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Interactive comment on “Precipitation variability in the winter rainfall zone of South Africa during the last 1400 yr linked to the austral westerlies” by J. C. Stager et al.

Anonymous Referee #1

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General comments

This paper describes an interesting and valuable sediment record from the winter rainfall region of South Africa, which was used to infer precipitation changes during the last 1400 yr. Comparison with other Southern Hemisphere records shows synchronous fluctuations with the Siple Dome Antarctic ice core chemistry but less so with other South African and South American records. In general I think that the analyses are sound and the conclusions careful enough. Much of the story depends upon a correct interpretation of the diatoms record, however. Therefore I think that inferences made based on the diatoms in the Verlorenvlei record need to be better substantiated by a

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more detailed and quantitative analyses of the autoecology of the main diatoms. The paper only refers to old papers and books, and the identifications need to be verified with recent literature. This is particularly important as closely related, morphologically similar species can yet have very different ecologies. The material and methods section states that ecological interpretations of the diatom assemblages were based upon plankton tows and surface sediment samples collected from across Africa by the first author but this should be substantiated by quantitative data showing how the key taxa differ in their ecologies. One potential alternative explanation of the variation in planktonic vs epiphytic taxa in such shallow environments is that the site experienced a transition from clear-water macrophyte dominated state to a turbid state. Such alterations can be related to climatic variation but may also be promoted by food web changes. This merits some consideration.

Specific comments

Section 3.2 geochronology. A figure presenting an overview of the features used in the core description would be useful here. Section 3.3 diatom records. As mentioned above, provide salinity optima for key species. Section 4.1. add references to other climate reconstructions from the Cape region (including those from some of the authors of the present manuscript). From these records it is inferred that also over a longer time scale warm and dry conditions have occurred during the Medieval warm period, which merits to be mentioned and discussed within the context of this paper. Table 1 : place dates in stratigraphic order Fig 3 g I can not see a dotted line; the dating of the bottom part of the core was done on bulk sediment, though. Fig 6 Add *Pseudostaurosirella* en *Staurosirella pinnata* als tychoplankton species. These taxa are often abundant both in the plankton and littoral of shallow lakes. Is the *Cocconeis* species found also an indicator of increased salinity? Provide evidence for this. Fig 7 Y-axes should be labeled with %CO₃.

Interactive comment on Clim. Past Discuss., 7, 4375, 2011.

