

Abnormal hydrological condition and disaster due to Arctic Change.

Based mainly on observation/research done at IORGC/JAMSTEC

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<u>However, it becomes well known that the Arctic sea ice has been</u> <u>decreasing significantly especially in recent years presumably</u> <u>due to global and Arctic warming.</u>

Time series of Arctic sea ice extent in September [Update of Inoue and Kikuchi, 2007]



Ice concentration of the Arctic Ocean on September 16, 2007. Note that the extent of Arctic summer sea ice in 2007 reached a record minimum. Picture was downloaded from NASA Earth Observatory web site http://earthobservatory.nasa.gov/

Arctic Ocean Climate Change

To study the role of the Arctic Ocean for climate change and to clarify the important processes among ocean, sea ice, and atmosphere in the Arctic Ocean.

Ice-drifting buoy observation of the multiyear ice area of the Arctic Ocean



Hydrographic observation in the Pacific Arctic Ocean







Sea ice condition on September 16 2007 From NASA Earth Observatory web site http://earthobservatory.nasa.gov/

Catastrophic reduction of Arctic Sea Ice [Shimada et al., 2006]



Outflow of Summertime Arctic Sea Ice and its Linkage with Ice Reduction and Atmospheric Circulation Patterns

Inoue and Kikuchi [2007, JMSJ]



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Outflow of sea ice

Warming of the Arctic Ocean







Sea ice condition on September 16 2007 From NASA Earth Observatory web site http://earthobservatory.nasa.gov/





Abnormality of cyclone activity (storm track) for summer (July to Sept., 2005 ~ 2007) . < Prepared by Yoshihiro Iijima> Red: Positive deviation(significance level, below 5%) Blue: Negative deviation

Increase in precipitation, soil moisture, water body .
Flood
Coastal erosion



Influence to human life: Roads damaged, probably due to deeper melted layer affecting loosening of grounds.



<Prepared by T. Maximov>

Disppearing village in northeast Siberia





Flooding in the Alzea River drainage



<u>Cause of flood</u> Permafrost melting? Abnormal precipitaion?

2007年



Conclusion

Arctic Change is occurring more faster than predicted.

They have substantial/unexpected influence to the climate and environment directly to northern Asian region, and more wider region.

They affect human activities and unexpected feedback to the global climate.

Therefore, better/integrated observing network is a urgent need, both Land and Ocean._along with analysis using available data.

GEOSS should show more interest to cold region.

As IPY (International Polar Year) Legacy, WMO is showing interest in developing GCW (Global Cryosphere Watch)