



The 21st century changes in the Arctic sea ice cover as a function of its present state : what can we learn from CMIP5 models ?

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We examine the recent (1979-2010) and future (2011-2100) characteristics of the Arctic sea ice cover as simulated by 22 Earth system and general circulation models from the Coupled Model Intercomparison Project phase 5 (CMIP5). As was the case with CMIP3, a large inter-model spread persists in the simulated summer sea ice losses over the 21st century for a given forcing scenario. We identify a nonlinear relationship between the mean September sea ice extent (SSIE) and the trend in SSIE over the same climatic (~ 30 yr) periods, characterized by an elevated rate of decline when the SSIE reaches $\sim 2-4$ million km^2 . From this point of view, all models evolve in a similar phase space but are currently located on different positions of resembling trajectories. Therefore, the current observed mean SSIE is, unlike the trends in SSIE (a statistic clearly sensitive to internal variability), a reasonable criterion to constrain summer sea ice projections.