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Ivan E. Frolov et al. (2009) on: Climate Change in the Arctic sea

Book review:

“Climate Change in Eurasian Arctic Shelf: Centennial Ice Cover Observations”

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Literally taken the Arctic is flooded with books and research papers, with little avail. The mechanism what drives climate changes, or ice coverage in the Arctic is still insufficiently understood. Just three years ago NASA expert Jay Zwally predicted an ice free Arctic Ocean by 2012[1]. Today, in autumn 2010, the assertion prove wrong. The sea ice cover has modestly increased again, and science is unable to explain why, and whether it is only a temporary halt, or a longer lasting reverse of trend.

Reference links :

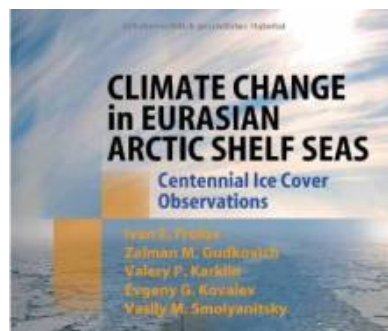
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As the lack of forecasting skill is immense, a new book[2], which predict a sea ice rebound, raise interest instantly. Four Russian experts from the eminent Arctic research facility AAIR[3] in St. Petersburg investigate the development in Eurasian Arctic Shelf during the last century concerning climate change and



ice cover observations[4]. In seven chapters they assess the relevance of the Arctic sea ice on climate during the 20th Century, possible causes of changes and how the future may look like in the 21st Century, with a two page

long summary[5].

The book is to recommend to anyone who is interested to get an overview of the parameters which may play a role for assessing the mechanism that drive the conditions in the Arctic. A book review, by A. M. Hamza, ([Here](#)) regards. "The data harvested from the Eurasian Arctic shelf seas might be very useful for scientists, and ... in Summing Up: Recommended. ... Upper-division undergraduates through professionals in environmental sciences."[6]

The book-blurb highlights particularly:

"In the first two chapters, they show that multi-year changes of the sea-ice extent in the Arctic Seas were formed by linear trends and long-term (climatic) cycles lasting about 10, 20 and 60 years. The structure of temporal variability of the western region (Greenland – Kara) differs significantly from the eastern region seas (Laptev and Chukchi). In the latter region, unlike the former area, relatively short-period cycles (up to 10 years) predominate. The linear trends can be related to a super-secular cycle of climatic changes over about 200 years. The most significant of these cycles, lasting 60 years, is most pronounced in the western region seas." ([Here](#))[7]

Whether the book's focus on the sea ice is a good idea to assess the source of climate change conditions in the Arctic is doubted, as sea ice extent and thickness seem to offer little on climatic cycles

(Ch. 2 & 3). The approach gains substance when atmospheric and hydrospheric processes (Ch.4), and subsequently the possible causes of changes in climate and Arctic sea ice extent (Ch.5) are discussed, including the widely discussed impact of CO₂ and solar activities. Little attention has been paid to quite different temperature deviation from long-term means between the summer and winter season. For example, the Arctic warming from 1919 to 1939, was actually a warming during the winter season, which indicates that the influence of CO₂ concentration and sun activities had a minor, or a different role in any observed changes, due to the long polar night from October to March. During the winter season the Arctic Ocean and the surrounding sea areas determine the weather conditions, and changes of climatic pattern. This is in no way reflected when the book concludes: "Over the period it seems possible that solar variations were the prime factor in climate change" (Conclusion, item 12).

As Frolov et al. investigated the 20th century, they should have taken the time to analyse what their predecessors had to say. But the discussion during the 1930s is completely ignored. None of the significant papers e.g. Birkeland (1930), O.V. Johannsson (1936), R. Scheraga (1936, 1937, 1939), C. E. D. Brooks (1938), Carruthers

SCHENK (1930, 1937, 1939), C.E.F. BROOKS (1936), CARLIERIS (1941), Manley (1941) is mentioned, nor the paper by Schokalsky, J. (1936); 'Recent Russian researches in the Arctic Sea and the mountains of Central Asia', in: The Scottish Geographical Magazine, Vol. 52, No.2, March 1936, p. 73-84; (for details see Ch. 3 (b), p. 30, at: http://www.arctic-heats-up.com/chapter_3.html) who at that time was President of the Geographical Society of the Soviet Union.

Most unfortunate, from the viewpoint of the reviewer, is the little interest, if not ignorance, the authors have shown for the oceanic influence. They explain the various parameters (Ch.4.6) but remain largely inexplicit on what to make out of the available data and observations. They mention the research of V.F. Zakharov [8] (Ch 4.1), and that „he was also able to explain localization of the most significant changes in the sub-Atlantic Arctic“, but actually do not answer a question that V.F. Zakharov (1997) [9] raised a decade ago:

- Why are the maximum climate fluctuations confined to the Atlantic sector of the Arctic?
- Why are these fluctuations pronounced, first of all, right here?
- Should the Atlantic sector of the Arctic be considered as a center of some kind, a source of climate change over the hemisphere?

The answer is that the first Arctic warming from 1919 to 1939 was generated in the sea area between Spitsbergen and the Fram Strait, which has been analysed in the book “Arctic Heats Up” (2009, p. 106) at: <http://www.arctic-heats-up.com> .

However, Ivan E. Frolov et al. are explicit with regard to climate models (Ch. 5.1) (excerpt):

“ ___ There are large discrepancies in the results of simulations of climate change using coupled atmosphere-ocean models, which testifies to the uncertainties inherent in the models,
___ These models are unable to simulate real historical climate changes... “,

summarizing in the Conclusion (item 14):

___ “Many climatologists have concluded that anthropogenic factors burning of fossil fuels, deforestation and other processes exert a strong influence on global warming in the 20th century. This was based on coupled –model simulations of the general circulation of the ocean, atmosphere, and ice cover. However, these models do not appear to reflect the cyclic features of variations in Arctic ice extent and climate”.

Finally Frolov et al. object the view that the recent rapid warming of polar temperatures and shrinking of multi-year Arctic sea ice are highly unusual compared to events from previous thousands of years, but forecast (Conclusion, item 15): “that continuing natural cyclic changes will bring about both decrease and increases in the ices extent of Arctic Ocean marginal seas.”

As much as the positive forecast is very welcome, it must be

acknowledged that it is based on the assumption that the findings on Arctic cycles do indeed allow to extrapolate the cycles forward into the 21st century. Whether that will work, may be known in a distant future only.

By: Amd-Bernaerts/20 Oct.2010

Blog:

Oct. 16, 2010: <http://wattsupwiththat.com/2010/10/16/arctic-ice-rebound%C2%A0predicted/>

[1] By Seth Borenstein, Associated Press, December 12, 2007, e.g. at National Geographic News: <http://news.nationalgeographic.com/news/2007/12/071212-AP-arctic-melt.html>, visited Dec. 2008, and 18 Oct.2010.

[2] Frolov, Ivan E.; Zalmann M. Gudkovich; Valery P. Karklin; Evgeny G. Kovalev, and Vasily M. Smolyanitsky (2009); "Climate Change in Eurasian Arctic Shelf: Centennial Ice Cover Observations", Berlin; (Springer/Praxis (2009) ISBN 9783540858744"

[3] Arctic and Antarctic Research Institute, St. Petersburg, Russia

[4] Frolov, I.E., Gudkovich, Z.M., Karklin, V.P., Kovalev, E.G., Smolyanitsky, V.M. (2009); "Climate Change in Eurasian Arctic Shelf Seas - Centennial Ice Cover Observations", Berlin & Chichester, pages 176.

[5] The seven chapters:

- __1. Arctic sea ice as an element of the global climate system (p.1-5)
- __2. Long-term changes in the Arctic Seas ice extent during the twentieth century (p.7-23)
- __3. Variability of sea ice thickness and concentration in the twentieth century (p.29-35)
- __4. Consistency among sea ice extent and atmospheric and hydrospheric processes (p.37-83)
- __5. Possible causes of changes in climate and Arctic Seas ice extent (p.89-108)
- __6. Assessment of possible changes in air temperature and sea-ice extent in the Arctic Seas in the twenty-first century (p.113-117)
- __7. Conclusions (p.131-133),
- __ Appendix A, B & C (p.134-144) ; References (p.145-164)

[6] A. M. Hamza, Choice, Vol. 47 (7), March, 2010 at: <http://www.springer.com/environment/global+change+-+climate+change/book/978-3-540-85874-4?detailsPage=reviews>

[7] At: <http://www.springer.com/environment/global+change+-+climate+change/book/978-3-540-85874-4>

[8] The book's References lists seven V.F. Zakharov papers between 1976 and 2000, six in Russian, one in English (see next Fn).

[9] Zakharov, V.F. (1997) 'Sea Ice in the Climate System', Arctic Climate System Study, WMO/TD-No. 782, p.70f.