New Draft Proposal, Global Warming in the Arctic - Past, Present and Future

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The Arctic confronted to the global warming, has shown an abrupt warming in these twenty years since 1980s. The warming in the Arctic is seen in numbers of climate processes such as air temperature rise, ground temperature rise, decrease of sea ice extent and so on. The Arctic sea ice extent shows a drastic decrease and has reached the record minimum in summer 2007. The rate of reduction in ice cover exceeds twice as that predicted by models, and already has reached to the amount simulated for 2040. Permafrost on the Arctic land has melted in the wide area and is expected to release greenhouse gases such as methane and outflow of large rivers to the Arctic Ocean has greatly increased. Retreats and melting of glaciers and ice caps surrounding the Arctic and Greenland ice sheet are contributing to the sea level rise. Following these changes, ecosystem/ biosphere will be changed and it will alter the exchange of greenhouse gases and surface albedo, and then feedback to the climate and environment. Accompanied are many extreme changes such as decrease in the area and term of snow fall, reduction of snow surface albedo by anthropogenic black carbon and acidification of surface sea water due to the increase of atmospheric CO_2 concentration, and we are anxious about their effect to the human life and natural ecosystem.

We have to survey these phenomena belonging to the warming in the Arctic and understand the Arctic climate and environmental system consistently. During 1920 to 40s, abrupt temperature rise as large as that of recent 20 years was recorded. The aim of the new project is with comparing to the past, to understand the present and to predict the future of the Arctic warming. Based on established research field such as atmospheric science, oceanography, glaciology, hydrology and ecology, we will conduct international cooperative observations in the circum Arctic area, make extreme data analyses and clarify common items of the whole project, status of the Arctic warming, water circulation and material cycle in the Arctic, and be followed by the validation and development of climate models. It is anticipated in the future to deepen our understanding of the Arctic warming through conducting Arctic system reanalysis, gathering those climate processes. The project will also contribute to the International Polar Year (IPY) 2007-2008, which is now actively carried out in the international polar research community. The project is to be proposed by interdisciplinary members from numbers of institutions in Japan to the Grant-in-Aid for Scientific Research of MEXT