

Corrigendum

Corrigendum to “Global ice volumes at the
Last Glacial Maximum and early Lateglacial”
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In the above article an erroneous distinction was made between the ice-volume equivalent sea level $\Delta\zeta_e(t)$ (defined by Eq. 3) and eustatic sea level $\Delta\zeta_{eus}(t)$. In the absence of other factors contributing to sea-level change (thermal expansion, melting of mountain glaciers not included in the ice models, or changes in ground- and surface-water storage) $\Delta\zeta_e(t)$ corresponds to eustatic sea level. Eqs. 4 and 5 state that the two are different but this is incorrect since the averages of the terms over the oceans must vanish in order to conserve mass as has been repeatedly stated in earlier papers by the authors. The error was a result of a programming error introduced in the output of the sea-level code whereby, at the end of each iteration, the mean sea-level change is computed. In our formulation sea-level change is non-zero over land so as to permit the calculation of change along narrow waterways, the tilting of inland lakes and the changing elevations of inland barriers or sills of lakes. Thus the appropriate areal integral is over the ocean surface, whereas the erroneous quantity calculated at this stage was the average over the entire globe. Because this was found to be different from that estimated from the ice volumes directly, and because of

the similarity in magnitude, it was seen as an explanation for the distinction sometimes made between sea-level equivalent and eustatic sea level (e.g. Denton and Hughes [13], p. 74), rather than as being incompatible with the condition of conservation of mass.

The integration of the sea-level change over the oceans requires a knowledge of the location of the shoreline at each time step, of the grounding line of the ice and of the part of the shelf ice that floats or grounds as a result of sea-level change and shelf-ice thickness change. The mistake was introduced in 1998 modifications to the code when this treatment of the shelf ice was improved. Fortunately this erroneous estimate of the mean sea-level change at no stage feeds back into the main part of the sea-level calculation because there the correct estimate, based on the ice-volume change, is used. Thus the relative sea-level predictions are unaffected and the relation between $\Delta\zeta_e(t)$ and ice volume (Eq. 3, below) remains correct. None of the conclusions about ice-volume change are affected.

In the paper it was noted that ‘Some inconsistency has crept into the usage of the term eustatic sea level to which the senior author has contributed’. Unfortunately the senior author contributed further to this confusion by allowing himself to be convinced that the wrong argument to explain the difference was correct. Hopefully that was a temporary lapse! We thank W.R. Peltier for drawing this lapse to our attention.

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