



Comparison of Arctic sea ice variability in IPCC climate experiments and in ocean-sea ice models

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In earlier work we have identified CMIP3 models for which certain characteristics of Arctic sea ice compared well with those in ocean-sea ice model hindcasts of the Arctic Ocean Model Intercomparison Project (AOMIP). Here, we focus on these CMIP3 models to investigate further the variability of Arctic sea ice volume in the 20th and 21st centuries. We are especially interested in the mechanisms of sudden changes in sea ice volume. We first introduce a AOMIP hindcast integration with the Alfred Wegener Institute NAOSIM (North Atlantic/Arctic Sea Ice Ocean Model) that covers the whole 20th century. The atmospheric forcing used for this integration is briefly described. In the hindcast, sudden changes in Arctic ice volume are most of the time related to sea ice export events. Ice export events follow a typical sequence of accumulation, export, and increased growth afterwards. However, in recent years also strongly modified thermodynamic growth rates became important for sudden changes in Arctic sea ice volume. We analyse corresponding events in CMIP3 experiments and investigate longterm changes as the Arctic ice volume gradually decreases with polar warming.