

The 2004 Sumatra Tsunami as Observed on the Atlantic Coast of South America

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Although the 2004 Sumatra tsunami was the third worldwide event of this type, it was the first for which there were high-quality tide gauge measurements. For the very first time, a tsunami signal has been clearly recorded along the Atlantic coast of South America, from Argentina to Brazil's northeast. Digital or analogue digitized tsunami records from 7 stations, with time resolution ranging from 1 to 10 minutes, were analyzed and observed tsunami wave characteristics (arrival times, main periods and maximum wave heights) were estimated and compared. Preliminary results indicated that, despite some local effects, in general the largest amount of energy was concentrated on the Brazilian coast around 20°S , in good agreement with the numerical results by Titov et al. (2005). The largest tsunami heights were observed at Ubatuba (São Paulo), where tsunami wave amplitudes had almost the same order as tidal oscillations (about 1 m), and at Arraial do Cabo (Rio de Janeiro), with about 0.9 m highest wave. South and north from these points, the tsunami energy was significantly smaller. Using Munk's acoustic analog model, we estimated tsunami energy decays: $E(t) = E_0 \exp(-\alpha t)$ for $t > t_d$, where t is time, t_d is the diffusion time (required for tsunami waves to become isotropic), $\alpha = 1/t_0$, and t_0 is the decay (e-folding) time. The estimated parameters were found to be: $t_d \sim 7$ h and $t_0 \sim 17$ h for the Brazilian coast. Spectral characteristics of the tsunami records were calculated and used to reconstruct the spectral source functions.