



## **Detecting the statistical significance of the trends in the Antarctic sea ice extent: an indication for a turning point**

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In the past decades, the Antarctic sea ice extent (SIE) has been steadily increasing, but recently showed a sharp decline. In this work, we address the questions whether (i) the observed changes in the Antarctic SIE can be fully explained by natural variability and (ii) whether the recent unprecedented decline in the SIE can serve as an indication that the long-term positive trend has reached a turning point entailing further decline. To study these questions, we analyzed data until May 2018 and applied a statistical model which accurately reflects the natural variability of the SIE. Contrary to earlier detection studies we find that none of the annual trends of the SIE in whole Antarctica and its five sectors are statistically significant. When studying the seasonal changes, we find that the only trends in the Antarctic SIE that cannot be explained by natural variability, are the negative trends of the SIE in austral autumn ( $p = 0.043$ ) and February ( $p = 0.012$ ) in the Bellinghausen and Amundsen Seas (BellAm). In contrast, when the recent decline is omitted from the analysis and only data until 2015 are included, the (annual and seasonal) increases of the SIE in whole Antarctica and the Ross Sea become significant, while the significance of the decreasing trends in BellAm is slightly decreased. We consider this as a first indication that the Antarctic SIE may have reached a turning point towards a further decrease.