 24 chapters, we present a cross-section of some of the most challenging issues related to oceans, lakes, forests, and agricultural systems under a changing climate. The authors present evidence for changes and variability in climatic and

Page 34/139

atmospheric conditions, investigate some the impacts that climate change is having on the Earth's ecological and social systems, and provide novel ideas, advances and applications for mitigation and adaptation of our socio-ecological systems to climate change. Difficult questions are asked. What

Page 35/139

have been some of the impacts of climate change on our natural and managed ecosystems? How do we manage for resilient socio-ecological systems? How do we predict the future? What are relevant climatic change and management scenarios? How can we shape management

Page 36/139

regimes to increase our adaptive capacity to climate change? These themes are visited across broad spatial and temporal scales, touch on important and relevant ecological patterns and processes, and represent broad geographic regions, from the tropics, to temperate and boreal

Page 37/139

regions, to the Arctic.

The Arctic is now experiencing some of the most rapid and severe climate change on earth. Over the next 100 years, climate change is expected to accelerate, contributing to major physical, ecological, social, and economic changes, many of which

Page 38/139

have already begun. Changes in arctic climate will also affect the rest of the world through increased global warming and rising sea levels. The volume addresses the following major topics: - Research results in observing aspects of the Arctic climate system and its processes across a range of

Page 39/139

*time and space scales -
Representation of cryospheric,
atmospheric, and oceanic processes
in models, including simulation of their
interaction with coupled models - Our
understanding of the role of the Arctic
in the global climate system, its
response to large-scale climate*

Page 40/139

variations, and the processes involved.
A GLOBEC Symposium
An Assessment of Consequences of
Climate Variability and Change and
the Effects of Increased UV in the
Arctic Region
Rapid Changes in the Arctic
Climate Change in Eurasian Arctic

Page 41/139

arctic-environment-variability-in-the-context-of-global-change

Shelf Seas

Natural Climate Variability on Decade-to-Century Time Scales

"The Arctic, the northernmost part of Earth, is the hotspot for climate change assessments and the sensitive barometer of global climate variability. This book includes scientific

Page 42/139

observations on the Arctic region climate and the results achieved by scientists at the Indian Arctic station Himadri over the last decade. Designed and structured to incorporate multi-dimensional climate change research, the book is a significant contribution to understand

Page 43/139

among other issues, the role of persistent organic pollutants and mercury, as well as the increase of carbon monoxide during ozone reduction in the Arctic. It is an important work for researchers, students, and all interested professionals"--

Page 44/139

arctic-environment-variability-in-the-context-of-global-change

This book provides in-depth information about the sea ice in the Arctic at scales from paleoenvironmental variability to more contemporary changes during the past and present centuries. The book is based on several decades of research related to sea ice in the Arctic and its

Page 45/139

arctic-environment-variability-in-the-context-of-global-change

variability, sea ice process studies as well as implications of the sea ice variability on human activities. The chapters provide an extensive overview of the research results related to sea ice in the Arctic at paleo-scales to more recent scales of variations as well as projections for

Page 46/139

changes during the 21st century. The authors have pioneered the satellite remote sensing monitoring of sea ice and used other monitoring data in order to study, monitor and model sea ice and its processes.

The Arctic Ocean plays a central role in ongoing climate change, with sea

Page 47/139

ice loss being the most prominent indicator. Recent observations showed that Atlantic inflows play an increasingly important role in the demise of sea ice. This encroaching atlantification of the eastern Arctic Ocean impacts the mean state and the variability of hydrography and current

Page 48/139

dynamics throughout the basin. Among the most energetic modes of variability are the seasonal cycle and high frequency semidiurnal (~ 12 -hourly) dynamics in the tidal and inertial frequency band. Limited observations indicated a substantial increase of both, hydrographic

Page 49/139

seasonal cycles as well as semidiurnal current dynamics in the eastern Arctic over the last decade. Using a uniquely comprehensive data set from an array of six moorings deployed across the eastern Eurasian Basin (EB) continental slope along the 125 ° E meridian between 2013 and 2015

Page 50/139

within the NABOS project, we assess the state of hydrographic seasonal cycles in the eastern EB. Results show a complex pattern of seasonality with a remarkably strong ($\Delta T=1.4^{\circ}\text{C}$), deep reaching ($\sim 600\text{ m}$) temperature signal over the continental slope and large-scale seasonal displacements of

Page 51/139

isopycnal interfaces. Seasonally changing background conditions are also the main source of variability of semidiurnal frequency band currents: During winter, vigorous baroclinic tidal currents whose amplitudes by far exceed predictions follow the vertical evolution of the pycnocline. During

Page 52/139

summer, extensive open-water periods additionally lead to strong wind-driven inertial currents in the upper ocean, routinely exceeding 30 cm/s far offshore in the deep basin. In order to obtain an Arctic-wide perspective on the impact of baroclinic tidal currents, a pan-Arctic tidal current atlas has

Page 53/139

been developed that synthesizes all available observations from the last 20 years. This atlas allows for in-depth studies of regional baroclinic tidal current variability as well as for validation of ocean and climate models, an essential step towards more accurate projections of the future

Page 54/139

Arctic Ocean state. Our findings from the eastern EB region already indicate a new, more dynamic state of the eastern Arctic Ocean with direct implications for the ecosystem and further sea-ice reduction.

Arctic Climate Impact Assessment
(ACIA)

Page 55/139

The Arctic
Arctic Hydrology, Permafrost and
Ecosystems
Response of Major Modes of Eastern
Arctic Ocean Variability to Climate
Change
High-Arctic Ecosystem Dynamics in a
Changing Climate

Page 56/139

The Arctic: A Barometer of Global Climate Variability provides a comprehensive source of information on all aspects of the Arctic region. Through thorough research, first-hand

Page 57/139

arctic-environment-variability-in-the-context-of-global-change

***accounts and case studies,
the book details
international arctic
research initiatives and
native environments,
including flora and fauna.
Sections explore the***

Page 58/139

arctic-environment-variability-in-the-context-of-global-change

***impact of climate change,
the effect of the Arctic
on climate change, the
environmental issues
facing the region and how
it is adapting. It is also
a must-read source of***

Page 59/139

arctic-environment-variability-in-the-context-of-global-change

***information for polar
scientists, applicable PhD
students, early
researchers, environmental
scholars, and anyone
searching for information
on any aspect of the***

Page 60/139

arctic-environment-variability-in-the-context-of-global-change

Arctic region. Users will find a great resource that brings together all aspects of Arctic research into one concise book. Provides comprehensive coverage of numerous

Page 61/139

arctic-environment-variability-in-the-context-of-global-change

***aspects of Arctic science,
including polar light,
Arctic resources and
environment, climate
change effects, the Arctic
ocean, Arctic history and
research initiatives, and***

Page 62/139

arctic-environment-variability-in-the-context-of-global-change

environmental risks, among others Explores the Arctic region from a comparative global perspective, likening it to other regions and detailing the Arctic environment Uses

Page 63/139

arctic-environment-variability-in-the-context-of-global-change

***computer modeling to
investigate the effect of
climate change on the
Arctic and the Arctic's
effect on global climate
change
Changes in the Arctic***

Page 64/139

arctic-environment-variability-in-the-context-of-global-change

Environment and the Law of the Sea is based on the 33rd Annual Conference of the Center for Oceans Law and Policy, a primary sponsor, along with the Law of the Sea Institute

Page 65/139

arctic-environment-variability-in-the-context-of-global-change

***of Iceland as well as with
the U.S. Arctic
Commission, the University
of Alaska (Fairbanks) and
the Law of the Sea
Institute, Law School
(Boalt Hall), University***

Page 66/139

***of California, Berkeley.
This Climate Change
Science Program Synthesis
and Assessment Product
addresses current
capabilities to integrate
observations of the***

Page 67/139

arctic-environment-variability-in-the-context-of-global-change

climate system into a consistent description of past and current conditions through the method of reanalysis. In addition, the Product assesses present

Page 68/139

capabilities to attribute causes for climate variations and trends over North America during the reanalysis period, which extends from the mid-twentieth century to the

Page 69/139

arctic-environment-variability-in-the-context-of-global-change

present. This Product reviews Past Climate Variability and Change in the Arctic and at High Latitudes. Paleoclimate records play a key role in our understanding of

Page 70/139

arctic-environment-variability-in-the-context-of-global-change

Earth's past and present climate system and in our confidence in predicting future climate changes. Paleoclimate data help to elucidate past and present active mechanisms of

Page 71/139

arctic-environment-variability-in-the-context-of-global-change

***climate change by placing
the short instrumental
record into a longer term
context and by permitting
models to be tested beyond
the limited time that
instrumental measurements***

Page 72/139

arctic-environment-variability-in-the-context-of-global-change

***have been available.
Recent observations in the
Arctic have identified
large ongoing changes and
important climate feedback
mechanisms that multiply
the effects of global-***

Page 73/139

arctic-environment-variability-in-the-context-of-global-change

scale climate changes. As discussed in this report, paleoclimate data show that land and sea ice have grown with cooling temperatures and have shrunk with warming ones,

Page 74/139

amplifying temperature changes while causing and responding to ecosystem shifts and sea-level changes.

Observed and Modeled Temperature and Sea Ice

Page 75/139

arctic-environment-variability-in-the-context-of-global-change

***Variability
Beaufort and Chukchi Sea
Seasonal Variability for
Two Arctic Climate States
Climate Change in the
Arctic
Sea Ice in the Arctic***

Page 76/139

A Barometer of Global Climate Variability

Understanding Present and Past Arctic
Environments: An Integrated Approach
from Climate Change Perspectives
provides a fully comprehensive overview
of the past, present and future outlook for
this incredibly diverse and important

Page 77/139

region. Through a series of contributed chapters, the book explores changes to this environment that are attributed to the effects of climate change. The book explores the current effects climate change has had on Arctic environments and ecosystems, our current understanding of the effects climate change is having, the

Page 78/139

arctic-environment-variability-in-the-context-of-global-change

effects climate change is having on the atmospheric and ocean processes in this region. The Arctic region is predicted to experience the earliest and most pronounced global warming response to human-induced climatic change, thus a better understanding is vital. Presents a thorough understanding of the Arctic, it's

Page 79/139

arctic-environment-variability-in-the-context-of-global-change

past, present and future Provides an integrated assessment of the Arctic climate system, recognizing that a true understanding of its functions lies in appreciating the interactions and linkages among its various components Brings together many of the world's leading Arctic researchers to describe this diverse

Page 80/139

arctic-environment-variability-in-the-context-of-global-change

environment and its ecology

The main focus of this book is the study of environmental dynamics in the Arctic, coupled with ecosystem dynamics.

Particular emphasis has been placed on problems of the composition of the Arctic atmosphere, as well as changes in the composition due to human impacts. The

Page 81/139

arctic-environment-variability-in-the-context-of-global-change

book also analyzes observational data and numerical modeling results that characterize the Arctic basin pollution dynamics and its impact on ecosystems. Other topics covered include problems of general circulation in the atmosphere and oceans, beginning with the 1930s when the Arctic was regarded as the kitchen of

Page 82/139

arctic-environment-variability-in-the-context-of-global-change

global weather and climate.
Towards the end of the 19th century some researchers put forward the hypothesis that the Polar regions may play the key role in the shaping of the global climate. This supposition found its full confirmation in empirical and model research conducted in the 20th century, particularly in recent

Page 83/139

decades. The intensification of the global warming after about 1975 brought into focus the physical causes of this phenomenon. The first climatic models created at that time, and the analyses of long observation series consistently showed that the Polar regions are the most sensitive to climatic changes. This aroused

Page 84/139

arctic-environment-variability-in-the-context-of-global-change

the interest of numerous researchers, who thought that the examination of the processes taking place in these regions might help to determine the mechanisms responsible for the "working" of the global climatic system. To date, a great number of publications on this issue have been published. However, as a re view of the

Page 85/139

arctic-environment-variability-in-the-context-of-global-change

literature shows, there is not a single monograph which comprises the basic information concerning the current state of the Arctic climate. The last study to discuss the climate of the Arctic in any depth was published in 1970 (Climates a/the Polar Regions, vol. 14, ed. S. Orvig) by the World Survey of Climatology,

Page 86/139

edited by H. E. Landsberg. This publication, however, does not provide the full climatic picture of many meteorological elements.

Arctic Climate Change
An Integrated Approach from Climate
Change Perspectives
Implementation Plan

Page 87/139

Arctic Alpine Ecosystems and People in a Changing Environment

The Upper Arctic Ocean Variability at a Time of Rapid Arctic Climate Change

This book provides a comprehensive, up-to-date assessment of the key terrestrial components of

Page 88/139

arctic-environment-variability-in-the-context-of-global-change

the Arctic system, i.e., its hydrology, permafrost, and ecology, drawing on the latest research results from across the circumpolar regions. The Arctic is an integrated system, the elements of which are

Page 89/139

*closely linked by the
atmosphere, ocean, and land.
Using an integrated system
approach, the book's 30
chapters, written by a
diverse team of leading
scholars, carefully examine
Arctic climate*

Page 90/139

arctic-environment-variability-in-the-context-of-global-change

*variability/change, large
river hydrology, lakes and
wetlands, snow cover and ice
processes, permafrost
characteristics,
vegetation/landscape
changes, and the future
trajectory of Arctic system*

Page 91/139

arctic-environment-variability-in-the-context-of-global-change

evolution. The discussions cover the fundamental features of and processes in the Arctic system, with a special focus on critical knowledge gaps, i.e., the interactions and feedbacks between water, permafrost,

Page 92/139

arctic-environment-variability-in-the-context-of-global-change

and ecosystem, such as snow pack and permafrost changes and their impacts on basin hydrology and ecology, river flow, geochemistry, and energy fluxes to the Arctic Ocean, and the structure and function of the Arctic

Page 93/139

arctic-environment-variability-in-the-context-of-global-change

*ecosystem in response to
past/future changes in
climate, hydrology, and
permafrost conditions. Given
its scope, the book offers a
valuable resource for
researchers, graduate
students, environmentalists,*

Page 94/139

arctic-environment-variability-in-the-context-of-global-change

managers, and administrators who are concerned with the northern environment and resources.

The Arctic, in the polar region, the northernmost part of Earth, is the hotspot for climate change

Page 95/139

assessments and the sensitive barometer of global climate variability. This book includes the scientific observations in the Arctic region's climate and the results obtained by scientists at the Indian

Page 96/139

arctic-environment-variability-in-the-context-of-global-change

Arctic station Himadri over the past decade. Designed and structured to incorporate multi-dimensional climate change research output, it is a significant contribution toward understanding, among

Page 97/139

other issues, the role of persistent organic pollutants and mercury, as well as the increase of carbon monoxide during ozone reduction in the Arctic.

Features include: Highlights the achievements of climate

Page 98/139

arctic-environment-variability-in-the-context-of-global-change

*change research in the
Arctic region Includes case
studies of scientists in the
Arctic and their significant
achievements through the
Indian research base Himadri
Provides a thorough review
of palaeoclimate change*

Page 99/139

arctic-environment-variability-in-the-context-of-global-change

*studies, the impact of
climate change on biotic
components and the impact of
climate change on abiotic
components Provides specific
details on the study of
ozone depletion phenomenon
over the Arctic region*

Page 100/139

arctic-environment-variability-in-the-context-of-global-change

*Covers a wide range of
research contributions
Details sea ice variability
in the context of global
warming over the Arctic
region Connects
seismogenesis with the
climate change in the Arctic*

Page 101/139

arctic-environment-variability-in-the-context-of-global-change

region This book will be an important read for researchers, students and all interested professionals.

About 50 species of shorebirds breed in the Arctic, where they

Page 102/139

arctic-environment-variability-in-the-context-of-global-change

constitute the most characteristic component of the tundra avifauna. Here, we review the impact of weather and climate on the breeding cycle of shorebirds based on extensive studies conducted across the Arctic.

Page 103/139

arctic-environment-variability-in-the-context-of-global-change

Conditions for breeding shorebirds are highly variable among species, sites and regions, both within and between continents. Weather effects on breeding are most moderate in the Low Arctic

Page 104/139

arctic-environment-variability-in-the-context-of-global-change

of northern Europe and most extreme in the Siberian High Arctic. The decision of whether or not to breed upon arrival on the breeding grounds, the timing of egg-laying and the chick-growth period are most affected by

Page 105/139

*annual variation in weather.
In large parts of the
Arctic, clutch initiation
dates are highly correlated
with snowmelt dates and in
regions and years where
extensive snowmelt occurs
before or soon after the*

Page 106/139

arrival of shorebirds, the decision to breed and on the breeding ecology of clutch initiation dates appear to be a function of food availability for laying females. Once incubation is initiated, adult shorebirds

Page 107/139

appear fairly resilient to variations in temperature with nest abandonment primarily occurring in case of severe weather with new snow covering the ground. Feeding conditions for chicks, a factor highly

Page 108/139

*influenced by weather,
affects juvenile production
in most regions. Predation
has a very strong impact on
breeding productivity
throughout the Arctic and
subarctic, with lemming
Dicrostonyx spp. and Lemmus*

Page 109/139

spp. fluctuations strongly influencing predation rates, particularly in the Siberian Arctic. The fate of Arctic shorebirds under projected future climate scenarios is uncertain, but High Arctic species and populations

Page 110/139

appear particularly at risk. Climatic amelioration may benefit Arctic shorebirds in the short term by increasing both survival and productivity, whereas in the long term habitat changes both on the breeding grounds

Page 111/139

arctic-environment-variability-in-the-context-of-global-change

and on the temperate and tropical non-breeding areas may put them under considerable pressure and may bring some of them near to extinction. Their relatively low genetic diversity, which is thought

Page 112/139

to be a consequence of survival through past climatically-driven population bottlenecks, may also put them more at risk to anthropogenic-induced climate variation than other avian taxa.

*Tracing Environmental
Variability in the Changing
Arctic Ocean with Optical
Measurements of Dissolved
Organic Matter
A Model Study of Natural
Variability in the Arctic
Climate*

Page 114/139

arctic-environment-variability-in-the-context-of-global-change

*Results Book of the Nordic
Arctic Research Programme
(NARP)*

*Understanding Present and
Past Arctic Environments
An Assessment of
Consequences of Climate
Variability and Change and*

Page 115/139

arctic-environment-variability-in-the-context-of-global-change

*the Effects of Increased UV
in the Arctic Region :
Implementation Plan*

This volume reflects the current state of scientific knowledge about natural climate variability on decade-to-century time scales. It covers a wide range of relevant subjects, including the

Page 116/139

arctic-environment-variability-in-the-context-of-global-change

characteristics of the atmosphere and ocean environments as well as the methods used to describe and analyze them, such as proxy data and numerical models. They clearly demonstrate the range, persistence, and magnitude of climate variability as represented by many different indicators. Not only do

Page 117/139

arctic-environment-variability-in-the-context-of-global-change

natural climate variations have important socioeconomic effects, but they must be better understood before possible anthropogenic effects (from greenhouse gas emissions, for instance) can be evaluated. A topical essay introduces each of the disciplines represented, providing the nonscientist

Page 118/139

arctic-environment-variability-in-the-context-of-global-change

with a perspective on the field and linking the papers to the larger issues in climate research. In its conclusions section, the book evaluates progress in the different areas and makes recommendations for the direction and conduct of future climate research. This book, while consisting of technical

Page 119/139

papers, is also accessible to the interested layperson.

The European Arctic and Alpine regions are experiencing large environmental changes. These changes may have socio-economic effects if the changes affect the bioproduction, which form the basis for the marine and terrestrial food

Page 120/139

arctic-environment-variability-in-the-context-of-global-change

chains. This uniquely multidisciplinary book presents the various aspects of contemporary environmental changes in Arctic and Alpine Regions.

This book is a new and revised second edition of the book 'The Climate of the Arctic', published in 2003. It presents a comprehensive analysis of the current

Page 121/139

state of knowledge related to the climate of the Arctic, using the latest meteorological data. All meteorological elements are described in detail and an up-to-date review of the available literature for each element is given. Climatic regions are distinguished and described. The monograph also

Page 122/139

provides an account of the present state of research on climate change and variability in the Arctic for three time scales: the Holocene, the last Millennium, and the instrumental period. The book concludes with a presentation of the scenarios of the Arctic climate in the 21st century. This

Page 123/139

arctic-environment-variability-in-the-context-of-global-change

monograph is intended for all those with a general interest in the fields of meteorology, climatology, and with a knowledge of the application of statistics in these areas.

Proceedings of a Workshop
Arctic Climate Change and Decadal
Variability

Page 124/139

Arctic Climate Impact Assessment -
Scientific Report
Past Climate Variability and Change in
the Arctic and at High Latitudes - Sap
1.2
North Pacific Climate Variability and
Arctic Sea Ice

The Arctic climate underwent strong

Page 125/139

modifications over the past decades. Thanks to a data base gathering more than 18000 observations collected in the entire deep basin of the Arctic Ocean since 1997, we focused on the interannual variability of the upper ocean. The subsurface Summer Pacific Water warmed up since the late 1990s. Notably, a particularly

Page 126/139

warm flux entered the Arctic Ocean in 2004 was documented all along its propagation in the Canadian basin. These analyses suggest a possible influence of the subsurface waters on the sea ice evolution in the Arctic region. At depth, observations confirm the propagation of warm Atlantic water pulses, in particular a warm anomaly

Page 127/139

of 0.8°C detected for the first time in 2004 West of Svalbard. Nevertheless, we did not find evidence for any gradual warming trend of this water mass. The double diffusion process seems to be a widespread phenomenon in the entire deep basin. The vertical heat fluxes transmitted through the interfaces between two mixed layers

Page 128/139

increased since the 1980s, notably because of the "supersteps" appearance, characterized by a strong temperature increase at the interface. Above the thermocline, the halocline remained relatively robust over the past decade. Its stratification intensified in 2007-2008 in the Canadian basin due to a freshwater

Page 129/139

content increase probably in response to the atmospheric forcing. As a consequence, the warm Atlantic waters remained insulated from the surface waters and did not contribute to the changes observed at the surface over this period. The U.S. Climate Change Science Program (CCSP), a consortium of Federal agencies

Page 130/139

that investigates climate, has established a Synthesis and Assessment Program as part of its Strategic Plan. A primary objective of the CCSP is to provide the best science-based knowledge possible to support public discussion and government- and private-sector decisions about the risks and opportunities associated with changes in

Page 131/139

climate and in related environmental systems (U.S. Climate Change Science Program, 2007). The CCSP has identified an initial set of 21 Synthesis and Assessment Products (SAPs) that address the highest-priority research, observation, and information needed to support decisions about issues related to climate

Page 132/139

change. This assessment, SAP 1.2, focuses on the evidence for and record of past climate change in the Arctic. This SAP is one of three reports that addresses the climate-variability-and-change research element and Goal I of the CCSP Strategic Plan to improve knowledge of Earth's past and present climate and environment,

Page 133/139

arctic-environment-variability-in-the-context-of-global-change

including its natural variability, and improve understanding of the causes of observed variability and change.

It has been known at least since the end of the century that the polar areas play a very important role in the formation of the Earth's climates. It is also known today that they are the most sensitive regions to

climatic change, and are thus perfect case studies for the detection of such changes. The most serious obstacle to the study of climatic and other geographical elements of the polar areas (including the Arctic) has always been the severe climatic conditions which prevail in these regions. Because of these extreme con- tions,

Page 135/139

research into particular elements of the climatic system (including the atmosphere) began here much later than it did in lower latitudes. For instance, the whole area of the Arctic was not sufficiently covered with a network of meteorological stations until the late 1940s (and even then there were large areas of the central Arctic and

Page 136/139

the Greenland interior for which no data were available). This is probably why it was not until the start of the 1990s that a body of work began to appear which analysed in any depth climatic variability for the Arctic as a whole. While a considerable number of papers had been published before this period, most of them

were local studies presenting highly localised information, providing air temperature measurements but often little else.

Effects of Climate Variability on Sub-Arctic Marine Ecosystems
Past, Present and Future
An Indian Perspective

Page 138/139

Arctic Environment Variability in the
Context of Global Change
Past Climate Variability and Change in the
Arctic and at High Latitudes

Page 139/139

arctic-environment-variability-in-the-context-of-global-change