14

Climate Change

and Ice Data Center

last 13 years. Source: National Snow

satellite era have all occurred in the

The 13 lowest ice extents in the

which is still the record minimum.

2007 and 2016—behind only 2012,

in the satellite record, along with

remaining low in the following two years.

tied for the second lowest minimum

(within the 40 years of satellite data) in 2017, and

In 2019, sea ice extent effectively

ice extent began to decline, reaching a record low

the sixth smallest extent on record.

have played a role. However, after 2014, Antarctic

rebounded somewhat, but was still

fresh water from melting ice shelves may also

2013, Arctic summer sea ice extent

1979 to 2000 (in orange outline). In

change; ocean factors such as the addition of cool

median summer sea ice extent for

contributed to the Antarctic pattern of sea ice

shown (in white) compared to the

in surface wind patterns around the continent

in September) was a record low,

atmosphere, ocean and sea ice system. Changes

sea ice extent in 2012, (measured

can readily occur from natural variability of the

The Arctic summer

Figure .

the Southern Ocean, such as those observed,

areas, such as that to the west of the Antarctic Peninsula experienced a decrease. Short-term trends in

Sea ice in the Antarctic showed a slight increase in overall extent from 1979 to 2014, although some

the ice decreases and more sunshine is absorbed by the darker underlying ocean surface.

unprecedented in at least the past 1,450 years. Because sea ice is highly reﬂective, warming is ampliﬁed as

the ice is thinner than it used to be. Estimates of past sea ice extent suggest that this decline may be

. Ice cover expands again each Arctic winter, but

[Figure ]

September) has decreased by about 40%

Since the satellite record began in 1978, the yearly minimum Arctic sea ice extent (which occurs in

Sea ice in the Arctic has decreased dramatically since the late 1970s, particularly in summer and autumn.

differences.

in summer and winter ice extent is different in each hemisphere, due in part to these basic geographical

ice survives the summer. Sea ice extent in both poles changes seasonally; however, longer-term variability

Because Antarctic sea ice forms at latitudes further from the South Pole (and closer to the equator), less

expand freely into the surrounding ocean, with its southern boundary set by the coastline of Antarctica.

Arctic, sea ice extent is limited by the surrounding land masses. In the Southern Ocean winter, sea ice can

by mountainous continental land masses, and Antarctica is a continent surrounded by ocean. In the

and its inﬂuence on atmospheric and oceanic circulation. The Arctic is an ocean basin surrounded largely

Some differences in seasonal sea ice extent between the Arctic and Antarctic are due to basic geography

ice change in the ocean around Antarctica.

changes in winds and in the ocean seem to be dominating the patterns of climate and sea

in the partly-enclosed Arctic Ocean seems to be responding directly to warming, while

Sea ice extent is affected by winds and ocean currents as well as temperature. Sea ice

12

Antarctic sea ice has changed little?

Why is Arctic sea ice decreasing while

n Q& A

