

## Climate changes in Ny-Ålesund and Longyearbyen, Svalbard based on long-term meteorological and terrestrial dataset

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Arctic has been undergoing various climatic and environmental changes associated with global warming. Temperature increase rate is almost double that the rate of global average, which causes the melting of permafrost, the reduction of sea ice. Since the climatic system in the Arctic consists of the interactions between atmospheric circulation, hydrological process, and sea ice variation, the understanding of atmosphere-land (ice)-ocean feedbacks is required to reveal the environmental changes due to global warming. Therefore long-term and multi-point monitoring of atmospheric, ocean and terrestrial components are required.

Svalbard is representative area for Arctic research where various institutes have been performing long-term monitoring. Longyearbyen and Ny-Ålesund in Spitsbergen that are located in far from human activity are better suited for monitoring of minor variation components and Arctic climate changes. National Institute of Polar Research (NIPR) and Alfred-Wegener Institute (AWI) have monitored climatic components since early 1990s using Automated weather stations. In Longyearbyen, The University Centre in Svalbard (UNIS) has monitored meteorological and permafrost components at Adventdalen with boreholes and weather stations. In addition to research institutes, Norwegian Meteorological Institute (NMI) has monitored snow cover and precipitation at Svalbard Airport and Ny-Ålesund since 1970s. We have compared various components of climatic system such as air temperature, ground temperature, precipitation, snow cover at several locations using NIPR, AWI, UNIS and NMI dataset. As a result of analysis of time-series variations, some notable trends in air temperature and precipitation were found. Winter temperatures at Longyearbyen and Ny-Ålesund are increased during the last two decades, however, temperatures at March remain mostly unchanged or decrease. As for the precipitation, precipitation amount at Ny-Ålesund remain unchanged, while that at Longyearbyen decreases. In this presentation, we discuss the long-term trend and correlation of meteorological and permafrost components.

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