



## **Impacts of sea ice / SST changes for the observed climate change –GREENICE project–**

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Under the recent global warming, melting of arctic sea-ice in recent decades could have contributed to recent climate changes including its long-term trend and extreme weather events. While the climatic response to the sea-ice loss have been studied recently, it is still an open question to what extent the sea-ice change has influenced recent climate change. Other factors, such as for example, SST could also have had an influence. A main objective of GREENICE research project is to show what extent of the observed climate trend as well as observed weather extremes could be explained by the change and variability in sea ice and SST, respectively. In this project, we designed two atmospheric general circulation model experiments: In both experiments observed daily sea ice cover variations are prescribed, while for SST, one experiment uses observed daily variations and the other the observed climatology. The experiment is performed by several different state-of-the-art AGCMs. Our preliminary results show that the observed wintertime temperature trend near the surface is poorly reproduced in our hindcast experiments using observed SIC and SST. The impact of SIC variation seems to be confined near the surface, while SST variation seems a key for temperature trend above. It suggests a necessity to consider the atmospheric poleward energy transport associated with SST variation to understand the observed arctic amplification. Other aspects of SIC/SST impact on the observed circulation change such as NAO shall also be discussed.