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A first calibration of nonmarine ostracod species for the quantitative estimation of Pleistocene climate change in southern Africa

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Although qualitative statements have been made about general climatic conditions in southern Africa during the Pleistocene, there are few quantifiable palaeoclimatic data based on field evidence, especially regarding whether the area was wetter or drier during the Last Glacial Maximum. Such information is critical in validating models of climate change, both in spatial and temporal dimensions. As an essential preliminary step towards palaeoclimate reconstructions using fossil ostracods from cored lake sediment sequences, we have calibrated a training set of living ostracod species' distributions against a modern climate dataset and other available environmental data. The modern ostracod dataset is based on the collections in the Royal Belgian Institute of Natural Sciences in Brussels, which constitutes the most diverse and comprehensive collection of southern African nonmarine ostracods available anywhere in the world. To date, c. 150 nominal species have been described from southern Africa (Martens, 2001) out of c. 450 species in the total Afrotropical area (Martens et al., 2008). Here we discuss the potential value and limitations of the training set for the estimation of past climatic parameters including air temperature (July and January means, maxima and minima, Mean Annual Air Temperature), precipitation, water conductivity and pH. The next step will be to apply the Mutual Ostracod Temperature Range method (Horne, 2007; Horne & Mezquita, 2008) to the palaeoclimatic analysis of fossil ostracod assemblages from sequences recording the Last Glacial Maximum in southern Africa. Ultimately this work will contribute to the development of a glacier-climate modelling project based on evidence of former niche glaciation of the Drakensberg Escarpment.

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