The Cryosphere
Discussions

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Comment

Interactive comment on "A simple approach to providing a more consistent Arctic sea ice extent timeseries from the 1950s to present" *by* W. N. Meier et al.

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In this contribution, Walt Meier and his co-authors construct a time series of sea-ice extent from 1953 to present by matching pre-satellite observations for the period 1953–1979 to a satellite time series starting in 1972, which in turn is matched against the NSIDC sea-ice index.

General comments

The 1953 to present time series of sea-ice extent that is developed in this contribution allows for a more consistent analysis of variability and trends than any other existing time series that I am aware of. *As such, this is an important contribution that in my*

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opinion is publishable after the specific comments given below have been addressed.
These comments are all scientifically minor, and many of them are suggestions rather
than requests for modifications.

Specific comments

Somewhat major suggestion

My only major comment relates to the absolute value of sea-ice extent that is implied by
the "consistent time series" presented here. As the authors state, a different approach
for constructing a "consistent time series" would have been to adjust the satellite ob-
servations upward rather than the pre-satellite observations downward. This obviously
doesn't matter for the analysis of trends and variability, but it does matter for a match-
ing of model simulations to the "consistent" time series. Compare, for example, the
two figures at the end of this review in which CMIP3 model simulations are shown with
(Fig.1) pre-satellite observations adjusted downward and (Fig. 2) satellite observations
adjusted upward. Obviously, the two methods result in a very different implied model
bias, which is why, based on their similarities in variability around their trend, we de-
cided for our 2012 paper to simply treat the two time series as independent data sets
with unknown "correct" mean.

Given that to my undestanding the NASA team algorithm underestimates sea-ice ex-
tent, I was wondering if you wouldn't do a better service to the community if you con-
structed a time series that doesn't include an absolute extent but only anomalies. This
is standard procedure for time series of the evolution of SST for example, which are
often just given as anomalies rather than absolute values for very similar reasons. Mod-
elers would then be forced to actively decide which data source they trust most when
calculating absolute sea-ice extent. As things stand now, I would expect many mod-
elers to simply follow your (somewhat subjective) choice of treating the NASA team
algorithm as the "truth", which would for example result in inconsistencies relative to
the NOAA/NSIDC Climate Data Record of Passive Microwave Sea Ice Concentration

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that is also meant to be "consistent". In practice, following this suggestion would primarily imply to change the y-axis in your Fig. 1 such that, for example, the 1953-value of the consistent time series always start at 0 and to give the absolute values in mean sea-ice extent that should be added if one wants to take either the pre-satellite or the satellite time series as the truth.

Minor comments

p.2828, l.16: I don't understand what you mean by "relative to the 1981–2010 mean". Why should a trend be relative to a mean?

p.2829, l.1+2: Some reference(s), at least to ACIA or the like, would be nice to have

p.2831, l.8; p. 2834, l.5, p.2840 l.25: You state several times that the pre-satellite record is inconsistent with the satellite record, but don't indicate in which way this materializes. You could for example cite in the introduction our GRL 2012 finding that the time series are very likely inconsistent because in March, the largest *positive* year-to-year change of the entire 1953-2010 time series happens across the 1978/1979 boundary, while in September the second largest *negative* year-to-year change happens across that 1978/1979 boundary (second to 2006/2007 change).

section 2.1 and 2.2: it'd be nice to briefly indicate which grids these products are obtained on, rather than only mentioning this in section 2.3

p.2833, l.26: I think there are some differences between HadISST and SII even during the period 1979–1996 (in addition to the bias correction), which seems to suggest that they are not entirely based on the same product as SII. While your "including" possibly indicates this, you might want to formulate this fact more directly.

p.2839, l.21: why only "nearly" continuously? Which month since 2001 was not below the average?

Technical comments

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p.2828, l.2: Shouldn't this be "Observations *from* passive microwave..."?

p.2838, l.4: It is not fully clear what the "smaller" refers to, in particular since you then talk about increasing and decreasing trends. Do you mean "positive" and "negative" trends, instead?

Interactive comment on The Cryosphere Discuss., 6, 2827, 2012.

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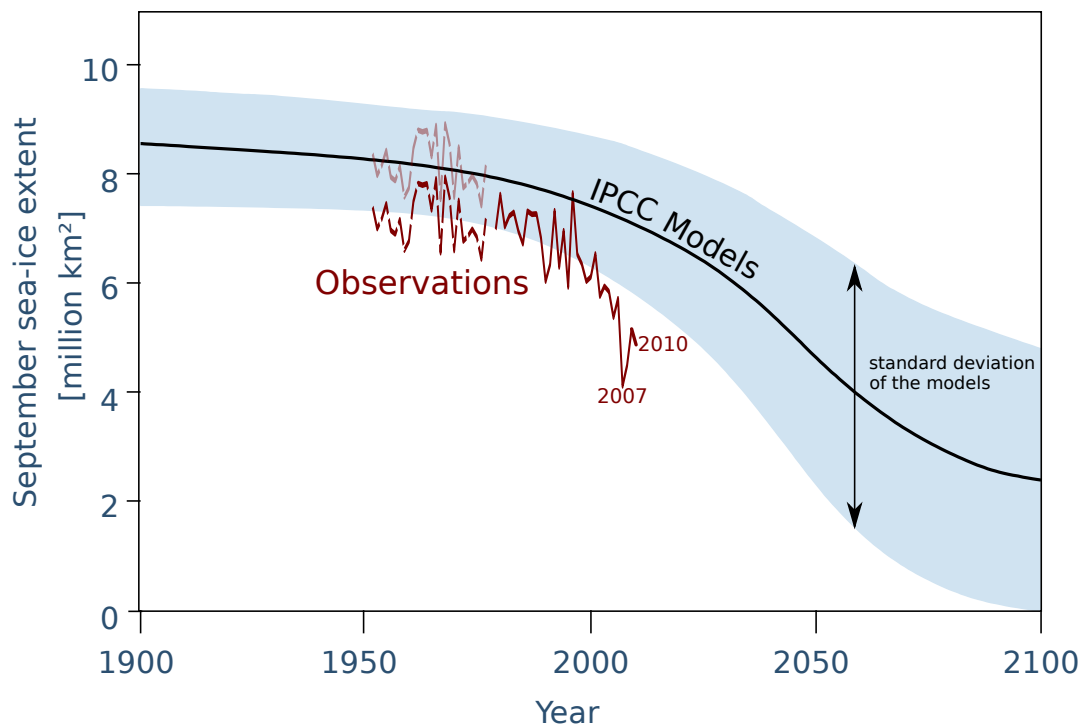
Fig. 1. Rough sketch to compare observations and CMIP3 models with pre-satellite record shifted downwards (shifts in this somewhat older figure were simply assuming no year-to-year change across 1978/1979)
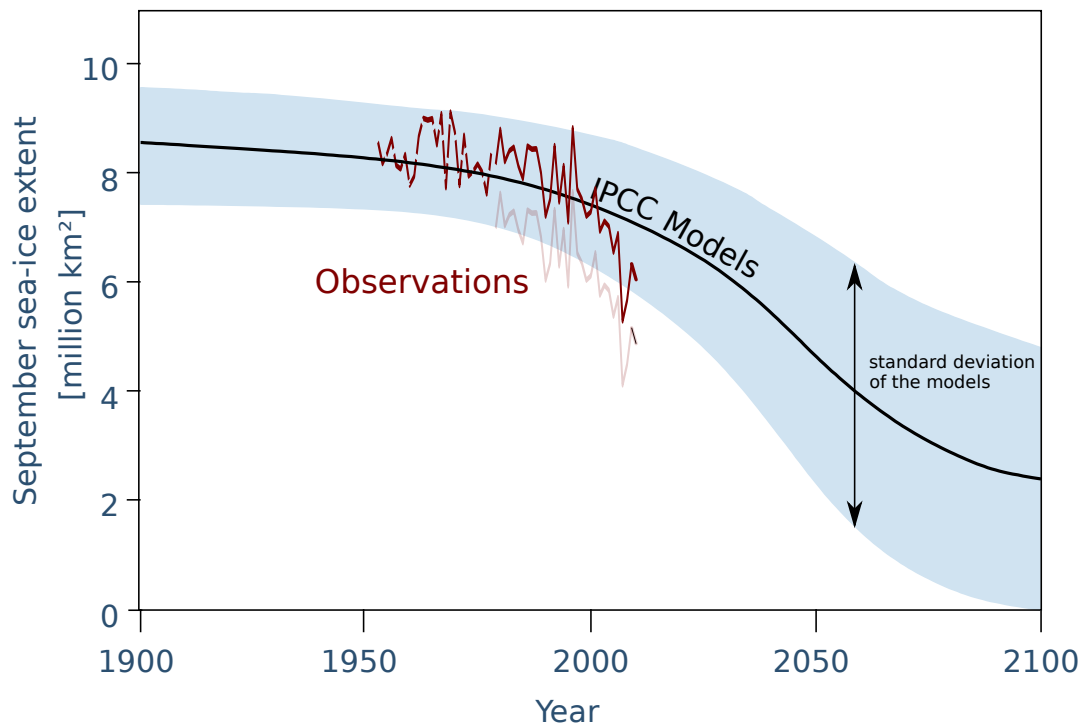
Fig. 2. Same as Fig.1, but instead with satellite record shifted upwards