



Klimarealistene
P.O. Box 33,
3901 Porsgrunn
Norway
ISSN: 2703-9072

Correspondence:

allan.astrup.jen-
sen@gmail.com

Vol. 3.4 (2023)
pp. 353-358

Time Trend of the Arctic Sea Ice Extent

Since 2007 no significant decline has been observed

Allan Astrup Jensen

Nordic Institute of Product Sustainability, Environmental Chemistry and Toxicology, Denmark

Abstract

The NSIDC website, IPCC's reports and some scientific papers have announced that the Arctic Sea ice extent, when it is lowest in September month, in recent years has declined dramatically, and in few decades the sea ice is supposed to disappear completely in the summer. In that way new and shorter ships routes will open up north of the continents.

The facts are, that the Arctic Sea ice extent measured by satellites since 1978 expresses annual variations and it has declined considerably from 1997 to 2007. However, before that time period, from 1978 to 1996, the downward trend was minimal, and in the last 17 years from 2007 to 2023 the downward trend has also been about zero. Therefore, there is no indication that we should expect the Arctic Sea summer ice to disappear completely, as predicted, in one or two decades.

Regarding the extent of the summer (February) sea ice at the Antarctic, the downward trend during the years 1979-2021 was very small but in 2022 and 2023 a considerable decline was observed, and a decline was also clearly observed for the whole period of 2007- 2023. That was in contradiction to what happened in the Arctic. The pattern of the annual levels was not the same for the Arctic and Antarctic, indicating different drivers in the North and the South.

These data show that there is no apparent correlation between the variable extent of the Arctic and the Antarctic Sea ice and the gradually increasing CO₂-concentrations in the atmosphere as proposed by NSIDC, IPCC and others, also for these areas of cold climate.

Keywords: Arctic Sea ice; Antarctic sea ice; annual sea ice trends; satellite sea ice data.

Submitted 2023-10-13, Accepted 2023-11-02. <https://doi.org/10.53234/scc202310/23>

1. Introduction

The paper of Serreze and Stroeve (2015) discussed the Arctic Sea ice average extent in September month over the period of satellite observation from 1979 to 2014 and found some interannual variability and a strong downward and steepening trend in ice extent. The paper presents a figure adapted from the National Snow and Ice Data Center (NSIDC) illustrating their conclusion.

A similar type of figure has been shown in some of IPCC's reports and is found, regularly updated, on the website of NSIDC. The latest from October 5th, 2023 is shown in copy in Figure 1 below:

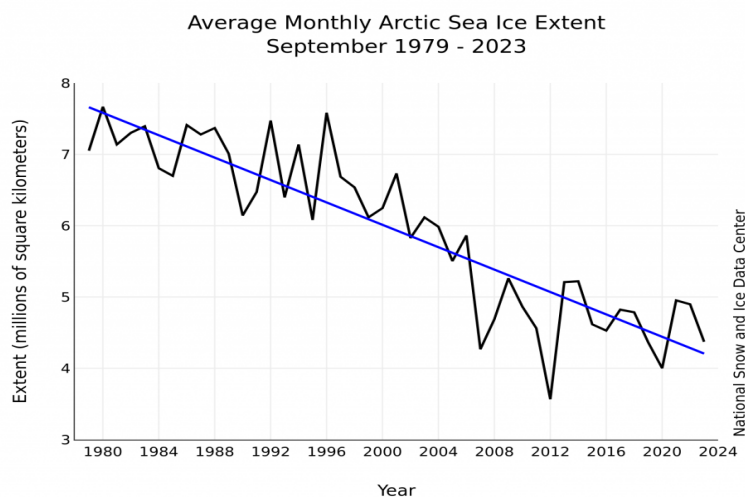


Figure 1: Average monthly Arctic Sea ice extent in September 1979-2023.

The trendline appears to show that the ice extent declines with about 10 % per decade and rather soon will be gone. The y-scale selected may suggest to the casual observer that the ice has almost disappeared.

During the years many predictions have been made concerning decline of the Arctic Sea ice. Overland and Wang (2007) made regional projections of Arctic Sea ice from the 20 models provided through the International Panel on Climate Change Fourth Assessment Report process. Based on the selection of a subset of models that closely simulate observed regional ice concentrations for 1979-1999, they found considerable evidence for a gradual loss of sea ice area of greater than 40 % by 2050 in summer for the marginal seas of the Arctic basin caused by greenhouse gas impacts. However, since the dramatical decline of the ice extent in 2007, the summer Arctic Sea ice area has not declined further.

This sharp decline in 2007 got Mark Serreze from NSIDC to predict that the Arctic Sea ice could melt completely as early as 2030.¹

In 2007 when Al Gore (and IPCC) received the Nobel Peace Prize, he mentioned in his acceptance speech both NSIDC's prediction and another study that estimated that the North Polar ice cap could be completely gone during summer in seven years' time.² Al Gore mentioned and took ownership of similar aggressive predictions in many talks at many occasions in the following years e. g. at COP15 in Copenhagen in December 2009, where he in a talk predicted that the summer ice could be gone in 2014 or 2016, as referred by USA TODAY online and CBS News, December 14, 2009. However, Figure 1 shows that in 2014 and 2016 the ice extent was much greater than in 2007 and 2009.

In the online edition of the British newspaper "The Guardian" September 17, 2012, professor Peter Wadhams from the Polar Ocean Physics Research Group at the University of Cambridge predicted a final collapse of the Arctic Sea ice in four years. That prediction was based on the all-time low sea ice extent in September 2012. Figure 1 shows that the ice cap did not collapse the following years but rather increased!

Further, in their 2021 report IPCC writes: "The September Arctic Sea ice is projected (by CMIP6 model simulations) to be practically ice-free near mid-century under mid and high GHG emissions scenarios."

¹ <https://earthobservatory.nasa.gov/images/8074/record-arctic-sea-ice-loss-in-2007#:~:text=According%20to%20the%20National%20Snow,percent%20below%20the%202005%20record.>

² <https://www.snopes.com/fact-check/ice-caps-melt-gore-2014/>

A recent modelling paper by Kim et al. (2023) predicted that the summer Arctic Sea ice would be completely absent in one to two decades, and one author was quoted for, on The Guardian website³ and other places, that it now was too late to save the summer ice, which had shrunk by 13 % a decade since satellite records began in 1979.⁴ That prediction/statement was of course wrong, unsubstantiated, unscientific, absurd and alarmistic.

2. The actual data on the development of the Arctic Sea ice extent

The website of NSIDC⁵ publishes spreadsheets with daily sea ice extents and monthly averages of sea ice extents since the satellite measurements began in 1978/79. The lowest levels are always in September month. The column diagram in Figure 2 shows the lowest daily sea ice extent in September together with the average sea ice minimum extent for September month for all years with satellite measurement of the Arctic Sea ice extent.

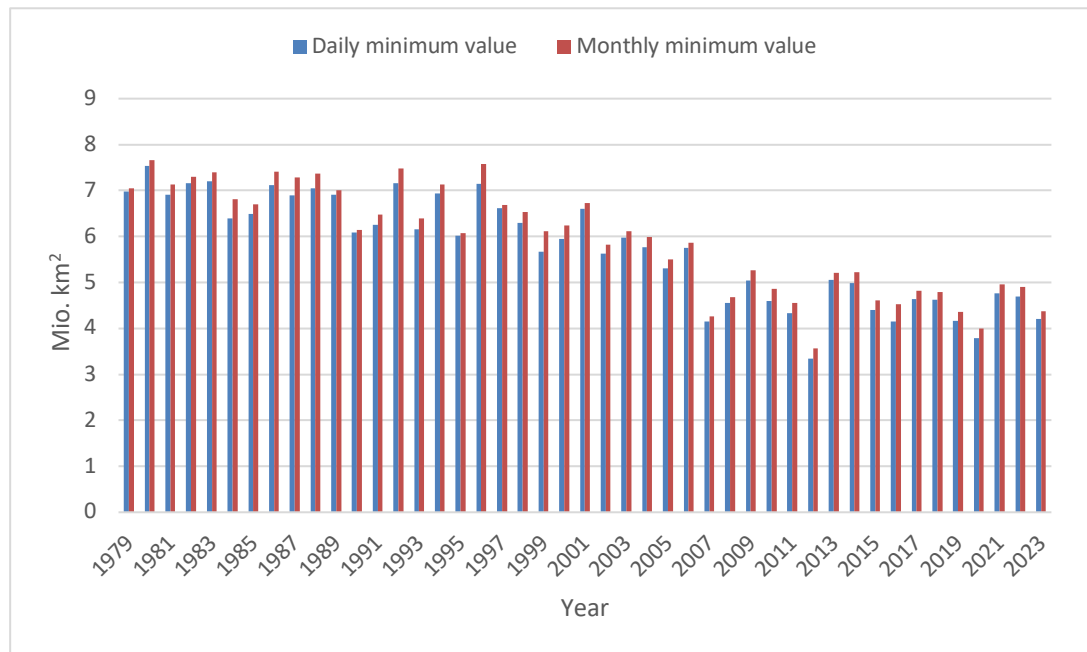


Figure 2: Arctic Sea daily and monthly minimum ice extent values (data from NSIDC.org).

It is of course clear that the day minimum values are lower than the monthly averages. The day minimum value may happen on different September days.

According to the spreadsheet data, the lowest sea ice extent in 2022 was 4.69 Mio. km² on September 15th. In 2023, the lowest daily extent was on September 17th with 4.21 Mio. km², however NSIDC selected on their website September 19th with 4.23 Mio. km² as the September minimum extent in 2023.

When comparing Figures 1 and 2, it seems that a downward trend is not apparent from 1979 to 1996 and from 2007 to 2023. Moreover, it is clear that even the lowest sea ice extents measured are very far from zero! The plateaux in the earlier and later periods of measurements can also be seen in Figure 1, ignoring the inserted trendline.

Figure 3 shows a column diagram with the average minimum sea ice extent in September month, but only for the latest years 2007 to 2023.

³ <https://www.theguardian.com/environment/2012/sep/17/arctic-collapse-sea-ice>

⁴ <https://www.theguardian.com/environment/2023/jun/06/too-late-now-to-save-arctic-summer-ice-climate-scientists-find>

⁵ <http://noaadata.apps.nsidc.org/NOAA/G02135/seaiceanalysis>

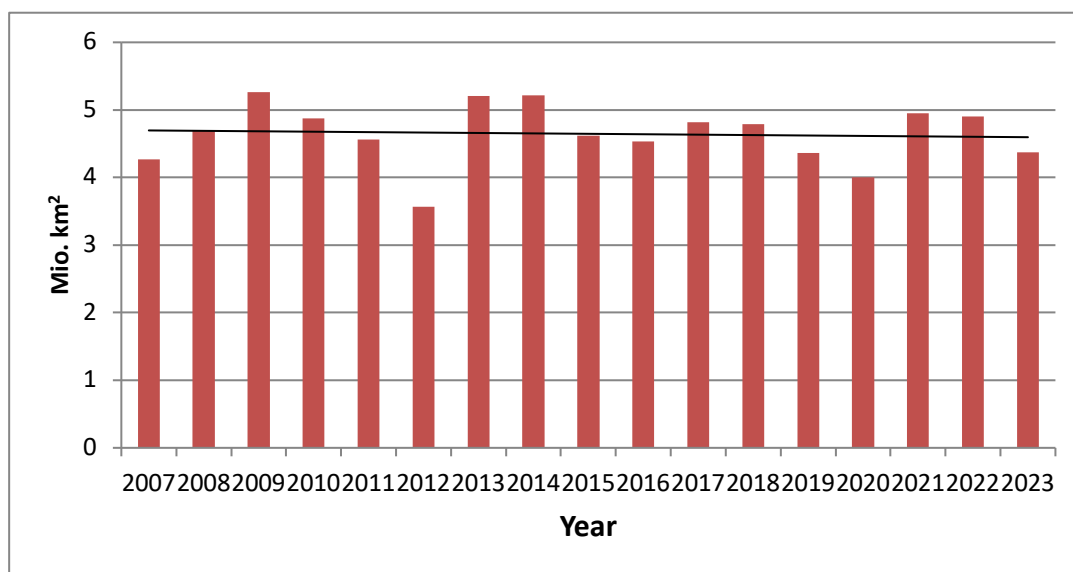


Figure 3: Average monthly minimum Arctic Sea ice extent for September 2007-2023 with trendline (data from <http://nsidc.org>).

According to this diagram, even with the rather low ice extent in 2023, there is no significant downward trend during the last 17 years (almost two decades) of satellite measurements.

3. Sea ice extent in the Antarctic

The sea ice extent in the Antarctic has also been measured in the years 1979-2023. The minimum ice extent is in February. In Figure 4 the data are shown in a column diagram with a trendline.

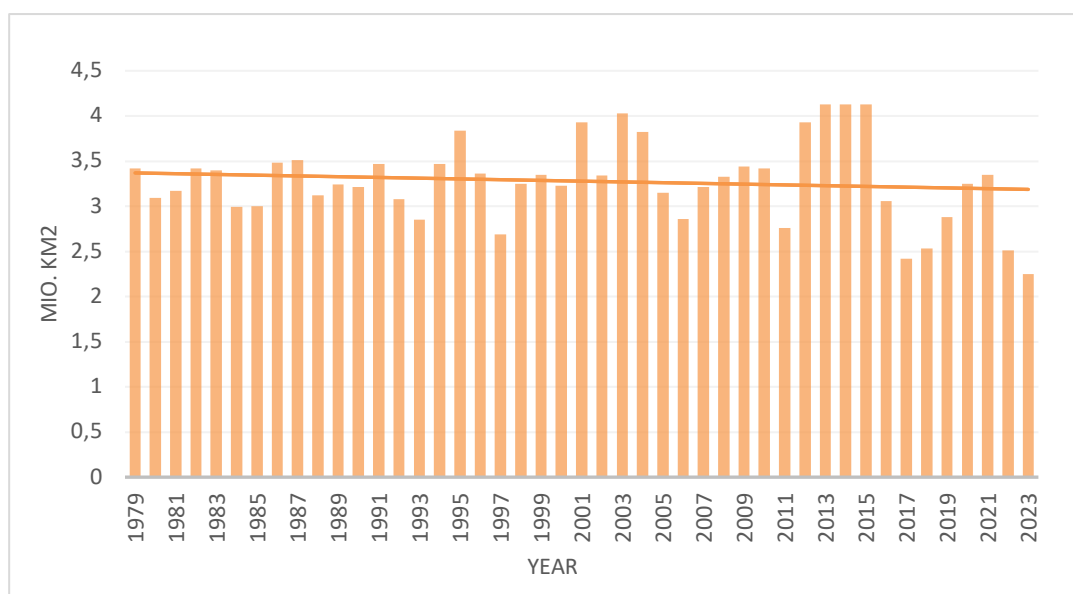


Figure 4: The minimum extent of the sea ice at the Antarctic in February month 1979-2023 (data from NSIDC.org)

The trendline has a small decline, because of low extents measured in the last two years. However, before that time the downward trend was minimal in the Antarctic, in contrast to what happened in the Arctic.

Figure 5 shows that during the last 17 years there has been a clear downward trend as opposed to the lacking downward trend in the Arctic.

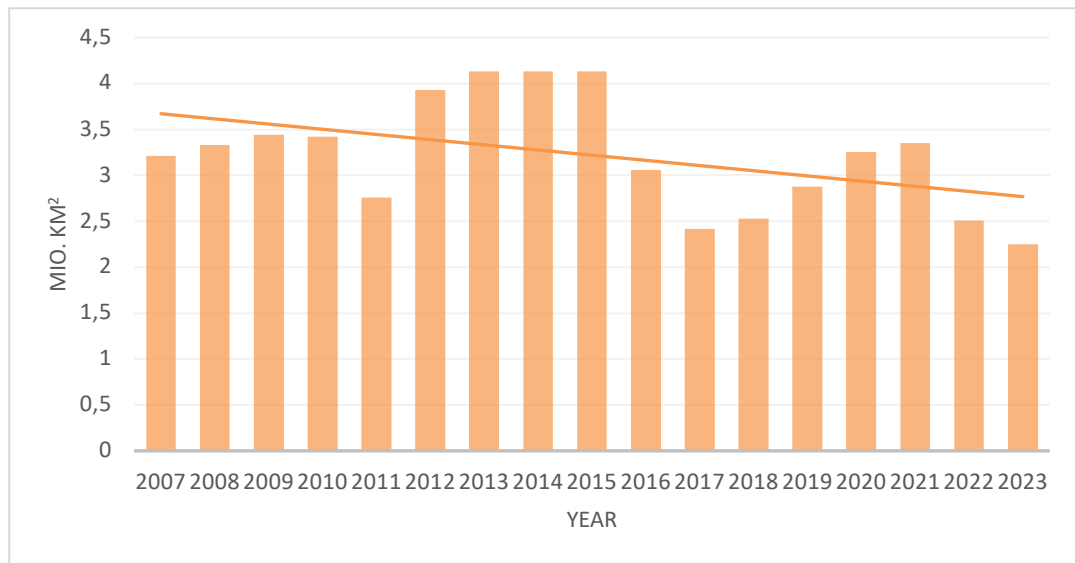


Figure 5: The minimum extent of the sea ice at Antarctica in February month 2007-2023 (data from NSIDC.org)

4. Discussion and conclusion

The Arctic Sea ice extent is measured by satellites and varies by day, month and year, and the yearly minimum ice extent will occur in a day of September month every year.

The ice extent is much lower now (2023) than in 1978, when the satellite measurements began. However, it has not been a gradual decline. A major decline happened during the years 1997 - 2007. Before that the decline was minimal and after that period, there was no significant downward trend.

Since the very low Arctic Sea Ice extent which happened in 2007, many scientists, organisations, media and communicators, including vice-president and Nobel Prize winner Al Gore, have predicted that the sea ice in the summer may completely disappear in few years or one to two decades. In that way new and shorter ships routes north of the continents will open up.

These predictions ignore the fact that the Arctic Sea ice extent during the last 17 years from 2007 to 2023 – almost two decades – has been stable without a downward trend. Therefore, there is no indication that we should expect the summer Arctic Sea summer ice to disappear completely in one or two decades, as predicted.

Regarding the extent of the summer (February) sea ice at Antarctic, the downward trend during the years 1979-2021 was very small, but in 2022 and 2023 a considerable decline was observed, and a decline was also clearly observed for the whole period of 2007- 2023. That was in contradiction to what happened in the Arctic. The pattern of the annual variation was not the same for the Arctic and Antarctic, indicating different drivers in the North and South.

These data shows that there is no apparent correlation between the variable extent of the Arctic and Antarctic Sea ice and the gradually increasing CO₂-concentrations in the atmosphere, as proposed by NSIDC, IPCC and others.

Funding

No external funding of the work.

Guest-Editor: Stein Storlie Bergsmark **Reviewers:** Anonymous

References

- Kim, Y-H., Min S-K., Gillett N.P., Notz D., Malinina E., 2023: *Observationally-constrained projections of an ice-free Arctic even under a low emission scenario*. Nature Communication, v. 14, 3139. <https://doi.org/10.1038/s41467-023-38511-8>
- Overland, J. E., Wang M., 2007: *Future regional Arctic Sea ice declines*. Geophysic. Res. Lett., v. 34, L17705. <https://doi.org/10.1029/2007GL030808>
- Serreze, M. C., Stroeve, J., 2015: *Arctic Sea ice trends, variability and implications for seasonal ice forecasting*. Phil. Trans. R. Soc. A, v. 373: 20140159. <http://dx.doi.org/10.1098/rsta.2014.0159>