

What's Happening to *mb*?

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The global *mb*/frequency distributions of the ISC Bulletin and the NEIS PDE show evidence of a growing bias in *mb*. ISC and NEIS each compute *mb* principally from amplitudes reported by other agencies including, for the ISC, the prototype IDC. A growing bias might be attributable to changes in siting, instrumentation, or procedures; comparing annual changes in the bias with other changes since 1994 reduces the ambiguity. Among amplitudes used by the ISC, the proportion reported by the pIDC has grown slightly (54% in 1996, 57% in 1997) and the average difference between *mb* from IDC and non-IDC stations has also increased a bit (0.32 in 1996, 0.33 in 1997). But even together these two small changes are insufficient to account for an apparent increase in *mb* bias of 0.1 magnitude units from 1996 to 1997. It is conceivable that stations newly reporting amplitude other than those in the pIDC bulletin are biased low, but there is no significant difference between 1997 *mb* computed from "new" non-IDC stations and "old" stations, i.e., those with reported amplitudes in the 1994 ISC Bulletin.

Thus it seems that stations that have been reporting amplitude at least since 1994 are now reporting smaller amplitudes, meaning that the growing bias is due at least partly to changes other than siting on "low noise" sites that also turn out to be "low signal" sites. Such changes might be related to installation of broadband sensors and digital recording systems or to new procedures for measuring or reporting amplitude. For example, the distributions of station magnitudes contributing to each network magnitude have become less skewed, suggesting that some small amplitude signals that were previously neglected are now being reported. It may be possible to find supporting evidence for this suggestion in the proportion of amplitudes from stations near focal mechanism nodal planes.

[Poster](#)