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Séverine Rosat, Tadahiro Sato, Yuichi Imanishi, Jacques Hinderer, Y. Tamura, et al.. Correction to "High-resolution analysis of the gravest seismic normal modes after the 2004 Mw = 9 Sumatra earthquake using superconducting gravimeter data". *Geophysical Research Letters*, 2012, 39, pp.L22601. 10.1029/2012GL054248 . hal-00754943

**HAL Id: hal-00754943**

**<https://hal.science/hal-00754943>**

Submitted on 15 Apr 2022

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# Correction to “High-resolution analysis of the gravest seismic normal modes after the 2004 $M_w = 9$ Sumatra earthquake using superconducting gravimeter data”

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Received 17 October 2012; published 16 November 2012.

**Citation:** Rosat, S., T. Sato, Y. Imanishi, J. Hinderer, Y. Tamura, H. McQueen, and M. Ohashi (2012), Correction to “High-resolution analysis of the gravest seismic normal modes after the 2004  $M_w = 9$  Sumatra earthquake using superconducting gravimeter data,” *Geophys. Res. Lett.*, 39, L22601, doi:10.1029/2012GL054248.

[1] In the paper “High-resolution analysis of the gravest seismic normal modes after the 2004  $M_w = 9$  Sumatra earthquake using superconducting gravimeter data” by S. Rosat et al. (*Geophysical Research Letters*, 32, L13304, doi:10.1029/2005GL023128, 2005), a method proposed by Dahlen [1982] was employed to compute the errors on the estimated frequencies; however, a mistake was made when implementing the method, so that the error bars were inconsistent with the signal-to-noise ratio. Indeed we used only one sample to estimate the noise spectrum instead of averaging over many samples of the demodded spectrum in the vicinity of the mode frequency. Another problem came from the fact that the

estimated amplitude and quality factor of the mode used in the variance computation are correlated. We have then improved the least-squares fit by optimizing with a Levenberg-Marquardt algorithm [Marquardt, 1963].

[2] To bring some constraints on the 3D density structure of the Earth, a reliable error estimate of the eigenfrequency is required [Häfner and Widmer-Schmidrig, 2012]. The revised error bars (Tables 1, 2 and 3) are much more robust than those published in the 2005 paper.

## References

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**Table 1.** Observed Frequencies of  ${}_0S_2$  After the 2004 Andaman-Sumatra Earthquake

	${}_0S_2$ Frequencies, mHz					
	m = -2	m = -1	m = 0	m = 1	m = 2	Mean Frequency
Canberra	$0.29996 \pm 7.2 \cdot 10^{-5}$	$0.30458 \pm 1.7 \cdot 10^{-4}$		$0.31379 \pm 2.1 \cdot 10^{-4}$	$0.31844 \pm 5.7 \cdot 10^{-5}$	$0.30919 \pm 1.3 \cdot 10^{-4}$
Esashi	$0.29983 \pm 8.2 \cdot 10^{-4}$	$0.30472 \pm 1.4 \cdot 10^{-3}$		$0.31383 \pm 1.8 \cdot 10^{-3}$	$0.31853 \pm 7.2 \cdot 10^{-4}$	$0.30923 \pm 1.2 \cdot 10^{-3}$
Kamioka	$0.29996 \pm 4.4 \cdot 10^{-5}$	$0.30458 \pm 1.1 \cdot 10^{-4}$		$0.31383 \pm 1.2 \cdot 10^{-4}$	$0.31848 \pm 3.9 \cdot 10^{-5}$	$0.30921 \pm 7.8 \cdot 10^{-5}$
Matsushiro	$0.29992 \pm 5.8 \cdot 10^{-5}$	$0.30465 \pm 1.8 \cdot 10^{-4}$		$0.31373 \pm 2.0 \cdot 10^{-4}$	$0.31842 \pm 6.0 \cdot 10^{-5}$	$0.30918 \pm 1.2 \cdot 10^{-4}$
Strasbourg	$0.29997 \pm 5.7 \cdot 10^{-5}$	$0.30462 \pm 1.2 \cdot 10^{-4}$	$0.30929 \pm 6.2 \cdot 10^{-5}$	$0.31389 \pm 1.0 \cdot 10^{-4}$	$0.31845 \pm 6.5 \cdot 10^{-5}$	$0.30924 \pm 8.1 \cdot 10^{-5}$
Bad-Homburg	$0.29998 \pm 8.4 \cdot 10^{-5}$	$0.30467 \pm 1.5 \cdot 10^{-4}$	$0.30924 \pm 7.0 \cdot 10^{-5}$	$0.31378 \pm 1.5 \cdot 10^{-4}$	$0.31844 \pm 8.6 \cdot 10^{-5}$	$0.30922 \pm 1.1 \cdot 10^{-4}$
Moxa	$0.30001 \pm 1.0 \cdot 10^{-4}$	$0.30452 \pm 2.0 \cdot 10^{-4}$	$0.30925 \pm 7.9 \cdot 10^{-5}$	$0.31383 \pm 1.4 \cdot 10^{-4}$	$0.31843 \pm 9.0 \cdot 10^{-5}$	$0.30921 \pm 1.2 \cdot 10^{-4}$
Wetzell	$0.29999 \pm 8.7 \cdot 10^{-5}$	$0.30433 \pm 1.6 \cdot 10^{-4}$	$0.30918 \pm 8.2 \cdot 10^{-5}$	$0.31388 \pm 1.5 \cdot 10^{-4}$	$0.31840 \pm 9.1 \cdot 10^{-5}$	$0.30916 \pm 1.1 \cdot 10^{-4}$
Vienna	$0.29994 \pm 1.2 \cdot 10^{-4}$	$0.30469 \pm 3.5 \cdot 10^{-4}$	$0.30928 \pm 1.2 \cdot 10^{-4}$	$0.31393 \pm 2.2 \cdot 10^{-4}$	$0.31848 \pm 1.2 \cdot 10^{-4}$	$0.30926 \pm 1.9 \cdot 10^{-4}$
Medicina	$0.29999 \pm 7.2 \cdot 10^{-5}$	$0.30459 \pm 1.8 \cdot 10^{-4}$	$0.30929 \pm 1.3 \cdot 10^{-4}$	$0.31378 \pm 1.1 \cdot 10^{-4}$	$0.31842 \pm 7.1 \cdot 10^{-5}$	$0.30921 \pm 1.1 \cdot 10^{-4}$
Sutherland	$0.29996 \pm 8.2 \cdot 10^{-5}$	$0.30480 \pm 3.0 \cdot 10^{-4}$	$0.30904 \pm 4.9 \cdot 10^{-4}$	$0.31377 \pm 2.4 \cdot 10^{-4}$	$0.31840 \pm 7.3 \cdot 10^{-5}$	$0.30919 \pm 2.4 \cdot 10^{-4}$
Weighted mean	$0.29996 \pm 2.2 \cdot 10^{-5}$	$0.30458 \pm 5.1 \cdot 10^{-5}$	$0.30925 \pm 3.3 \cdot 10^{-5}$	$0.31383 \pm 4.6 \cdot 10^{-5}$	$0.31844 \pm 2.1 \cdot 10^{-5}$	$0.30921 \pm 3.5 \cdot 10^{-5}$

**Table 2.** Observed Frequencies of  ${}_0S_3$  After the 2004 Andaman-Sumatra Earthquake

	${}_0S_3$ Frequencies, mHz						
	m = -3	m = -2	m = -1	m = 0	m = 1	m = 2	m = 3
Strasbourg	$0.46167 \pm 5.4 \cdot 10^{-5}$	$0.46424 \pm 7.8 \cdot 10^{-5}$	$0.46639 \pm 3.6 \cdot 10^{-5}$	-	$0.47084 \pm 3.0 \cdot 10^{-5}$	$0.47266 \pm 7.8 \cdot 10^{-5}$	$0.47474 \pm 6.8 \cdot 10^{-5}$

**Table 3.** Observed Frequencies of  ${}_2S_1$  After the 2004 Andaman-Sumatra Earthquake

	${}_2S_1$ Frequencies, mHz		
	m = -1	m = 0	m = 1
Canberra			$0.41072 \pm 6.2 \cdot 10^{-4}$
Kamioka			$0.41033 \pm 8.0 \cdot 10^{-4}$
Matsushiro			$0.41078 \pm 9.2 \cdot 10^{-4}$
Strasbourg	$0.39801 \pm 1.3 \cdot 10^{-3}$		$0.41082 \pm 4.7 \cdot 10^{-4}$
Bad-Homburg	$0.39822 \pm 1.5 \cdot 10^{-3}$		$0.41081 \pm 5.3 \cdot 10^{-4}$
Moxa			$0.41077 \pm 6.1 \cdot 10^{-4}$
Wetzell			$0.41082 \pm 4.7 \cdot 10^{-4}$
Vienna			$0.41081 \pm 5.3 \cdot 10^{-4}$
Medicina			$0.41074 \pm 6.7 \cdot 10^{-4}$
Sutherland			$0.41126 \pm 5.4 \cdot 10^{-4}$
Weighted mean	$0.39810 \pm 9.8 \cdot 10^{-4}$		$0.41082 \pm 1.8 \cdot 10^{-4}$