

***Interactive comment on* “Towards understanding hydroclimatic change in Victoria, Australia – why was the last decade so dry?” by A. S. Kiem and D. C. Verdon-Kidd**

Anonymous Referee #1

Received and published: 16 November 2009

General comments

This paper investigates large scale drivers for Victoria, how they modulate synoptic patterns and in turn seasonal rainfall and runoff. It does so by a combination of literature review (in particular the authors prior work) and some new analysis. Unfortunately, in my opinion, the combination is muddled. Because the results and discussion are not separated, it is unclear to me what aspects are new. I am left with the impression that the majority of data and findings have already been published elsewhere by the authors, with the exception of some new analysis that appears to be inconclusive.

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A review paper might still be publishable but for that to happen, the substantial body of literature (both peer-reviewed reports and journal articles) needs to be fully reviewed and new insights would need to result. I believe neither of these are currently achieved.

I recommend the authors to reconsider what aspects of the analysis or synthesis in this manuscript are novel, and – if they are sufficient - use this as the basis for a new manuscript.

If they feel a comprehensive review is timely than they should take note of the sizeable amount of analysis contained in the reports produced by the SEACI initiative (of which they are aware) and the Murray-Darling Basin Sustainable Yields project (www.csiro.au/partnerships/MDBSY; which already reported on trends and projections for seasonal rainfall and rainfall-runoff relationships in northern Victoria) as well as related journal publications by Bertrand Timbal, Francis Chiew, and others scientists involved in these.

Technical comments and corrections

Abstract:

- “Lowest on record” – mention length of record
- “While severe decreases” – subjective, delete ‘severe’
- “which takes into account insights into..” → “that takes into account..”

Section 1

Page 1

- “extremely low” – compared to what? Be specific.
- (~60%) -> (~60% of the total decline)
- “drier autumns” This has been well published – refer to SEACI and MDBSY reports.

Page 2

- 'rest of the year' -> mainly 'following winter' I would have thought?

- 'is not totally explained by' -> Pls review what other factors they suggested or speculated on. See also SEACI and MDDBSY reports on this.

Section 2.1

- 'historical records .. representative of 'natural' streamflow' : (1) define natural here or elsewhere (2) further on you mention the Goulburn d/s Eildon. How is this natural?

- 'except Goulburn and Yarra...REALM' – Does this mean you used modeled rather than observed data? Use of modeled data would be unacceptable in a study like this.

Page 3

- 'infilled'- > 'gapfilled' is the more common term?

Section 2.3

- pls provide a table with gauge codes and indicate their location in the map pls

Section 3

- 'As mentioned...'- > indeed already mentioned, I still remember. Pls delete

- 'long term average'-> list years pls

- '(only two shown here) '- > delete

- 'elevated and suppressed' -> rephrase?

Page 4

- 'far east changes' - > can this be connected to the earlier climate shift further west in WA?

- 'the 'post-1997 climate shift' initiated' Why the " ? What is the significance of these 4 words? Probably requires a reference to an earlier use or an explanation as to why it

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is a commonly used concept.

- 'Importantly, . . . Fig 2,' -> unnecessary, delete.

- '~1935 switch to dry' - > not very readable - suggest rephrase as 'drier conditions around to 1935' and so on. How about colour coding wet and dry epochs in the figures?

- 'the Federation drought'- > insert 'so-called'

Section 3.1

- 'Importantly, not only is there'-> 'There is'

- 'extreme rainfall events' - > or do you mean extreme seasonal rainfall? Not the same.

Page 5

- Fig 4b and associated text - > I am getting confused here. The source & processing needs to be explained here. If it is from another publication, it needs proper referencing in text and in figure and should be removed from what appear to be results and brought to either introduction or discussion. If it is new material, the methods need to be described properly.

- 'This is consistent. . . rain?' -> delete, adds nothing.

- 'There is limited understanding. . . (e.g. Cai and Cowan, 2008b)' The authors fail to review a sizeable number of analyses that have been published about this (certainly the reference given is not the best either). Please review journal and report literature: SEACI, MDBSY and derived papers by Chiew and others.

Section 4

- 'Vernon-Kidd and Kiem (2009) identified 20 Climate of Victoria' OK so this is already published. Why does this need to be repeated then?

Page 6

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- 'consistent with. . . SEACI'. Indeed, which raises the question as to what is novel about these results.

- 'rain producing troughs' I am very surprised that the work of Timbal and others is not referred to here. Section 4.2.

- 'Refer to Kiem and Verdon-Kidd (2009)' OK, so given that it is already published, why does it need to be repeated here? This reference is repeated several times, which suggests to me that there is little point to include it all again here.

Section 5

- "However, the rainfall-runoff . . . underestimated" There are several flaws with the Cai and Cowan analysis and indeed this is one of them. However, again this is already addressed in various SEACI and MDBSY publications.

Page 10

- 'Fig 7a shows that. . .' -> here there seem to be some new findings, but unfortunately they appear open ended.

Section 6

- All three conclusions are already well and truly out there in the peer-reviewed as well as grey but electronic literature. Refer Bureau of Meteorology, DSE, SEACI, MDBSY, papers and reports by Timbal, Chiew etc. The next statement about the changed seasonal distribution is not novel but more interesting, however probably rightly not included as a conclusion here because the analysis was inconclusive.

Tables and figures

- Table 1: last date is 2006 – not very up to date. This info should be available to a much more recent date.

- Figure 2: not very clear. In particular, please indicate missing years.

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- Figure 3: please increase detail in vertical direction (by changing axes or figure size)

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 6181, 2009.

HESSD

6, C2637–C2642, 2009

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