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Supplementary Material for the paper entitled "Fluctuations of the entropy change under time reversal: further investigations on identifying the occurrence time of an impending major earthquake"

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1. Figure S1

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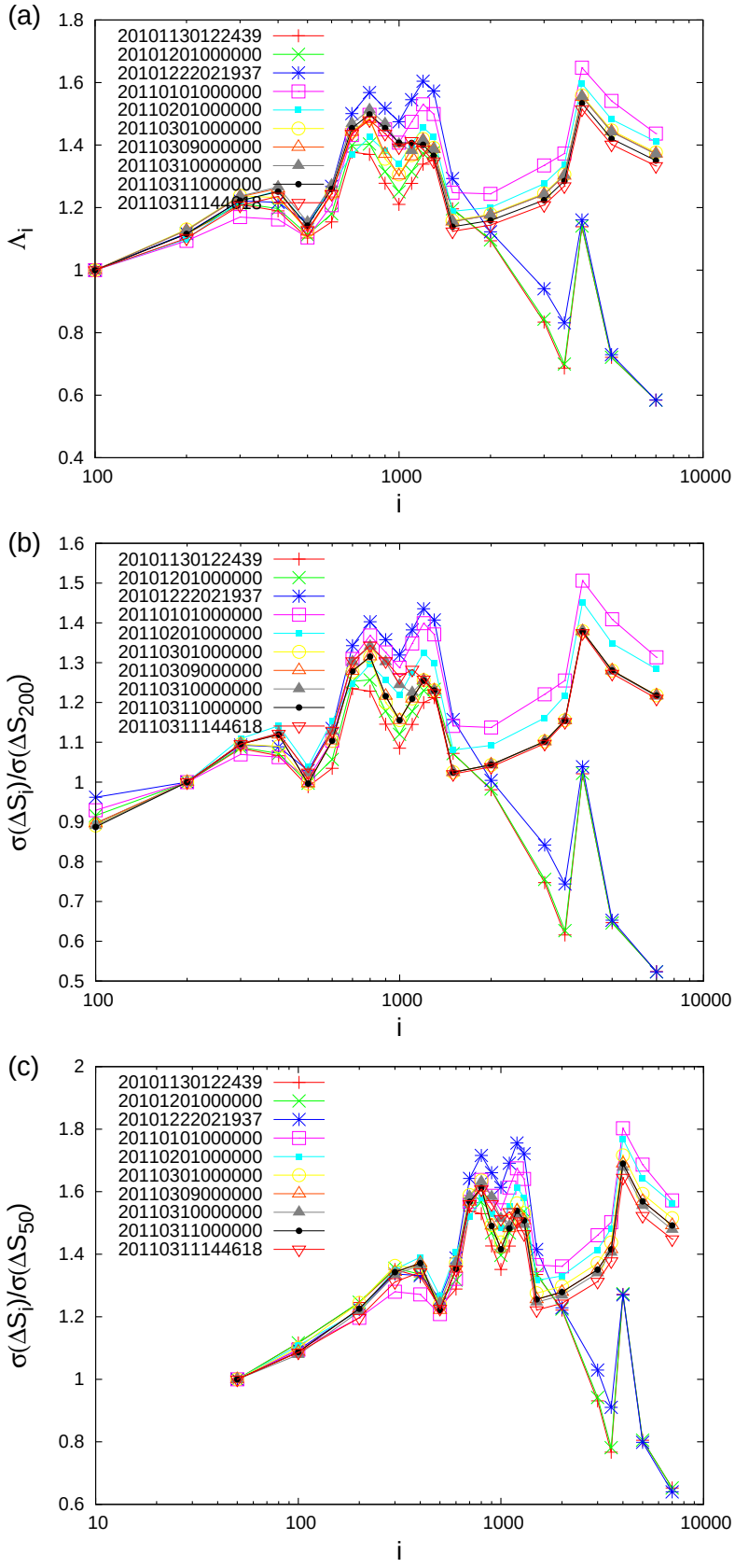
(a)
20101130122439
20101201000000
20101222021937
20110101000000
20110201000000
20110301000000
20110309000000
20110310000000
20110311000000
20110311144618
Λi
i
(b)
σ(ΔSi)/σ(ΔS200)
(c)
σ(ΔSi)/σ(ΔS50)

Figure S1. (color online) Plot of Λ_i values versus the scale i (number of events) for all $M \geq 3.5$ EQs in the entire Japanese region $N_{25}^{46}E_{125}^{148}$ since 1 January 2010. Panel (a) reproduces fig.1(a) of the main text while panels (b) and (c) correspond to the ratios $\frac{\sigma(\Delta S_i)}{\sigma(\Delta S_{200})}$ and $\frac{\sigma(\Delta S_i)}{\sigma(\Delta S_{50})}$, respectively, in the denominators of which the scales $i = 200$ and 50 events are used instead of the scale $i = 100$ events in the denominator of Λ_i of eq.(3) of the main text. An inspection of these three panels demonstrates the robustness of the systematic behavior observed at scales longer than $i \approx 2000$ events, i.e., the Λ_i value starts increasing from 22 December 2010 (the date at which ΔS is minimized) reaching a maximum close to the appearance of a Seismic Electric Signals activity (evidenced from the recording of anomalous magnetic field variations on the z-component) in the beginning of January 2011; then it gradually diminishes until just before the mega-earthquake occurrence. The Λ_i values as well as the ratios $\frac{\sigma(\Delta S_i)}{\sigma(\Delta S_{200})}$ and $\frac{\sigma(\Delta S_i)}{\sigma(\Delta S_{50})}$ have been calculated for each scale at the following dates: 30 November 2010 (pluses in red, just before the M7.1 EQ on this date), 1 December 2010 (crosses in green), 22 December 2010 (asterisks in blue, just before the M7.8 EQ that occurred on this date), 1 January 2011 (open squares in magenta), 1 February 2011 (solid circles in cyan), 1 March 2011 (open circles in brown), 9 March 2011 (open triangles in orange, at 00:00 LT, thus almost 12 hours before the M7.3 EQ occurrence on 9 March 2011), 10 March 2011 (gray filled triangles, at 00:00 LT thus almost 12 hours after the M7.3 EQ occurrence on 9 March 2011), 11 March 2011 (solid circles in black, at 00:00 LT, thus almost 15 hours before the mega-earthquake occurrence) and 11 March (inverted red triangles, almost 10 min before the M9 Tohoku EQ occurrence). The time format in the figure keys is YYYYMMDDhhmmss in Japan Standard Time.