Comment on "Estimating the extent of Antarctic summer sea ice during the Heroic Age of Antarctic Exploration" by Tom Edinburgh and Jonathan J. Day, The Cryosphere, 10, 2721–2730, 2016.

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In November of last year, an analysis based on records of ships logs during the Heroic Age of Antarctic Exploration (1897–1922) (hereafter HAAE) was compared with satellite data to draw conclusions concerning differences in localization of the sea ice edge. "This comparison shows that the summer sea ice edge was between 1° and 1.7° further north in the Weddell Sea during this period but that ice conditions were surprisingly comparable to the present day in other sectors." Despite the authors' approach of time consuming numerical effort, their methods and thus their conclusions are not valid, even as a first iteration.

Recently, it was shown in great detail that all meteorological data recorded in Antarctica during HAAE are useless proxies of past climate (Sienicki). It was evidenced that while committing the cherry picking fallacy and the tantamount of weather and climate, one arrives at false conclusions, concerning for example Captain Scott's weather record during his return from the South Pole. Said conclusions for weather temperature data of continental Antarctica (specifically a tiny part of it) also apply to minute data of the sea ice edge recorded in the past.
In their paper, the authors for their modern proxy used daily mean sea ice concentration for the period of 1989–2014, and then using a certain method the authors compared these moden *mean* numbers with data from the log books of various HAAE expeditions.

Firstly, the authors did not provide an answer to the meaning of calculating of the *mean* sea ice edge. Calculating the arithemtical mean $\langle x \rangle$ of random variable x– sea ice edge – is not a sound method, without first answering how this random variable probability distribution function $p(x)$ is distributed, and *if* $\langle x \rangle = \int_0^\infty xp(x)dx$ is integrable.

Secondly, and provided that the answer to the first objection of integrability is affirmative, the authors did not provide any rationale for comparing the modern sea ice edge proxy averaged over period of about 25 years with a *single*, individual point recording of ice edge on say December 5th, 1911 by the Terra Nova Expedition. Conversely, no relationship between daily *variability* of sea ice edge and its modern proxy (long term) was addressed and specified to draw a scientific conclusion.

Therefore, simply comparing a modern proxy with minute data points is unjustified and equivalent to confusing of climate with the weather at a given location.

The authors evoke El Niño to explain the 1902–1903 northerly expansion of sea ice edge as compared to modern proxy in the Weddell Sea area. However, this is a cherry picking fallacy and the authors hide the lack of El Niño on the ice edge recorded at the Ross Sea area during the Discovery Expedition (1901–1903) and the subsequent Terra Nova Expedition (1911–1913). Additionally, the authors ignore that their modern proxy contains several El Niño years.

The above concerns not only apply to the paper commented on here, but alsoto similar contrubtion (Stern) atempting to find the Arctic ice edge, which are using cargo cult science by a tantamount of weather and climate.

References

Sienicki, Krzysztof: Captain Scott: Icy Deceits and Untold Realities, Open Academic Press, Berlin-Warsaw, 2016, pp. 274.

Stern, Harry, L.: Polar maps: Captain Cook and the earliest historical charts of the ice edge in the Chukchi Sea, Polar Geography, 39(4)(2016)220-227.
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