Q: Page 2, lines 3-5. If the earthquakes associated to the historic tsunamis mentioned in the text have any magnitude estimation, please provide the value and include the reference. For instance, the 1867 tsunami, magnitude?

A: We have done it. [Page 2, lines 3-4]

The 1867 Keelung earthquake was inferred approximately Mw 7.0 (Tsai 1985; Ma and Lee 1997; Cheng et al., 2016; Yu et al., 2016).

Reference:

Cheng, S. N., Shaw, C. F., and Yeh, Y. T. (2016). Reconstructing the 1867 Keelung Earthquake and Tsunami Based on Historical Documents. Terr. Atmos. Ocean. Sci., 27(3). doi: 10.3319/TAO.2016.03.18.01(TEM)

Ma, K. F., and Lee, M. F. (1997). Simulation of historical tsunamis in the Taiwan region. Terr. Atmos. Ocean. Sci., 8(1), 13-30. doi: 10.3319/TAO.1997.8.1.13(T)

Tsai, Y. B. (1985). A study of disastrous earthquakes in Taiwan, 1683–1895. Bull. Inst. Earth Sci. Acad. Sin, 5, 1-44.

Yu, N.-T., Yen, J.-Y., Chen, W.-S., Yen, I. C., and Liu, J.-H.: Geological records of western Pacific tsunamis in northern Taiwan: AD 1867 and earlier event deposits, Mar. Geol., 372, 1-16, 2016. doi:10.1016/j.margeo.2015.11.010

Q: Page 2, lines 13-15. When comparing PTHA and PSHA, authors mentioned in the text that PSHA works with ground-motion parameters. So, can you complete the idea by specifying that PTHA works with tsunami wave amplitudes, or some other wave measurements? If there is any reference, please include it.

A: We have done it. [Page 2, lines 14-19]

Geist and Parsons (2006) mentions that the tsunami wave amplitudes follow a definable frequency-size distribution over a sufficiently long amount of time at a given coastal region (Soloviev, 1969; Houston et al., 1977; Horikawa and Shuto, 1983; Burroughs and Tebbens, 2005). This method is of great use in establishing tsunami probability for regions if there is an extensive catalog of observed tsunami wave heights (Geist and Parsons, 2006). The other approach is numerical simulation (Geist, 2002; Geist and Parsons, 2006; Geist and Parsons, 2009) which applies the stochastic slip model to estimate the tsunami amplitudes probability as this study.

Reference:

Burroughs, S.M., Tebbens, S.F. (2005). Power law scaling and probabilistic forecasting of tsunami runup heights. Pure Appl. Geophys. 162, 331–342

Geist, E.L., (2002). Complex earthquake rupture and local tsunamis. J. Geophys. Res. 107. doi:10.1029/2000JB000139.

Geist, E. L., and Parsons, T. (2006). Probabilistic analysis of tsunami hazards. Natural

Hazards, 37(3), 277-314. doi 10.1007/s11069-005-4646-z
Geist, E. L., and Parsons, T. (2009). Assessment of source probabilities for potential tsunamis affecting the US Atlantic coast. Marine Geology, 264(1), 98-108.
Horikawa, K. and Shuto, N. (1983). Tsunami disasters and protection measures in Japan, In: K. Iida and T. Iwasaki (eds), Tsunamis-Their Science and Engineering, Terra Scientific Publishing Company, pp. 9–22.
Houston, J. R., Carver, R. D. and Markle, D. G. (1977). Tsunami-wave elevation frequency of occurrence for the Hawaiian Islands. Technical Report H-77-16, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS, 66 pp.
Soloviev, S. L. (1969). Recurrence of tsunamis in the Pacific. In: W. M. Adams (ed.), Tsunamis in the Pacific Ocean, East-West Center Press, pp. 149–163.

Q: Page 3. Line 2. Please, provide the reference for the magnitude range, Mw 7.5-8.7.

A: We have done it. [Page 3, line 5]

Reference:

Hsu, Y. J., Ando, M., Yu, S. B., and Simons, M. (2012). The potential for a great earthquake along the southernmost Ryukyu subduction zone. Geophysical Research Letters, 39(14).

Q: Page 3. Line 12. About the fault geometry setting. Which is the source depth of the top (or bottom) of the fault plane? I think it has not been specified yet in the text.

A: We have done it. [Page 3, lines 14-15]

The fault geometry setting refers to Hsu et al. (2012) and fault model extends from the Ryukyu Trench to a depth of 13 km.

Q: Page 3. Line 15, please complete to "...in dip slip faults".

A: Thank you. We have done it. [Page 3, line 18]

Q: Page 3. Eq. (1), please, specify what is L, and W.

A: We have done it. [Page 3, line 21]

Q: Page 3. Line 18. I suggest to change "constant" by "parameter". Strictly speaking, in elastic heterogeneous media, the Lamè parameters (lambda and mu) vary in space.

A: We have done it. [Page 3, line 22]

Q: Page 3. In Eq. (2). Which is the value assumed for mu?

A: We have done it. [Page 3, lines 22-23]

Q: Page 3. Section 2.1. When the authors compute the earthquake magnitude, average slip and fault area. Did the authors compare (or contrast) these values with any magnitude/fault-size scaling relationship for subduction earthquakes? It could be interesting to compare these values with any magnitude/size scaling relationship for subduction zones.

A: We analyzed the relation between Mw and average slip (D) in Fig 1. The public finite fault slip models of global slip earthquakes are from the website (http://equake-rc.info/SRCMOD/). This figure appears the trend between Mw and average slip and its boundary. For Mw8.15, the range could be 200~1000 cm. It explains that our estimation, which follows the trend and in the possible boundary, is reasonable.

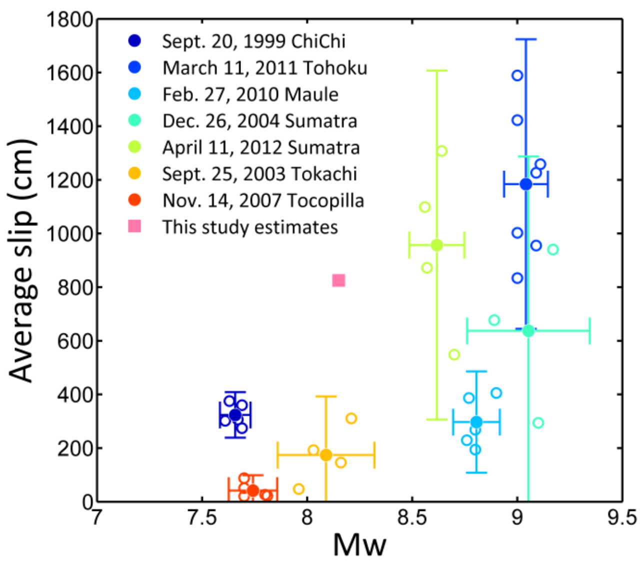

Fig 1. Mw of real events and their average slips with 2 standard deviation (http://equake-rc.info/SRCMOD/). Open circles represent the inverse slip results in each study. Solid circles represent the mean slip of each study for same event.

ChiChi (1999): Ma et al. (2000); Chi et al. (2001); Zeng and Chen (2001); Wu et al. (2001); Zhang et al. (2004)

Tohoku (2011): Ammon et al. (2011); Ide et al. (2011); Lay et al. (2011); Shao et al. (2011); Yagi and Fukahata (2011); Yamazaki et al. (2011); Wei et al. (2012)

Maule (2010): Delouis et al. (2010); Hayes (2010); Shao et al. (2010); Sladen (2010); Luttrell et al. (2011)

Sumatra (2004): Ammon et al. (2005); Ji (2005); Rhie et al. (2007)

Sumatra (2012): Hayes (2012); Shao et al. (2012); Wei (2012); Yue et al. (2012)

Tokachi-Oki (2003): Yamanaka and Kikuchi (2003); Koketsu et al. (2004); Tanioka et al. (2004); Yagi (2004)

Tocopilla (2007): Ji (2007); Sladen (2007); Zeng et al. (2007); Béjar-Pizarro et al. (2010); Motagh et al. (2010)

Reference:

Ammon, C. J., J. Chen, H.-K. Thio, D. Robinson, S. Ni, V. Hjorleifsdottir, H. Kanamori, T. Lay, S. Das, D. Helmberger, G. Ichinose, J. Polet, and D. Wald. (2005). Rupture process of the great 2004 Sumatra-Andaman earthquake, Science, 308, 1133-1139.

Ammon, C. J., T. Lay, H. Kanamori, and M. Cleveland (2011) A rupture model of the 2011 off the Pacific coast of Tohoku Earthquake, Earth Planets Space, 63, 693–696.

Bejar-Pizzaro M., Carrizo D., Socquet A., Armijo R., (2010) Asperities, barriers and transition zone in the North Chile seismic gap: State of the art after the 2007 Mw 7.7 Tocopilla earthquake inferred by GPS and InSAR data, Geoph. Journ. Int., GJI-S-09-0648, doi: 10.1111/j.1365-246X.2010.04748.x

Chi, W. C., D. Dreger, and A. Kaverina. 2001. Finite-source modeling of the 1999 Taiwan (Chi-Chi) earthquake derived from a dense strong-motion network. Bull. Seis. Soc. Am 91 (5):1144-1157.

Delouis B., J. M. Nocquet, M. Vallée (2010). Slip distribution of the February 27, 2010 Mw = 8.8 Maule Earthquake, central Chile, from static and high-rate GPS, InSAR, and broadband teleseismic data, Geophys. Res. Lett., 37, L17305, doi:10.1029/2010GL043899.

Hayes G., (NEIC, Maule 2010) Updated Result of the Feb 27, 2010 Mw 8.8 Maule, Chile Earthquake, http://earthquake.usgs.gov/earthquakes/eqinthenews/2010/us2010tfan/finite_fault.php,last accessed August 19, 2013.

Hayes G., (NEIC, Sumatra 2012) Preliminary Result of the Apr 11, 2012 Mw 8.6 Earthquake Off the West Coast of Northern Sumatra, http://earthquake.usgs.gov/earthquakes/eqinthenews/2012/usc000905e/finite_fault.php,last accessed August 19, 2013.

Ide S., A. Baltay, and G. C. Beroza (2011). Shallow Dynamic Overshoot and Energetic Deep Rupture in the 2011 Mw 9.0 Tohoku-Oki Earthquake, 332, 1426-1429, DOI: 10.1126/science.1207020

Ji, C. (2005). Preliminary Rupture Model for the December 26, 2004 earthquake, off the west coast of northern Sumatra, magnitude 9.1, http://neic.usgs.gov/neis/eq_depot/2004/eq_041226/neic_slav_ff.html.

Ji C. (UCSB, Tocopilla 2007) Preliminary Result of the Nov 14, 2007 Mw 7.81 ANTOFAGASTA, CHILE Earthquake, http://www.geol.ucsb.edu/faculty/ji/big_earthquakes/2007/11/anto/anto.html, last accessed August 11, 2013.

Koketsu, K., K. Hikima, S. Miyazaki, and S. Ide. (2004). Joint inversion of strong motion and geodetic data for the source process of the 2003 Tokachi-oki, Hokkaido, earthquake. Earth Planets and Space 56 (3):329-334.

Lay T., C. J. Ammon, H. Kanamori, L. Xue, and M. J. Kim (2011). Possible large near-trench slip during the 2011 Mw 9.0 off the Pacific coast of Tohoku Earthquake. Earth Planets Space. 63, 687–692.

Luttrell, K. M., Tong, X., Sandwell, D. T., Brooks, B. A., and Bevis, M. G. (2011). Estimates of stress drop and crustal tectonic stress from the 27 February 2010 Maule, Chile, earthquake: Implications for fault strength. Journal of Geophysical Research: Solid Earth (1978–2012), 116(B11).

Ma, K. F., T. R. A. Song, S. J. Lee, and H. I. Wu. (2000). Spatial slip distribution of the September 20, 1999, Chi-Chi, Taiwan, earthquake (M(W)7.6) - Inverted from teleseismic data. Geophys. Res. Lett. 27 (20):3417-3420.

Motag, M., B. Schurr, J. Anderssohn, B. Cailleau, T. R. Walter, R. Wang, J.-P. Villotte, (2010) Subduction earthquake deformation associated with 14 November 2007, Mw 7.8 Tocopilla earthquake in Chile: Results from InSAR and aftershocks, Tectonophysics 490, 60–68

Rhie, J., D. Dreger, R. Burgmann, and B. Romanowicz. (2007). Slip of the 2004 Sumatra–Andaman Earthquake from joint inversion of long-period global seismic waveforms and GPS static Offsets, Bull. Seismo. Soc. Am., 97(1A): S115–S127.

Shao, G., X. Li and C. Ji. (UCSB, sumatra 2012). Preliminary Result of the Apr 11, 2012 Mw 8.64 sumatra Earthquake, http://www.geol.ucsb.edu/faculty/ji/big_earthquakes/2012/04/10/sumatra.html,last accessed August 19, 2013.

Shao, G., X. Li, C. Ji. and T. Maeda (2011). Focal mechanism and slip history of 2011 Mw 9.1 off the Pacific coast of Tohoku earthquake, constrained with teleseismic body and surface waves, Earth Planets Space, 63 (7), 559-564.

Shao, G., X. Li, Q. Liu, X. Zhao, T. Yano and C. Ji(UCSB, Maule 2010).Preliminary slip model of the Feb 27, 2010 Mw 8.9 Maule, Chile Earthquake, http://www.geol.ucsb.edu/faculty/ji/big_earthquakes/2010/02/27/chile_2_27.html ,last accessed September 24,2013.

Sladen A. (Caltech, Tocopilla 2007). Preliminary Result 11/14/2007 (Mw 7.7), Tocopilla Earthquake, Chile. Source Models of Large Earthquakes. http://www.tectonics.caltech.edu/slip_history/2007_tocopilla/tocopilla.html, last accessed July 1, 2013.

Sladen A. (Caltech, Maule 2010). Preliminary Result, 02/27/2010 (Mw 8.8), Chile.

Source Models of Large Earthquakes. http://www.tectonics.caltech.edu/slip_history/2010_chile/index.html.

Tanioka, Y., K. Hirata, R. Hino, and T. Kanazawa. (2004). Slip distribution of the 2003 Tokachi-oki earthquake estimated from tsunami waveform inversion. Earth Planets and Space 56 (3):373-376.

Wei S. (Caltech, Sumatra 2012). April/11/2012 (Mw 8.6), Sumatra. Source Models of Large Earthquakes. http://www.tectonics.caltech.edu/slip_history/2012_Sumatra/index.html, last accessed July 1, 2013.

Wei, S. J., R.W. Graves, D. Helmberger, J.P. Avouac and J.L. Jiang (2012) Sources of shaking and flooding during the Tohoku-Oki earthquake: A mixture of rupture styles, Earth and Planetary Science Letters, 333-334, 91-100.

Wu, C. J., M. Takeo, and S. Ide. (2001). Source process of the Chi-Chi earthquake: A joint inversion of strong motion data and global positioning system data with a multifault model. Bull. Seis. Soc. Am 91 (5):1128-1143.

Yagi, Y. (2004). Source rupture process of the 2003 Tokachi-oki earthquake determined by joint inversion of teleseismic body wave and strong ground motion data, Earth Planets Space, 56, 311–316.

Yagi, Y. and Fukahata, Y., (2011). Rupture process of the 2011 Tohoku-oki earthquake and absolute elastic strain release, Geophys. Res. Lett, 38, L19307, doi:10.1029/2011GL048701.

Yamanaka, Y., and M. Kikuchi. (2003). Source process of the recurrent Tokachi-oki earthquake on September 26, 2003, inferred from teleseismic body waves. Earth Planets and Space 55 (12):E21-E24.

Yamazaki, Y., T. Lay, K. F. Cheung, H. Yue, and H. Kanamori (2011). Modeling near-field tsunami observations to improve finite-fault slip models for the 11 March 2011 Tohoku earthquake, Geophys. Res. Lett., 38, L00G15, doi:10.1029/2011GL049130.

Yue, H, T. Lay and K. D. Koper (2012), En Echelon andOrthogonal Fault Ruptures of the 11 April 2012 Great Intraplate Earthquakes. Nature, 490, 245-249, doi:10.1038/nature11492.

Zeng, Y. H., and C. H. Chen. (2001). Fault rupture process of the 20 September 1999 Chi-Chi, Taiwan, earthquake. Bull. Seis. Soc. Am 91 (5):1088-1098.

Zeng, Y., G.Hayes and C. Ji (2007; USGS, Online Model). Preliminary Result of the Nov 14, 2007 Mw 7.7 Antofagasto, Chile Earthquake, http://earthquake.usgs.gov/earthquakes/eqinthenews/2007/us2007jsat/finite_fault.php, last accessed August 20, 2013.

Zhang, W., T. Iwata, K. Irikura, A. Pitarka, and H. Sekiguchi (2004), Dynamic rupture process of the 1999 Chi-Chi, Taiwan, earthquake, Geophys. Res. Lett., 31, L10605, doi:10.1029/2004GL019827.

Q: Page 3, line 25. For completeness purposes, please provide the scalar seismic moment, M0 for the corresponding Mw 8.15.

A: We have done it. [Page 4, line 2]

Q: Page 4. Please clarify or complete the sentence in line 8, because there is a dot at the end of the sentence, so it is not clear what Eq. (4) means or represents. The 2D Fourier spectrum amplitude of what?

A: We have done it. [Page 4, lines 9-11]

Eq. (4) illustrate that the spectrum of static slip distribution in wavenumber domain is following k^{-2} decay. In Eq. (4), $D_{x,y}$ is slip distribution and its spectrum is proportional to k^{-2}. Andrews (1980) derived the k^{-2} from the relationship of slip and stress change.

Q: Page 4. Line 10. Please, to be consistent with the notation in Eq. (4), please clarify the meaning of "F", or, change F by Fs,t which represents the 2D discrete Fourier transform of Dx,y. Also, for completeness purposes, specify that Dx,y is the slip distribution over a 2D lattice, for instance.

A: Thank you. We have done it. [Page 4, line 13]

Q: Page 4. In line 10, please complete, "...wave number.", by "...radial wavenumber."

A: Thank you. We have done it. [Page 4, line 13]

Q: Page 4. Line 13, please correct "corner frequency" by "corner radial wavenumber", because kc is not a frequency.

A: Thank you. We have done it. [Page 4, line 16; Page 5, line 7 and Page 15, line 13]

Q: Page 4. Line 14. What happen with the phase beyond kc? Please, clarify. Or, the last sentence "Within the kc,....(Geist, 2002)." could be deleted because authors are describing the overall characteristics of the slip and not describing the details of how the random slip is generated numerically in the practice.

A: We have removed this sentence. Beyond the corner radial wavenumber, kc, the slip spectrum decays with k^{-2}. The generation of random slip is explained in next paragraph, Page 5.

Q: Page 4. Eq. (5). Please, be careful and clear with the mathematical notation. What does F^(-1) represent ?. Is it the inverse 2D discrete Fourier transform?

A: Thank you. We have done it. [Page 4, lines 22-23]

Q: Page 4. Line 23. Please, specify that PDF is Probability Density Function, I think it has not been mentioned before in the text.

A: Thank you. We have done it. [Page 4, line 27]

PDF is Probability Density Function.

Q: Page 5. Line 3. Complete the units in the sentence, "...5x5 km...", by "...5x5 km^2...".

A: Thank you. We have done it. [Page 5, line 8; Page 5, line 32; Page 16, line 4]

Q: Page 5. Line 3. Please, clarify that 24x14 are along strike and dip respectively.

A: Thank you. We have done it. [Page 5, line 8]

Page 5. Line 1-4. I will ask the authors to provide some details about how the stochastic slip distribution is generated, and to be clear on the choice of parameters and discuss about the results. Please, read the following comments.

Q: The authors used the values of the Levy PDF suggested by Lavallee et al. (2006), so please clarify in the manuscript that those values were estimated from a stochastic 2D model in the dip slip direction, obtained for the Northridge earthquake. So, why do you use parameters from a shallow crustal earthquake occurred in California to characterize a interplate subduction zone earthquake? Please justify, or discuss.

A: Thank you. We have done it. [Page 5, lines 10-15]

Furthermore, in this study, we do not focus on the values of characteristic for different kinds of faults. Therefore, we decided to simply apply these values which had been published already.

Reference:

Davis, T. L. (1994). 1994 Northridge earthquake. *Nature*, *372*, 167.

Q: Notice that according to Lavallee et al (2006) and others, the scaling exponent is (nu+1) so, the Power Spectrum Density of slip is, P(k) ~ k^(-(nu+1)), it implies that the slip spectrum behaves as, D(k) ~ k^(-(nu+1)/2). The authors generate random variables using the Levy distribution, and imposed P(k) ~ k^(-2) as

shown in Fig. 1c, so, the slip in the wavenumber domain behaves as, D(k) ~ k^(-1), and Figure 1 is ok, but the slip spectrum does not follow the k^(-2) source characteristic discussed at the beginning of Section 2.2. Please, clarify this point in the text. Also, discuss the effect in the spatial distribution of slip of this choice (falloff as k^(- 1) of the slip spectrum amplitude in the wavenumber domain), versus a slip spectrum that falloff as k^(-2). From the results shown in Fig. 1, authors generated a slip spectrum that decays as k^(-1) because they imposed the power spectrum density as P(k) ~ k^(-2), but in the legend they say "This slip spectrum decays with exponent of -2 and...", so, it is an inconsistency for me. Please, be clear on the choice, and the terminology used when generating spatial random fields. Herrero & Bernard (1994), Andrews (1981), and others, used a stochastic slip model with a 2D Fourier spectrum that decays as k^-2 which means, D(k) ~ k^(-2). I am not saying the authors are wrong in their choice, it is only that some parts of the text need some clarification, justification of the choice, or discussion about the assumptions done.

A: We are very sorry for the confusion. In general, the spectrum of slip distribution is proportional to *k*-2 (Herrero and Bernard 1994; Andrews 1980; Tsai 1997). (|D(k)|~k^(-nu-1), nu=1) At the beginning of Section 2.2, the Eq. (1) wants to present the spectrum of slip distribution is proportional to *k*-2. Fig. 1c shows slip spectrum and it consist with k-square. In Lavallee et al (2006), it is formularized by power spectrum density so that there is a disparity of square. We have modified the sentence and Fig. 1c. [Page 4, lines 9-11; Page 15]

Q: Page 5. Line 3. Why did you set a 5x5 subfault size? Did you test different subfault sizes?

A: For 5x5 km^2, the resolution of 1 minute (~1.8 km) should be enough to calculate and differentiate the surface deformation.

Q: Page 5. Line 3. Did you assume a constant slip at each subfault? If it is the case, how do you treat the non-smooth slip boundary condition at the boundaries of the fault? Did you apply a taper at all the borders, if not, authors should discuss or justify their treatment?

Q: Page 5. Lines 15-19. Same comment as done in Page 5, line 3, about the assumption of uniform slip at each subfault.

A: Thank you. We have done it. [Page 5, lines 22-27]

In this study, we do not do any smooth for slip distribution or its boundary. They are complete uniform slip and stochastic process over the fault model. There are two reasons for this application. The first is that we do not have information for where is locked or the location of asperity often repeats in historical event. The second is that there are some studies present the asperity expanding to the boundary of fault model (Ide et al., 2011; Lay et al., 2011; Shao et al., 2011; Yue and Lay 2011). According to these, we do not prefer to apply any extra constraint. If we have more information about the characteristic of rupture behavior for this region, we would consider giving a constraint.

Reference:

Ide, S., Baltay, A., and Beroza, G. C. (2011). Shallow dynamic overshoot and energetic deep rupture in the 2011 Mw 9.0 Tohoku-Oki earthquake. *Science*, *332*(6036), 1426-1429. doi: 10.1126/science.1207020

Lay, T., Ammon, C. J., Kanamori, H., Xue, L., amd Kim, M. J. (2011). Possible large near-trench slip during the 2011 Mw 9.0 off the Pacific coast of Tohoku Earthquake. *Earth, planets and space*, *63*(7), 32. doi:10.5047/eps.2011.05.033

Shao, G., Li, X., Ji, C., and Maeda, T. (2011). Focal mechanism and slip history of the 2011 Mw 9.1 off the Pacific coast of Tohoku Earthquake, constrained with teleseismic body and surface waves. *Earth, planets and space*, *63*(7), 9. doi:10.5047/eps.2011.06.028

Yue, H., and Lay, T. (2011). Inversion of high-rate (1 sps) GPS data for rupture process of the 11 March 2011 Tohoku earthquake (Mw 9.1). *Geophysical Research Letters*, *38*(7). **doi:** 10.1029/2011GL048700

Q: Page 5, line 15. I would suggest to use "computational domain" instead of "...numerical model".

A: Thank you. We have done it. [Page 5, line 32]

Q: Page 5. Line 15. Complete the units in 5x5 km^2.

A: Thank you. We have done it. [Page 5, line 32].

Q: Page 5, lines 21-25. Why do you use 4 min and 1 min for the nested grids? Did you test a different grid size? Which bathymetry/topography is used in the numerical simulation of the tsunami? Please include a reference. For instance, GEBCO (https://www.gebco.net/) provides a global 30 arc-sec bathymetry, which has a better resolution than the bathymetry used in this work. Please comment on it. Which is the boundary condition set at the coastlines (the boundary between wet and dry domains)?. Do you assume a vertical wall condition, or do you allow inundation? Did you impose any friction, if yes, which one is the Manning's coefficient used in the simulation?

A: Thank you. We have done it. [Page 6, lines 11-12; Page 6, lines 13-18]

NOAA's open data is used. It is free GEBCO and SRTM. The data can be download from: https://maps.ngdc.noaa.gov/viewers/wcs-client/

The Figure 2 presents the time series by uniform slip distribution at station 25 in different resolution of topography. The time series are similar. For resolution, 1 minute is better than 2 minute and for time spent, 1 minute is less than 30 arc-sec. Therefore, to consider the resolution of simulation and time spent, the resolution of 1 minute was applied. COMCOT is capable of efficiently studying the entire life-span of a tsunami, including its generation, propagation, runup and inundation. COMCOT also supports the nested grid system that the finer grid can be placed on a coarser grid to increase the resolution locally (Wang 2009). In this study, Manning coefficient is 0.013, which represents a smooth surface (Wu, et al., 2008).

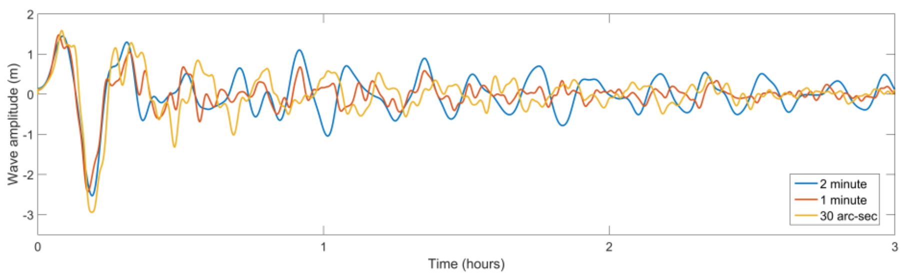

Fig. 2 The time series by uniform slip distribution at station 25 in different resolution of topography. Blue line is 2 minute, red line is 1 minute and yellow line is 30 arc-sec.

Reference:

Wang, X. (2009). User manual for COMCOT version 1.7 (first draft). Cornel University, 65.

Wu, T. R., Chen, P. F., Tsai, W. T., and Chen, G. Y.: Numerical Study on Tsunamis Excited by 2006 Pingtung Earthquake Doublet, Terr. Atmos. Ocean. Sci., 19, 705-715, 2008. doi: 10.3319/TAO.2008.19.6.705(PT)

Q: Page 6. Sentence in line 5-6 is a bit confusing, please rephrase to clarify.

A: We are very sorry for the confusion. We have done it. [Page 6, lines 29-31]

Q: Page 6. Section 3.1. If I understand, authors used the vertical seafloor displacement as initial condition to propagate the tsunami, and the horizontal motion of the seabed is not included in the simulation. I will suggest to clarify better these assumptions in Section 3.1.

A: We have done it. [Page 6, lines 29-31]

Q: Page 7. Section 3.3. Authors say basically that they computed the probability

of the PTA by histograms, but from my understanding they show (Fig. 5) a probability density estimated from the numerical PTA data. I think authors could say/argue a little bit more about this, in terms of this choice and analysis. I mean, does the data follow any distribution (e.g. Gaussian, Levy, Log-normal)? Are the PTA data (simulated) Gaussian distributed? Is it possible to estimate the probability of exceeding a certain input value from these numerical results? I think some of these aspect is not discussed or mentioned in the text.

A: We have added in the text. [Page 8, lines 11-13]

Q: Page 7. Line 11. Please complete the idea that after generating the second set of slip models, the tsunami is simulated.

A: We have done it. [Page 8, lines 2-6]

The histograms, first set, and black lines, second set, are similar. The second set illustrate that the PTA distribution by 100 times tsunami simulations is approximately reliable.

Q: Page 7. Paragraph 3. When you compare PTA versus distance, how do you define or measure the distance between source and station? At least, it could be mentioned or discussed in the text.

A: We have done it. [Page 8, line 22]

Q: Page 8. Lines 14-16. Please, provide the references for the Maule, Tohoku and Sumatra earthquakes.

A: We have done it. [Page 9, line 6-8]

Reference:

Chile earthquake (Lay et al., 2010; Fritz et al., 2011)

Lay, T., Ammon, C. J., Kanamori, H., Koper, K. D., Sufri, O., & Hutko, A. R. (2010). Teleseismic inversion for rupture process of the 27 February 2010 Chile (Mw 8.8) earthquake. *Geophysical Research Letters*, *37*(13).

Fritz, H. M., Petroff, C. M., Catalan, P. A., Cienfuegos, R., Winckler, P., Kalligeris, N., Weiss, R., Barrientos, S. E., Meneses, G., Valderas-Bermejo, C., Ebeling, C., Papadopoulos, A., Contreras, M., Almar, R., Dominguez, J. C., and Synolakis, C. E. (2011). Field survey of the 27 February 2010 Chile tsunami. *Pure and Applied Geophysics*, *168*(11), 1989-2010.

Tohoku earthquake (Goda et al., 2015; Goda and Song, 2016)

Goda, K., and Song, J. (2016). Uncertainty modeling and visualization for tsunami hazard and risk mapping: a case study for the 2011 Tohoku earthquake. *Stochastic*

Environmental Research and Risk Assessment, *30*(8), 2271-2285.
Goda, K., Yasuda, T., Mori, N., and Mai, P. M. (2015). Variability of tsunami inundation footprints considering stochastic scenarios based on a single rupture model: application to the 2011 Tohoku earthquake. *Journal of Geophysical Research: Oceans*, *120*(6), 4552-4575.

Sumatra earthquake (Lay et al., 2005)

Lay, T., Kanamori, H., Ammon, C. J., Nettles, M., Ward, S. N., Aster, R. C., ... & DeShon, H. R. (2005). The great Sumatra-Andaman earthquake of 26 December 2004. Science, 308(5725), 1127-1133.

Q: Page 8. Lines 22-31. The results discussed here are obtained at several sites, but It is not clear where the sites (tides gauges) are exactly located, right at the boundary, or surrounded by a wet domain even during the tsunami evolution? If the latter is true, the comparison of maximum tsunami wave height (this study) is not exactly straightforward comparable to runup (analyzed in other studies). Also, authors should comment on the effect (or limitations) of the grid resolution (1 arc-min, used in this study) over the results obtained. I suspect this coarse grid may have an effect on the simulations near the coast.

A: Thank you. These stations are surrounded by a wet domain so that we have modified this part. [Page 9, lines 13-22]

In comment of **Page 5, lines 21-25**, we provide a test in different resolution of topography to prove that the resolution of 1 minute can be accepted.

Q: Page 8, line 17. Clarify what "lecture" means.

A: We have done it. [Page 9, line 9]

Q: Page 9. Line 29. I would suggest to complete the idea in the sentence, "Furthermore, interpolation has a tremendous effect for the exponent value becoming larger with grid size reducing (Tsai, 1997).", because it refers to how the exponent and correlation lengths are computed from the solutions of slip models of earthquakes. On the other hand, some authors assume k-2 slip models based on other physical considerations.

A: We have done it. [Page 10, lines 18-20]

Interpolation for a given geometry will affect the exponent of k. For example, the exponent value of the original slip model of the Northridge earthquake from Zeng and Anderson (1996) is 1.876 in Tsai (1997). The slip model is interpolated by making the dimension of the element size one-half of the original size (0.5x0.5 km2).

The slip distribution is smoothed by the interpolation and the new exponent value is 3.767. The exponent value is 4.202 when the slip model is interpolated by making the dimension of the element size one-fourth of the original size. Our point from mathematical operation is that interpolation make original pattern smoother as a filter depresses the short wavenumber and enhancing the long wavenumber.

============== Figures ==============

Q: Figure 1. Clarify units, X? k? length km or 5km? To avoid misunderstanding, I suggest to delete the label "Northrigde earthquake" in the Fig 1a, and you can mention it in the caption (e.g. Levy parameters were taken from Lavallee et al......obtained for the Northridge earthquake.), because the realization shown is for an Mw 8.15 earthquake and not for the Northridge earthquake. Fault axis along dip and strike are confusing too. I will suggest to plot the real distance along strike and dip directions (with the correct units) and not the "indexes" of each subfault. What do represent the colorbar? See my comments about P(k) and D(k), what is shown in Fig 1c is not what is written in the caption.

A: We have done it. [Page 15]

X is random variable (the filtered slip) so that the unit of X is meter. The unit of k is km-1 ((kx^2+ky^2)^-2).

Q: Figure 2. I suggest to contextualize at the beginning the region of the study area, (e.g. Map of Taiwan...for example). Correct 5x5 km by 5x5 km^2. Is the white box the nested inner grid? Colorbar?

A: We have done it. [Page 16] The colorbar presents the elevation in km.

Q: Figure 3. I would suggest specify that the "energy propagation" corresponds to, maximum tsunami wave height, for instance. Colorbar?

A: We have done it. [Page 17, lines 1-2]

The colorbar presents the maximum tsunami wave height in meter (b, d, and f).

======= Tables =======

Q: Table 1. The description of the table and caption is a bit confusing. What is the meaning of Max(uni)? A suggestion is that a part of the description given at the end of the table can be moved to the caption, and authors can put the units [m] directly beneath each variable description.

A: We have modified it. [Pages 20-21]

Max(uni) means the maximum wave height in uniform slip case.