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Impact of an abrupt Arctic sea ice loss on the extreme precipitation events in the midlatitudes

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The current Arctic sea ice melting is accompanied by a significant Arctic warming, which could induce several climatic responses not limited to the high latitudes. These responses include changes in storm tracks, modification of the jet stream patterns as well as a stimulation of the planetary waves. The objective of this study is to determine the short-term changes on the extreme precipitation events over the high and mid-latitudes due to a sudden loss of Arctic sea ice. These changes are analysed using two different climate models (ECMWF-IFS and CNRM-CM6) at two different horizontal resolutions, that participate to the EU Horizon 2020 PRIMAVERA project. A common protocol in which the sea ice albedo is reduced to the ocean value is applied to simulate the sudden loss of Arctic sea ice. The results show an increase in drought duration in early winter over the southwestern North America in the ECMWF-IFS model at the two different horizontal resolutions and in the CNRM-CM6 at low resolution, and over the western part of the Mediterranean Basin in the ECMWF-IFS model. This increase can be understood by a stationary wave response due to Arctic sea ice loss which leads to an amplification of the subsidence over these two regions. Indeed, a northward shift of the North Atlantic High and North Pacific High is modelled in early winter. Thanks to these results, abrupt Arctic sea ice loss seems to play a role on the extreme precipitation events over mid-latitudes.