



## **Extreme climate events in the Mediterranean region during winter due to arctic sea-ice reduction**

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Arctic sea-ice cover has experienced an accelerated decline during the last decade. General circulation models (GCMs) have been used in the past to study possible effects of sea-ice reduction on the Eurasian winters. Extremely cold winter events, characterizing the Europe and northern Asia during recent years, have been suggested to be driven by the anomalous decrease of wintertime sea ice concentration in the polar region and in particular in the Barents-Kara seas. Observations seem to support the idea that Mediterranean climate is changing. In particular the possibility that the climate in this region could become more variable and extreme is currently under investigation based on the increased frequency in the occurrence of extreme events registered during latest years. In this work we estimate potential effects on the Mediterranean basin of Arctic sea-ice reduction during winter period. Two simulations have been performed by fixing different values of sea-ice concentrations on the Barents-Kara seas in the CAM/NCAR GCM. The remote perturbation on the Mediterranean region has been studied in terms of climate extreme events occurrence for both low temperatures and intense precipitations, by using CAM global simulations to initialize and force the RegCM/ICTP regional climate model to downscale the response over the European domain. Results show the arising of a minimum in the geopotential height over the Mediterranean basin, driven by the reduction of sea-ice concentration in the Barents-Kara region. This leads to an increased number of extreme cold events over the central Mediterranean region and an increased number of intense precipitation events in particular over the westward coasts of southern Italy and Greece.