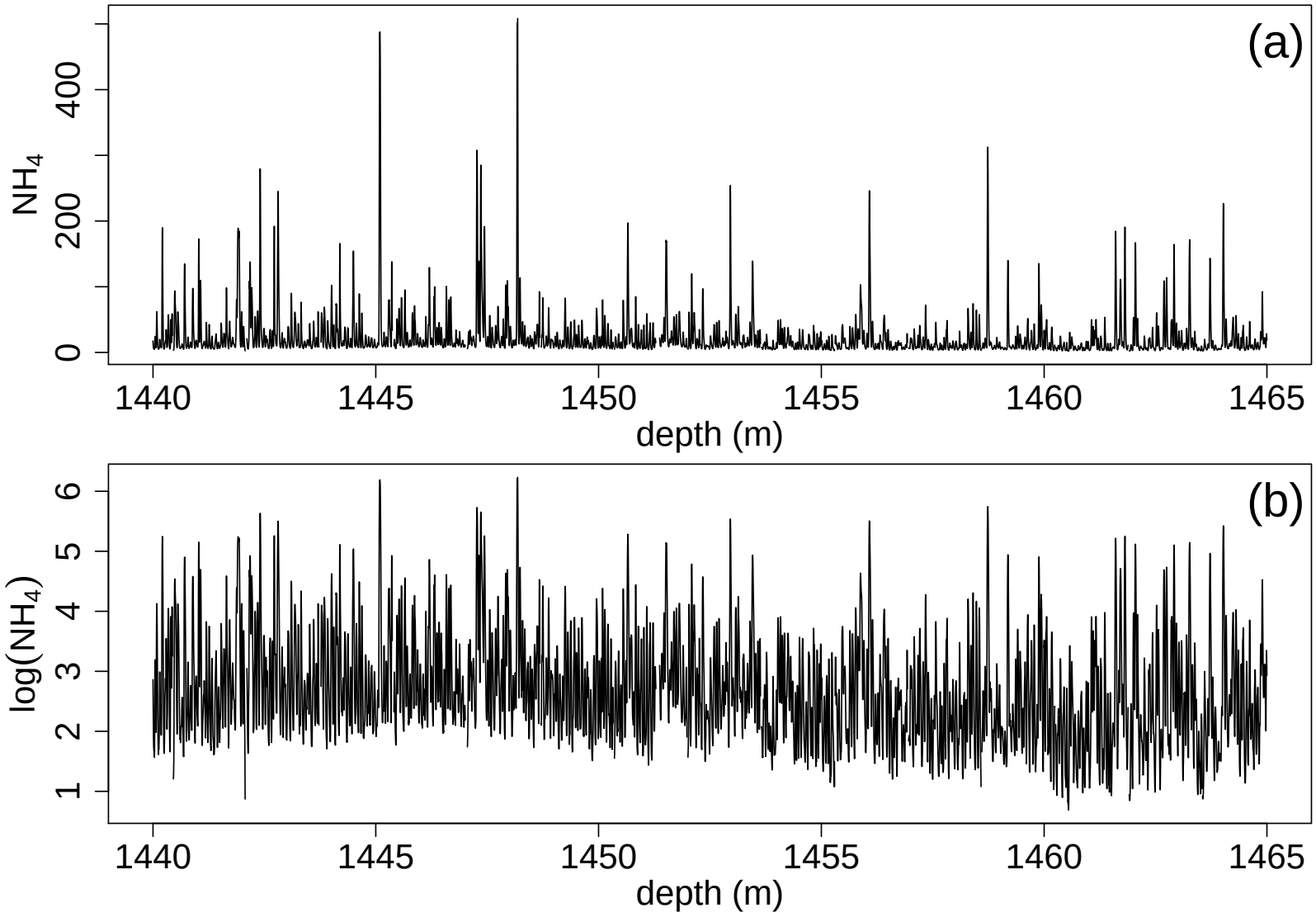
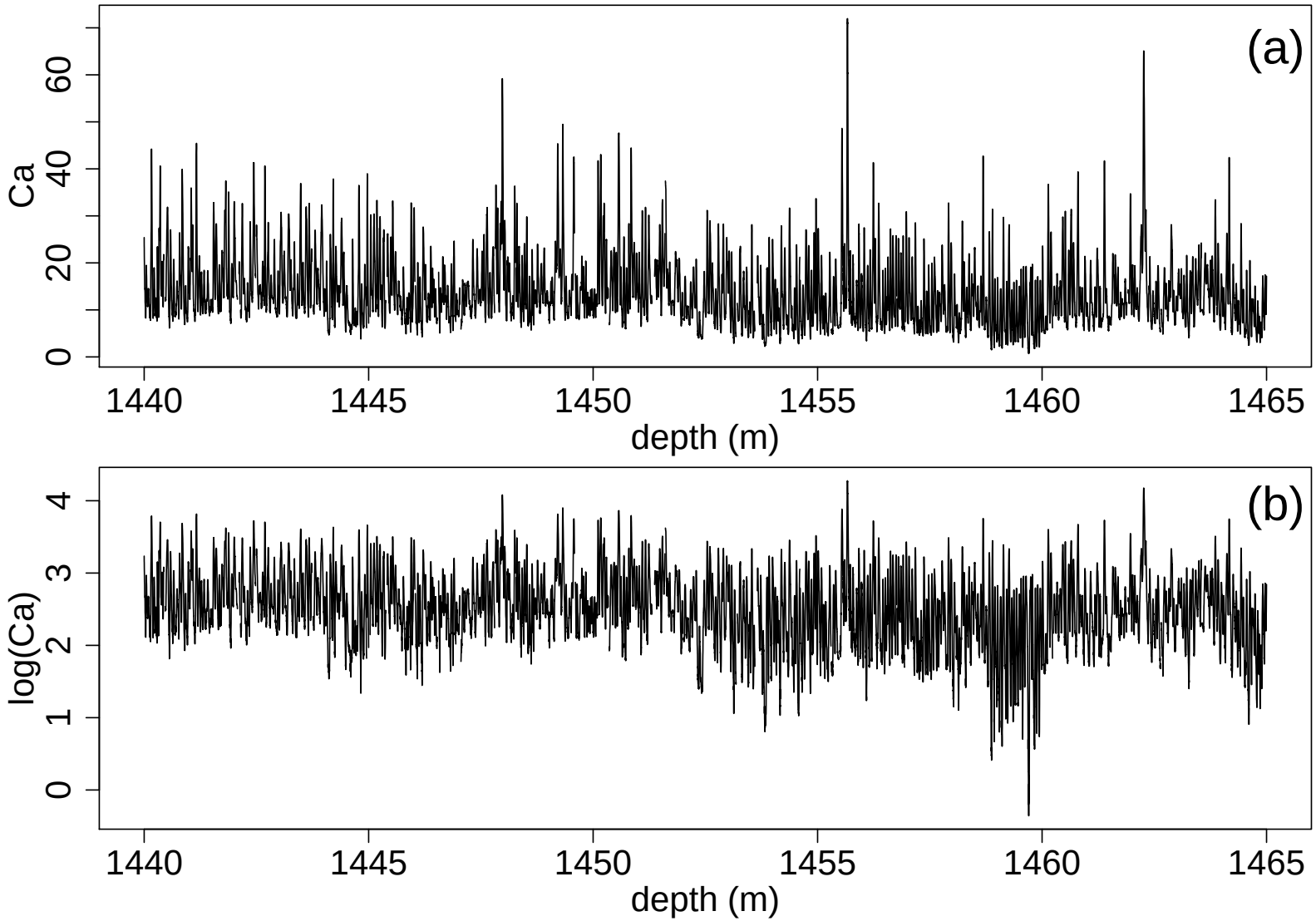
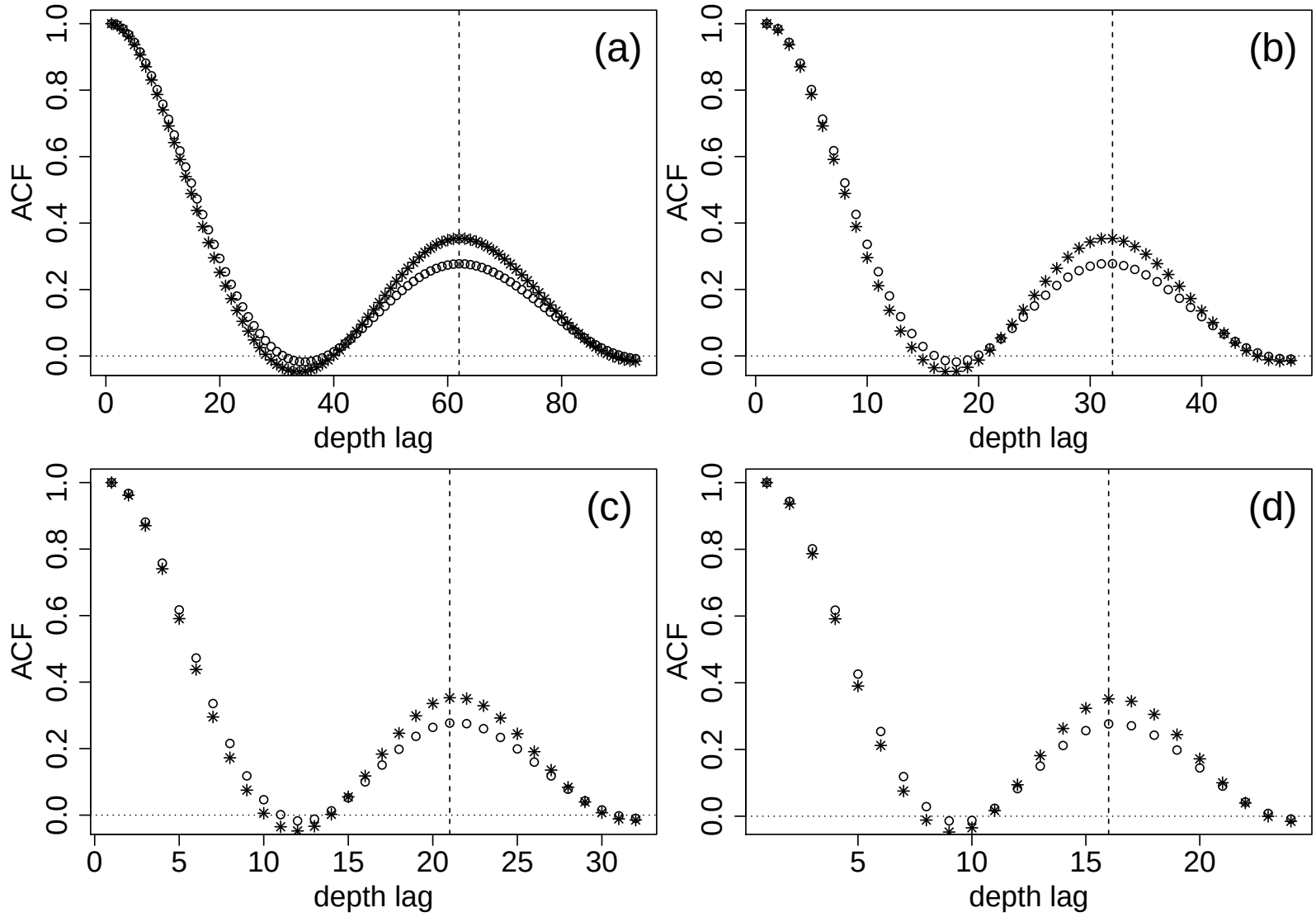


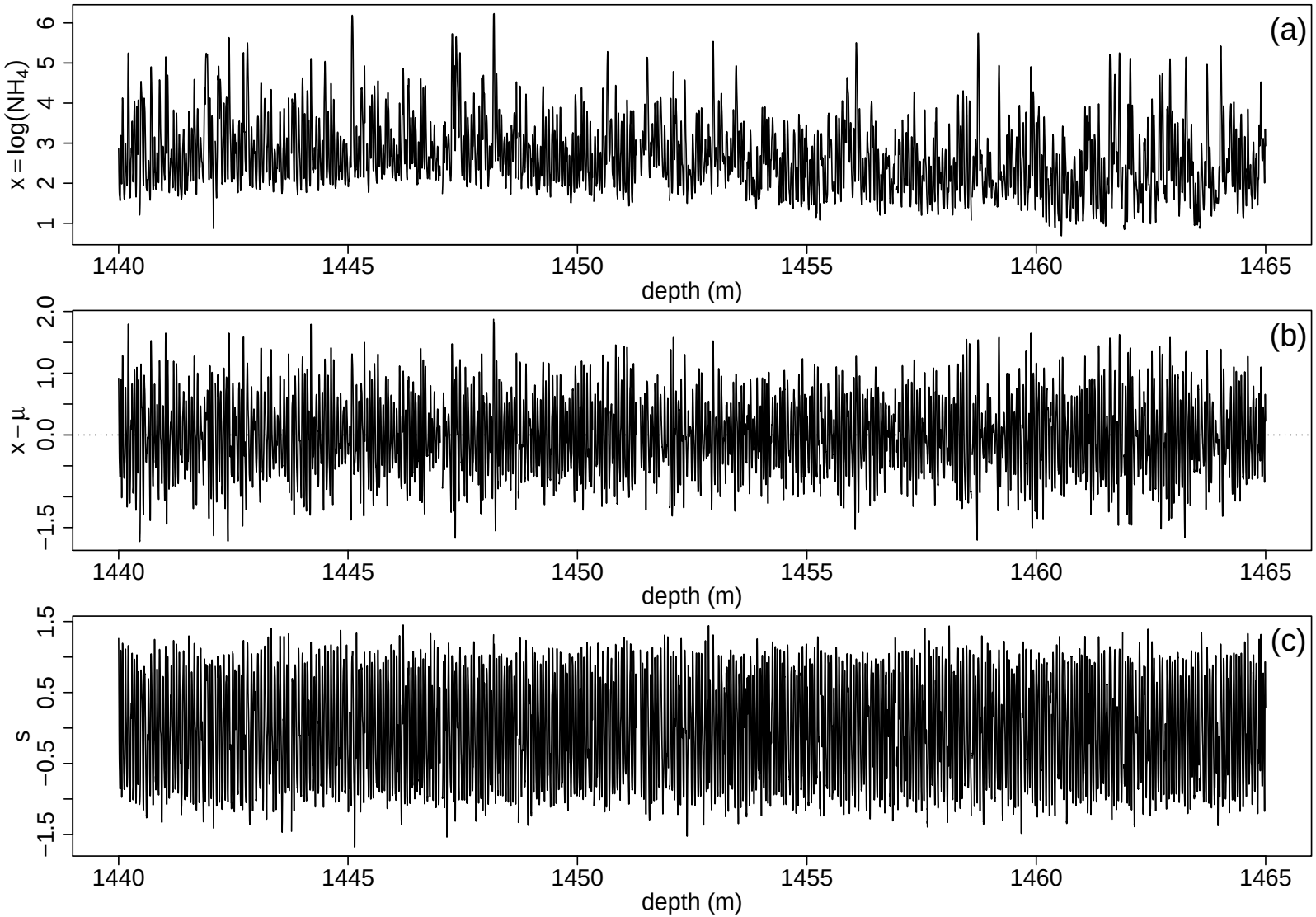
A1: The effect of taking the natural logarithm of the NH_4 signal from the NGRIP ice-core (1440 – 1465m). (a) the raw signal. (b) the log signal.



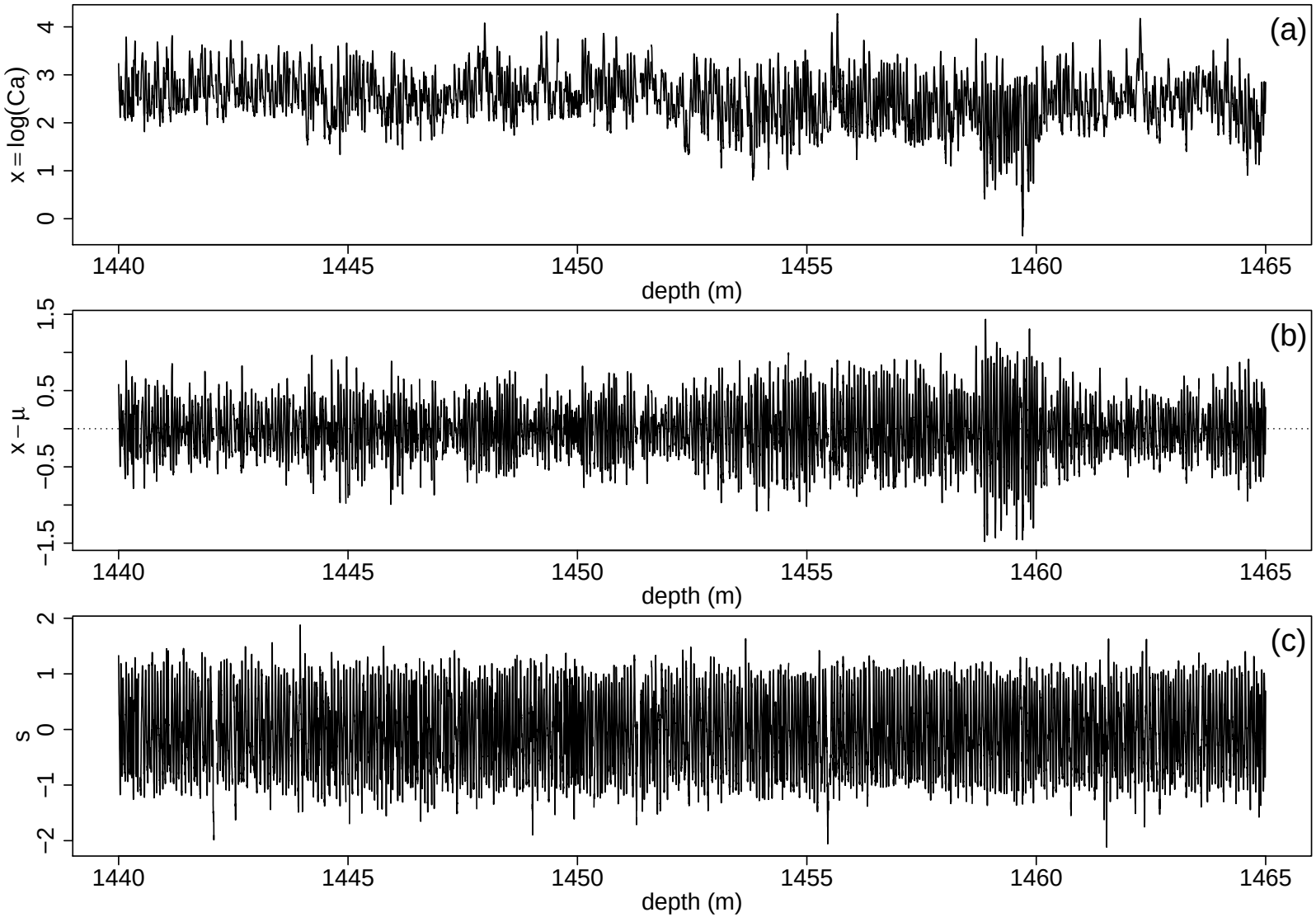
A2: The effect of taking the natural logarithm of the Ca signal from the NGRIP ice-core (1440 – 1465m). (a) the raw signal. (b) the log signal.



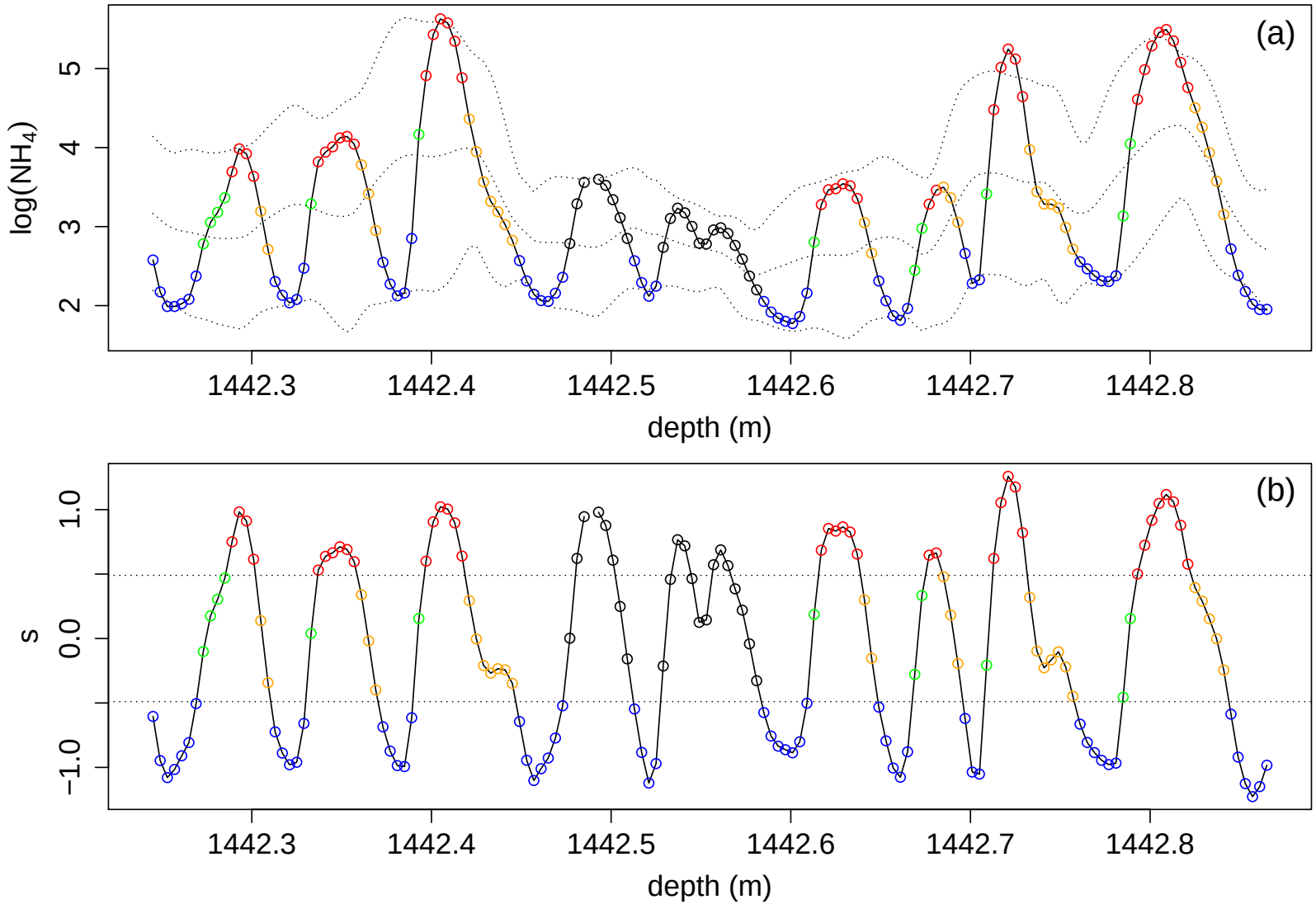
A3: The ACFs of the log NH_4 (circles) and log Ca (stars) signals from the NGRIP ice-core ($1440 - 1465$m), plotted against lag. The vertical dashed lines indicate the local maxima, used to obtain an initial estimate of cycle length. (a) no thinning. (b) second thinning. (c) third thinning. (d) fourth thinning.



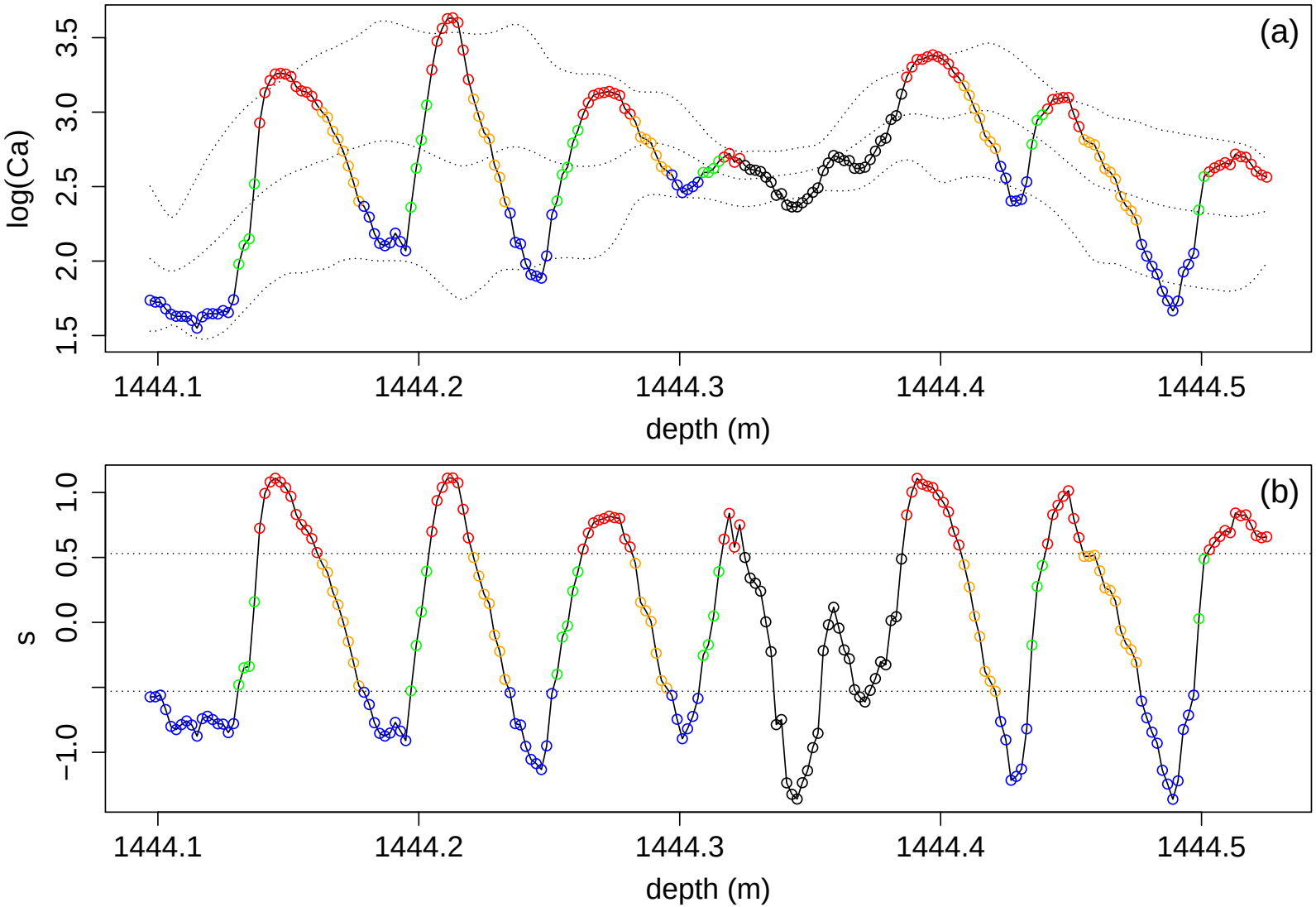
A4: The process of smoothing the log NH_4 signal from the NGRIP ice-core (1440 – 1465m), using an initial estimate of annual cycle length. (a) the log signal **x**. (b) the de-trended signal. (c) the standardised signal **s**.



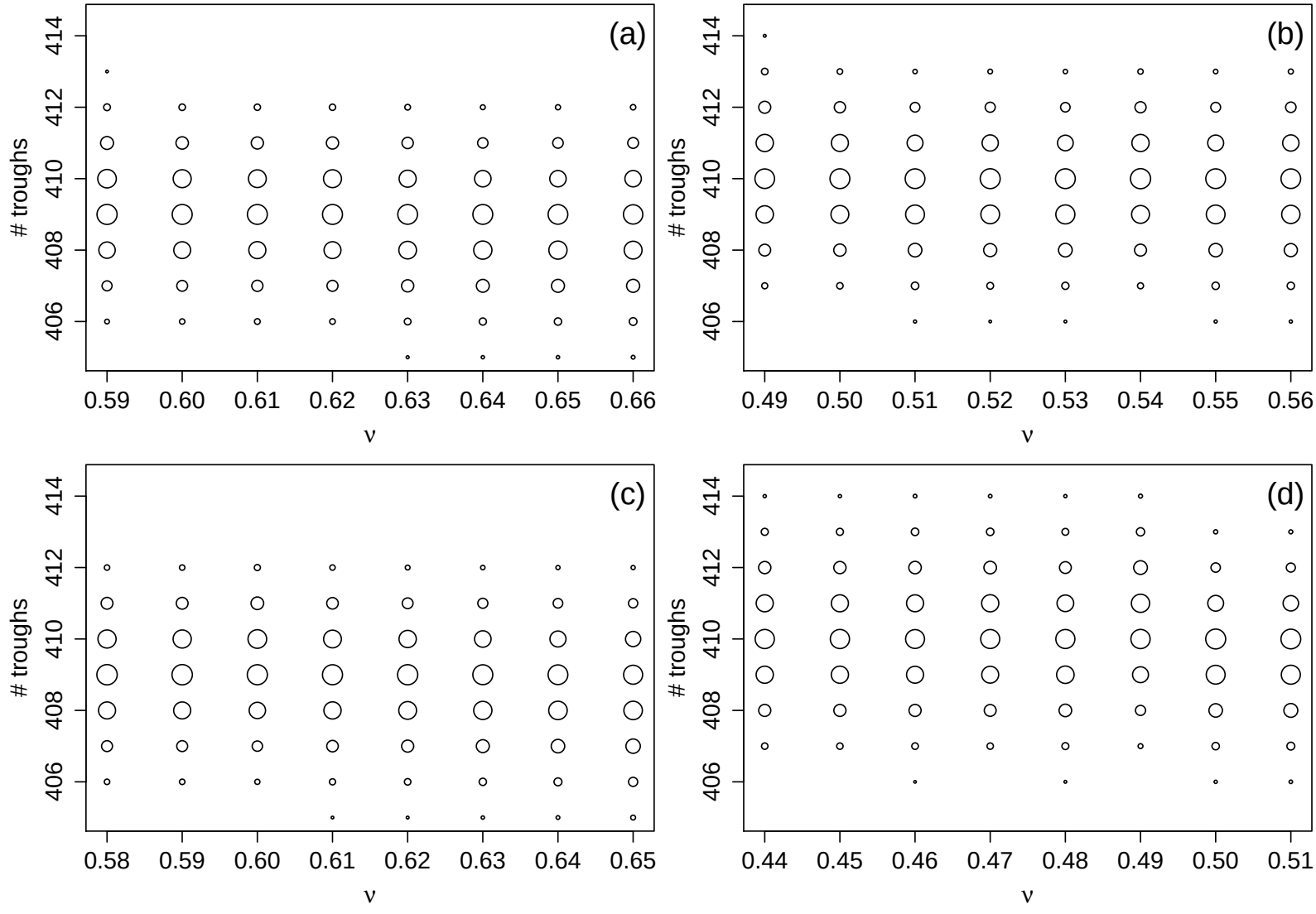
A5: The process of smoothing the log Ca signal from the NGRIP ice-core (1440 – 1465m), using an initial estimate of annual cycle length. (a) the log signal **x**. (b) the de-trended signal. (c) the standardised signal **s**.



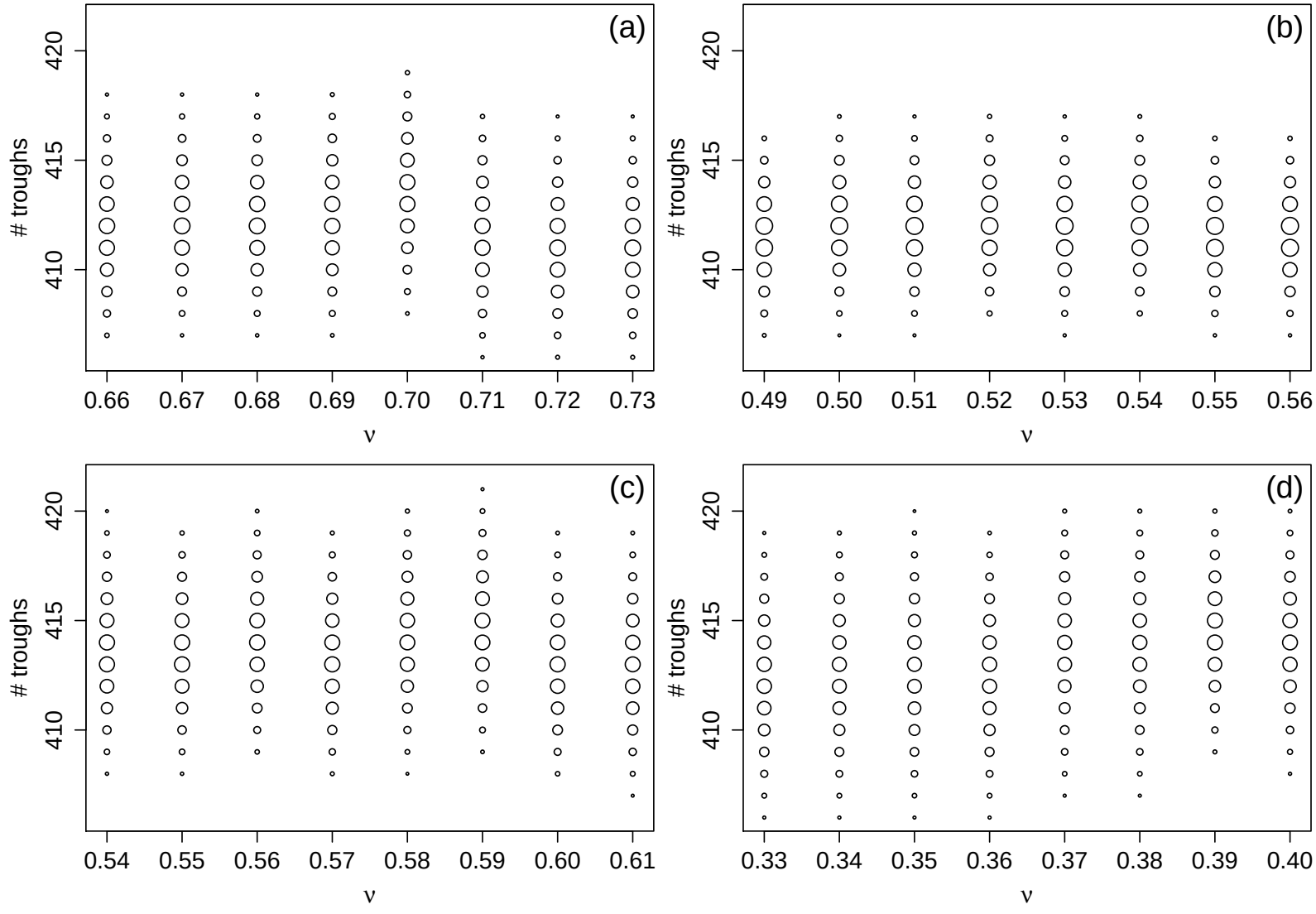
A6: A stretch of the classified log NH_4 signal (fourth thinning) from the NGRIP ice-core (1442.25 − 1442.87m), for $\nu = 0.49$. Points within an issue are black, points within peaks are coloured red, descending points are orange, troughs are blue, and ascending points are green. (a) the log signal with $\boldsymbol{\mu}$ and $\boldsymbol{\mu} \pm \boldsymbol{\sigma}$ shown as dotted lines. (b) the standardised signal.



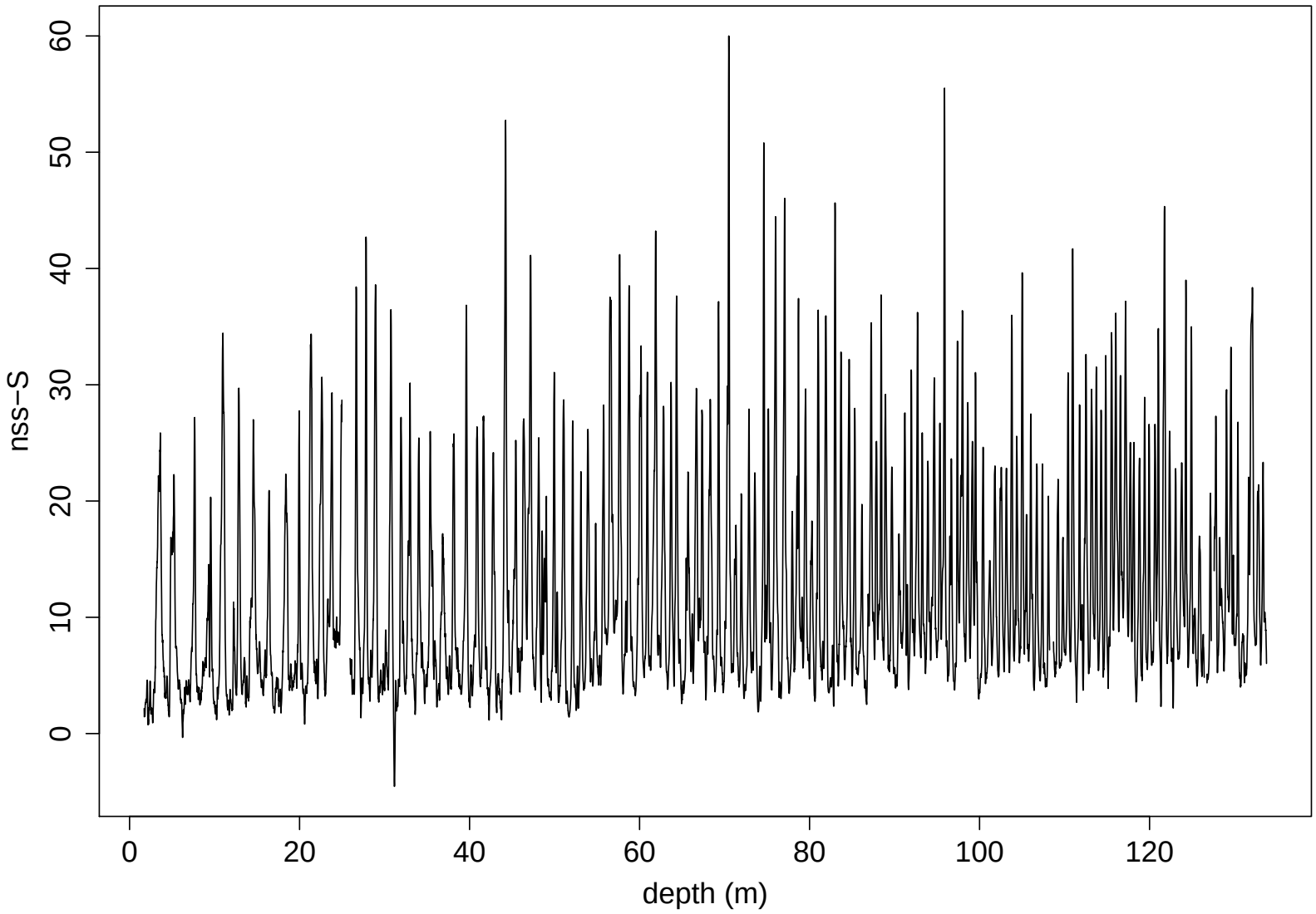
A7: A stretch of the classified log Ca signal (second thinning) from the NGRIP ice-core (1444.10 – 1444.53m), for $\nu = 0.53$. Points within an issue are black, points within peaks are coloured red, descending points are orange, troughs are blue, and ascending points are green. (a) the log signal with $\boldsymbol{\mu}$ and $\boldsymbol{\mu} \pm \boldsymbol{\sigma}$ shown as dotted lines. (b) the standardised signal.



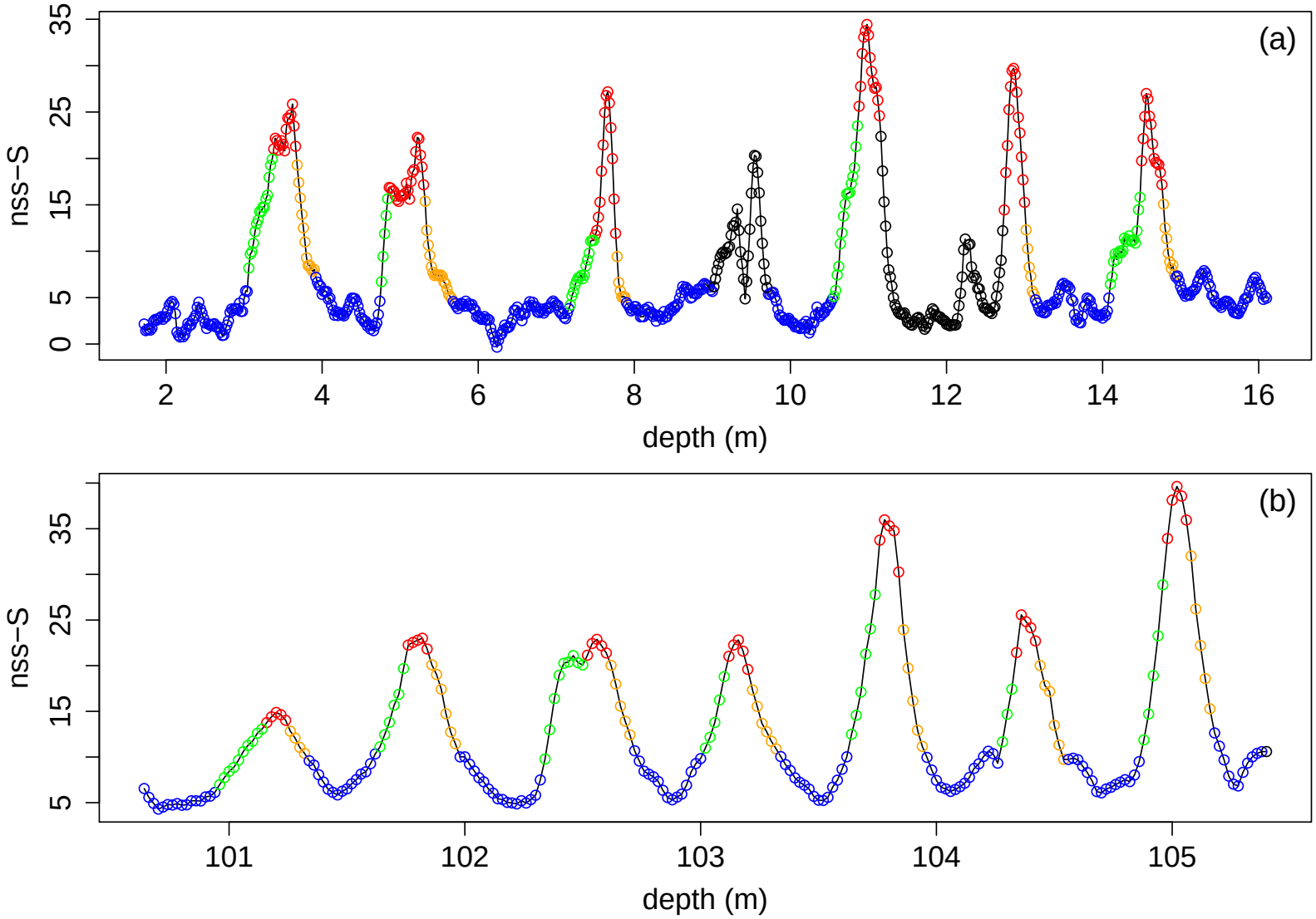
A8: The effect of ν on the probability distribution obtained for the number of annual troughs in the dating of the NGRIP ice-core (1440 – 1465m) using its log Ca signal. Each circle has area proportional to the probability of a particular number of troughs. (a) no thinning. (b) second thinning. (c) third thinning. (d) fourth thinning.



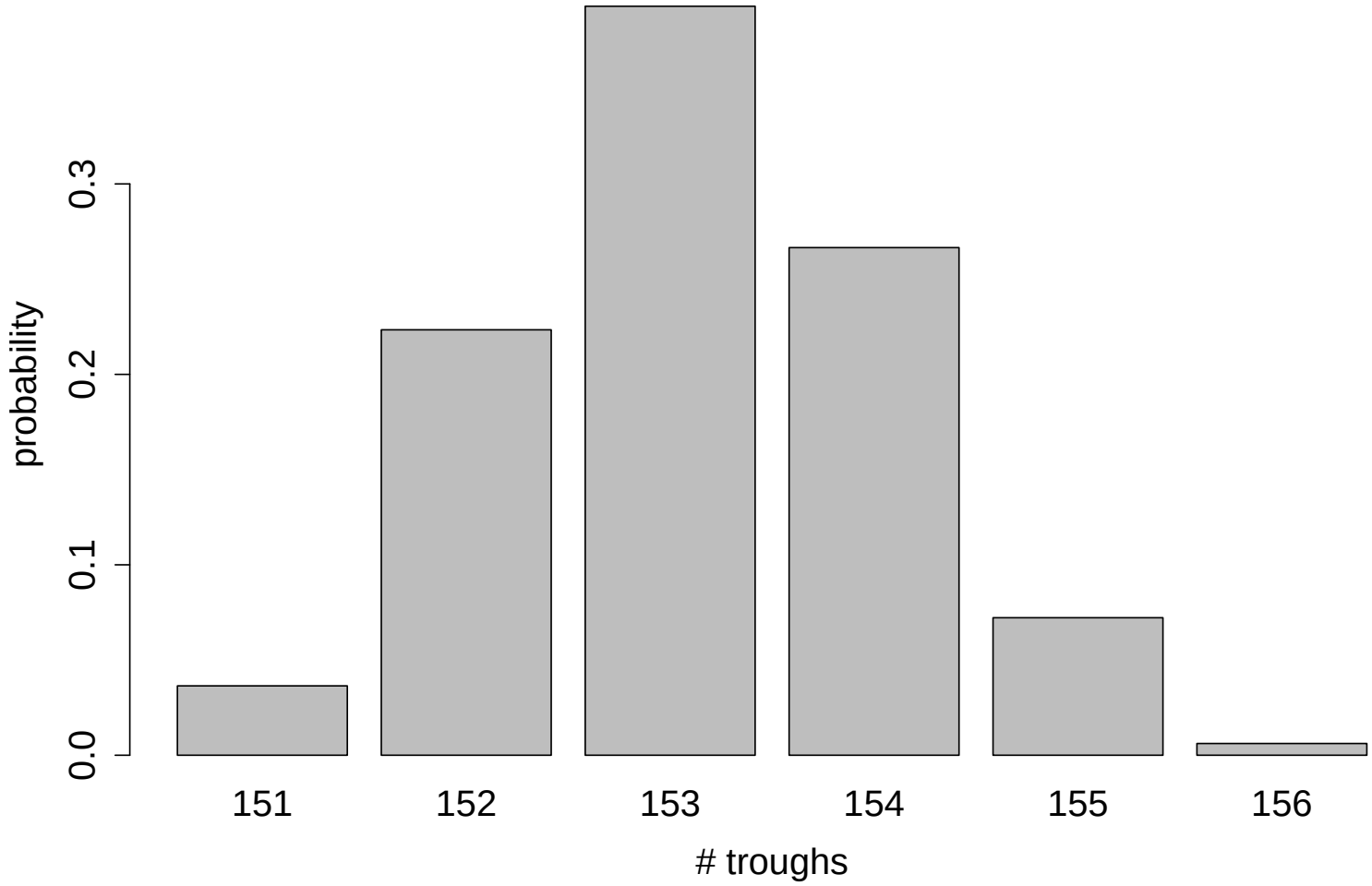
A9: The effect of ν on the probability distribution obtained for the number of annual troughs in the dating of the NGRIP ice-core (1440 – 1465m) using its log Ca signal. Each circle has area proportional to the probability of a particular number of troughs. (a) no thinning. (b) second thinning. (c) third thinning. (d) fourth thinning.



A10: The nss-S signal for the entire Gomez core.



A11: Two portions of the classified log nss-S signal from the Gomez ice-core for $v_1 = 0.85$, $v_2 = 0.5$, and $\beta = 10$. Points within an issue are black, points within peaks are coloured red, descending points are orange, troughs are blue, and ascending points are green. (a) at the start of the core. (b) towards the end of the core.



A12: Bar plot showing the probability distribution of the number of annual troughs—a summary of the chronology—in the dating of the Gomez core using its nss-S signal for $v_1 = 0.85$, $v_2 = 0.5$, and $\beta = 10$.