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Arctic rapid sea ice loss events in CMIP6 simulations

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The summer Arctic sea ice is projected to disappear completely by the middle of the century in response to anthropogenic greenhouse gas emissions, according to simulations conducted with the latest global climate models. The decrease in summer Arctic sea ice extent is marked by periods of rapid ice loss, known as rapid ice loss events (RILEs), which are expected to become more frequent in the coming decades. However, the causes of RILEs are not well understood and it is difficult to predict their occurrence a season to several years ahead. It is essential to improve our understanding of these events and their potential impacts on ecosystems and societies, as the rate of sea ice decline can affect the ability to adapt to rapid change. To gain a better understanding of RILEs, we conducted an analysis using climate simulations from the Coupling Model Intercomparison Project phase 6 (CMIP6). Our results show that the frequency of RILEs increases as the Arctic sea ice extent diminishes, and the probability of observing a RILE is highest during the period from 2025 to 2030. Moreover, the observed September Arctic sea ice extent is critically approaching the value corresponding to the peak of probability of occurrence of RILEs. This suggests that we may be on the verge of a new RILE, following a slowdown since the early 2010s. In the future, we plan to identify the climatic conditions that are favorable for the formation of RILEs, with the goal of predicting the probability of their occurrence in real-time. We also aim to study the impacts of these rapid ice loss events on the wider climate system.