Corrigendum

Corrigendum to "Axial Seamount: Periodic tidal loading reveals stress dependence of the earthquake size distribution (b value)" [Earth Planet. Sci. Lett. 512 (2019) 39–45]

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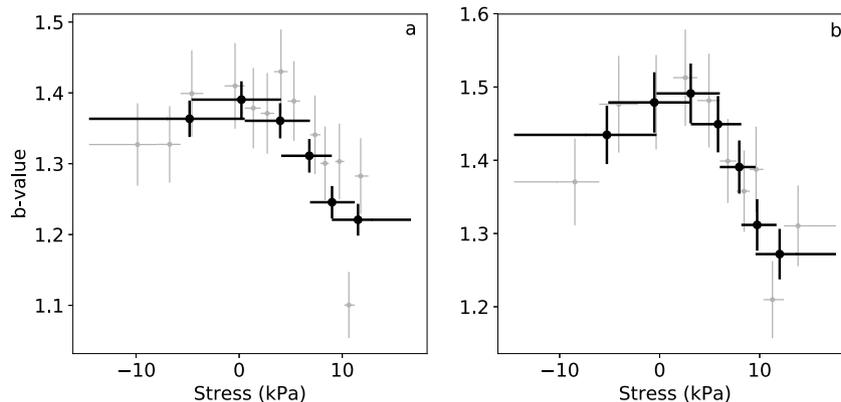
ARTICLE INFO

Fig. 2. The earthquake b value as a function of tidal stress. The vertical error bars represent two standard deviations of the estimated b values (Shi and Bolt, 1982). The horizontal bars represent the range of earthquake tidal stress values included in each bin, with the markers centered at the mean earthquake tidal stress for each bin. **a**, Using $M_c = 0.1$. Non-overlapping bins of 2,000 events (gray) as well as moving bins of 10,000 events shifted by 5,000 events (black). **b**, Using $M_c = 0.3$. Non-overlapping bins of 2,000 events (gray) as well as moving bins of 5,000 events shifted by 2,500 events (black).

1. Due to the plane stress condition, there is no vertical tidal stress changes due to body tide and variable regional ocean tidal loading. The description of the tidal stress calculations in the original manuscript is correct. However, a coding error in converting strains to stresses resulted in there being a vertical tidal stress component from body tide and regional ocean tidal loading that was included in the combined tidal stress time series.

Correcting this error results in a decrease in the tidal stress amplitude range (Fig. S3) with no discernable phase changes (Fig. S2) since the combined tidal stress is dominated by the direct ocean tidal loading effect. The error affects Figs. 2–3, S2–S4, and S6 and the corrected versions are included here. The error does not change our original main observation, which is that at stress amplitudes greater than 5 kPa, the earthquake b value is inversely correlated with vertical tidal stress at ∼0.03 per kPa (Fig. 3 and S4).

2. Equation (8) should be $\Delta\sigma_{zz} = -\rho g h$ instead since we adopt tension to be positive. This is a typo and not an error in the calculation.
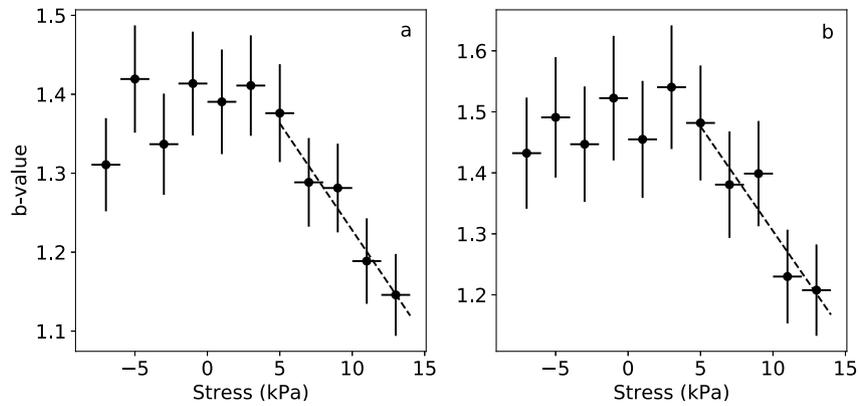
Fig. 3. The earthquake *b* values for non-overlapping stress bins of 2 kPa. The vertical error bars represent two standard deviations of the estimated *b* values from bootstrapping. The horizontal bars represent the tidal stress range for each bin. Dashed lines represent linear least-squares fits, both giving b value varying by ∼ 0.03 per kPa. **a**, Using $M_c = 0.1$. **b**, Using $M_c = 0.3$.
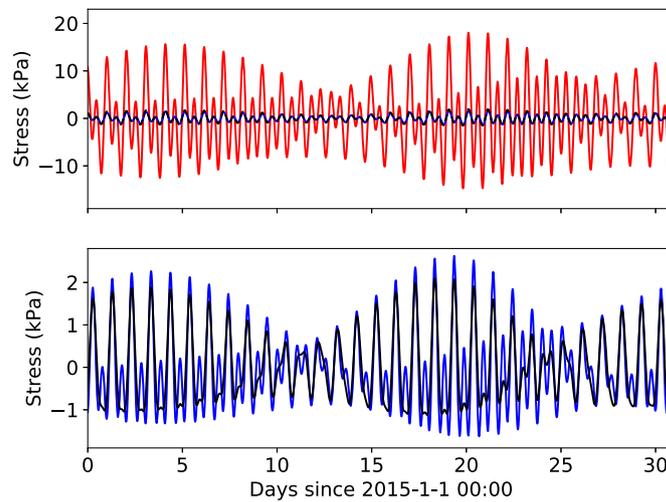

Fig. S2. Time series of predicted tides at the surface at 45.95°N, 130.00°W. **top**, Estimate of σ_{xx} (black), σ_{yy} (blue), and σ_{zz} (red) from ocean tidal loading, with tension being positive (i.e. σ_{zz} is positive upwards). **bottom**, Body tides. The stress amplitude is about an order of magnitude smaller than that of ocean tides. (For interpretation of the colors in the figure(s), the reader is referred to the web version of this article.)
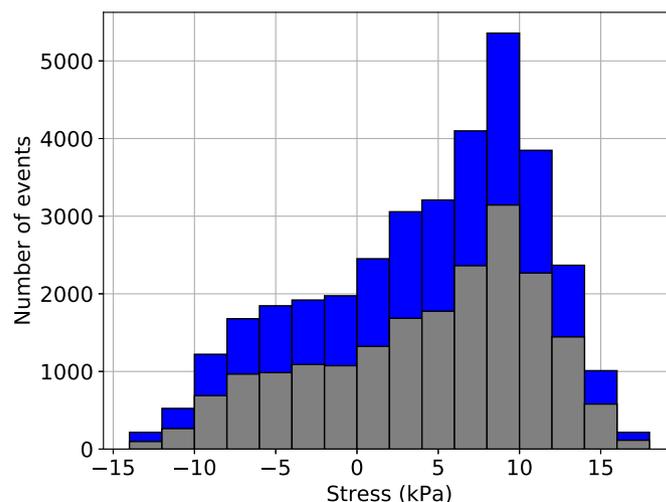

Fig. S3. The earthquake tidal stress distribution in bins of 2 kPa for $M_c = 0.1$ (blue) and $M_c = 0.3$ (gray). The distribution reflects the combined effect of seismicity rate increasing with tidal stress (Scholz et al., 2018) and the uneven distribution of tidal stress amplitudes.
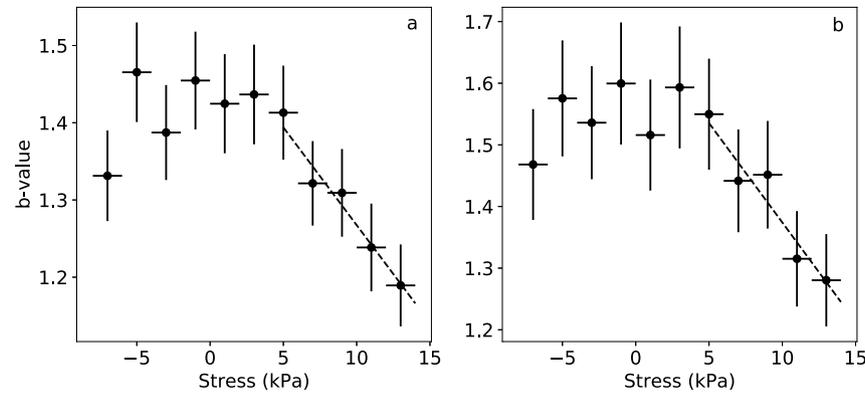
Fig. S4. The earthquake *b* values for non-overlapping stress bins of 2 kPa. Earthquakes of M_w greater than 1.5 are excluded. The vertical error bars represent two standard deviations of the estimated *b* values from bootstrapping. The horizontal bars represent the tidal stress range for each bin. Dashed lines represent linear least-squares fits, both giving b value varying by ∼ 0.03 per kPa. **a**, Using $M_c = 0.1$. **b**, Using $M_c = 0.3$.
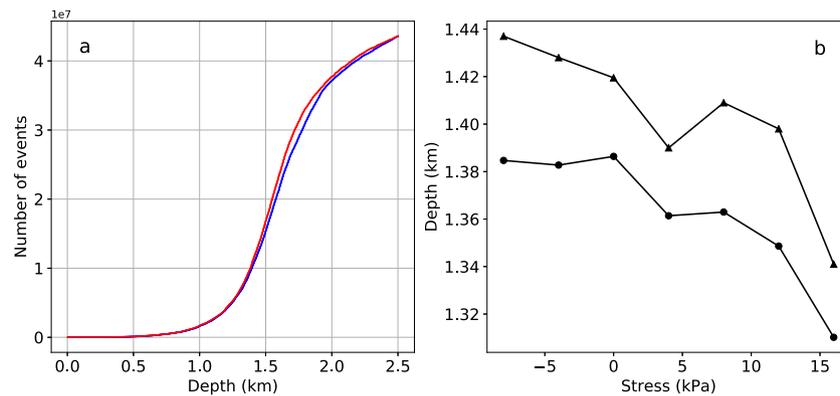

Fig. S6. a, Cumulative number of events with depth for the lower tidal stress group (blue) and higher tidal stress group (red) (see Fig. 4). **b**, Mean (circle) and median (triangle) earthquake depth for non-overlapping stress bins of 4 kPa.

References

Shi, Y., Bolt, B.A., 1982. The standard error of the magnitude-frequency b value. Bull. Seismol. Soc. Am. 72 (5), 1677–1687.

Scholz, C.H., Tan, Y.J., Albino, F., 2018. The mechanism of tidal triggering of earthquakes at mid-ocean ridges. arXiv:1812.00639v1.