We would like to thank the anonymous reviewer for their positive review and suggestions for improvement of the paper "Links between the Big Dry in Australia and hemispheric multi-decadal climate variability – implications for water resource management" by Verdon-Kidd et al. Details of how we have addressed the reviewer's comments are included below:

General Comment: "It is a shame that this methodology is not extended to SWWA rainfall stations, with a subsequent comparison between east and west, as this could provide more tangible evidence to back the authors' claims that the wet spell in SEA is indeed a temporary reprieve from the drying trend since the 1970s in SWWA. The comparison with other southern hemisphere land masses could also be enhanced with at least a reference to, and discussion of, other papers of interest, e.g. Cai et al. (2012)."

Authors' response: A companion paper was submitted (for the special issue on Drought Forecasting and Warning) addressing synchronicity of droughts across the Southern Hemisphere (see **hess-2013-521**). This paper details a subsequent investigation into the occurrence and causes of droughts across the Southern Hemisphere land masses during the period from 1900 to present. The paper has recently been accepted for publication in HESS and will be referenced and discussed in the revised paper (along with the Cai et al (2012) paper suggested by the reviewer).

Specific comments:

1. "Many of the figures could easily be improved for clarity, for example: font sizes in-creased throughout; and the panels in figures 2-3 could be aligned to make comparison easier. Figures 8 and 9 are crucial for the paper, and I recommend improving these substantially. The authors go to great lengths in the text to explain the different synoptic patterns that bring or withhold rainfall to southern Australia and their relative importance to different geographical areas. It is apparent that the SOM methodology has identified and classified these systems, but it is very difficult to identify differences between the contour maps in figures 8 and 9. An improved colour scheme may help here, but perhaps also better organisation of the material and its relationship to figures 10-11 need to be considered. Perhaps even only representative synoptic types need to be considered in detail. There is clearly a structure to the classification system as noted by the authors (e.g. that in general the top half is westerly flow, and the bot- tom half is easterly flow), however it is not clear what exactly the alphanumeric (i.e. 1-5, A-D) scheme represents, and combined with the apparent similarity of many of the synoptic types, it is difficult for the reader to draw firm conclusions from this section. Moreover, the SOM methodology is not described in much detail at all in this paper. I don't suggest a detailed description, but some insight into the type of classification this procedure does would be useful (e.g. is it cluster-based, or related to rainfall amounts?)"

Authors response: As per the reviewer's suggestion, panels in Figures 2 and 3 will be aligned into one figure to make direct comparisons easier. Font size in figures will be increased where possible to improve clarity.

The synoptic charts shown in Figures 8 and 9 will also be improved by labeling the troughs, ridges and depressions discussed in the paper for a selection of representative types identified (these will be enlarged). This will aid in interpretation of the figures. The alphanumeric system is used to label/identify each of the 20 types, a system that is commonly employed in this type of analysis (e.g. Hope et al 2006, Hewitson ad Crane 2002 etc). The types that are most similar are located close together in the SOM grid, while those that represent different conditions are located in opposite corners of the SOM grid. The

SOM methodology is cluster based (using a neural network approach) where similar ‘patterns’ of sea level pressure are identified and grouped together. The user determines how many groups to identify (in this case 20 was determined to be appropriate). The synoptcis types that are closest together in Once the synoptic types were identified and labeled (using the alphanumeric system), the variability in frequency of the types over time was analysed and the rainfall associated with each type was determined (to identify ‘dry’ and ‘wet’ types). This will be clarified in the revised paper.

2. “The climate scenarios examined in section 7 in order to ascertain the effect on runoff is perhaps the least successful part of the paper. To me, it seems perilously close to circular reasoning: the rainfall decline since the 1970s would be more pronounced without the wet seasons in the late 1980s, and if these wet years are replaced by aver- ages, streamflow is reduced and drought risk is enhanced. Indeed, the main findings of this section, as summarised in the last sentence of section 7, are clearly self-evident without any further analysis.”

Author’s response: We acknowledge that the theory proposed is fairly simple (i.e. that the absence of wet seasons would result in reduced flow/soil moisture), however we feel that it is important to demonstrate the theory, given that the purpose of the paper is to reach a wide audience (both climatologists and hydrologists/water resource managers). In particular we wished to demonstrate that the ‘wet’ seasons that occurred in the late 1980s and early 1990s had an overall large impact on the resulting water availability trends for the region. The aim of this section was therefore to determine the importance of seasonal rainfall in overall streamflow/soil moisture trends in SEA and to provide a scenario similar to SWWA that may have eventuated if it the autumn/winter rains had also failed during the later 1980s and early 1990s. Given this, we feel that Section 7 has merit and important implications as discussed in Section 8.

3. “Technical corrections: The DSE reference has year 2011 and 2012 in different parts of the paper.”

Author’s response: This has been corrected in the revised paper.