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# Seismic moment of the great 2004 Sumatra earthquake from individual observations of split singlets of the Earth's gravest modes

S. Stein and **E.A. Okal**

Dept. of Geol. Sci., Northwestern University, Evanston, IL 60208, USA

In the aftermath of the great Sumatra earthquake of 26 December 2004, an increasingly large number of observations suggests that the seismic moment (3.95*10**29 dyn-cm) available at the time of writing (20 Jan. 2005) may still underestimate the true size of the static moment release. These include the extent of the aftershock zone, the time offset of the centroid moment, the exceptional directivity observed at the lowest frequencies (3 mHz) on multiple passages of surface waves, and the quality of tsunami simulations using a longer fault than inverted by source tomography. In order to resolve this issue, we study the amplitude of the Earth's longest normal modes (principally 0s2 and 0s3) excited by the Sumatra earthquake. The event is so large that individual singlets resulting from the splitting of the longest period normal mode multiplets by rotation and ellipticity can be individually resolved. Hence filtering multi-day seismic records to isolate time series of the displacement due to individual singlets and then forming their Hilbert transform envelopes makes it possible to directly estimate both the mode's attenuation and the moment at very long periods.