



Increased variability of the Arctic summer ice extent in a warmer climate

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Simulations performed with general circulation models and a model of intermediate complexity show that the variability of the September sea ice extent in the Arctic of the 21st century increases first when the mean extent decreases from present-day values. A maximum of the variance is found when the mean September ice extent is around 3 million km². For lower extents, the variance declines with the mean extent. The behavior is clearly different in Antarctica where the variance always decreases as the mean ice extent decreases, following roughly a square-root law compatible with very simple geometric arguments. Several mechanisms are responsible for the non-linear behavior of the Arctic. However, the strong interhemispheric contrast suggests that the difference in geometrical setting, with an open ocean in the south and a semi-closed basin in the north, plays a significant role.