

Climatic and environmental changes during the past 200 years viewed from Arctic ice cores

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The Arctic region has recently undergone drastic changes under global warming. Abrupt warming was observed during 1920s and 1940s, in addition to the more recent warming. Causes of the warming in the first half of the 20th century have not been clarified yet. Large natural variability makes it difficult to quantify the anthropogenic impact on Arctic climate and environment. To understand both natural and anthropogenic variability and its mechanisms, long-term climate data are required. Ice cores provide invaluable information on the past climatic and environmental changes in the Arctic, where long-term meteorological observation has been very limited. Data from more than ten ice cores drilled by Japan and other nations are available for the past 100-200 years. In this report, ice core data available so far are reviewed, and the climatic and environmental changes reconstructed by the cores are discussed, to make the information available to the climatologists and modelers etc. Previous ice core studies show that there is large regional variability in temporal patterns of temperature, precipitation and anthropogenic air pollutants within the Arctic region. Spatial and temporal variability of climate and environment during the past 100-200 years in the Arctic region is discussed.