Supporting Information for "A first-order statistical exploration of the mathematical limits of Micromagnetic Tomography"

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1. Extra figures uncertainty ratio distribution

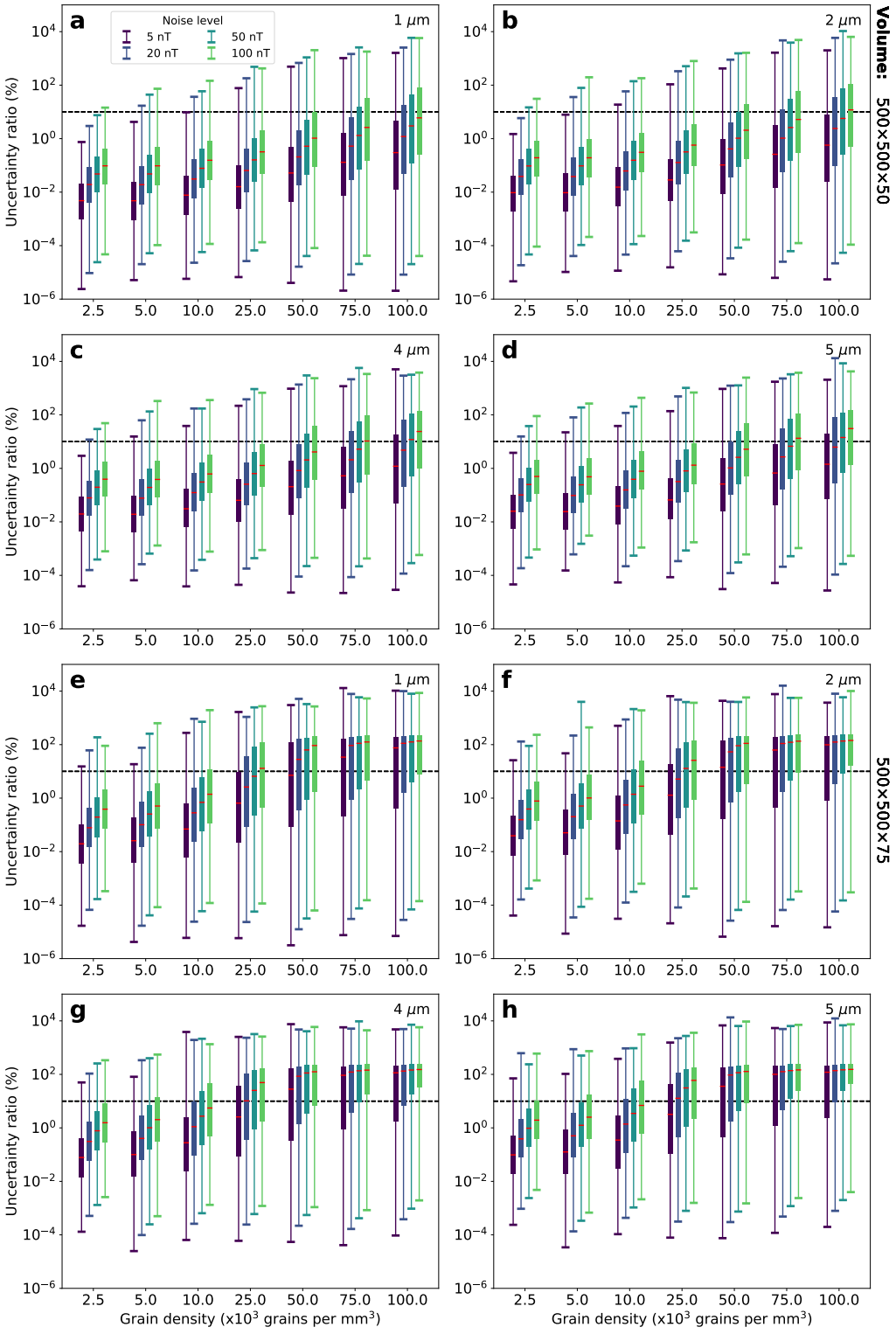

Figure S1. Boxplots showing the distribution of the uncertainty ratio in a 500×500 μm^2 domain. Each panel shows the relation between uncertainty ratio and grain density. The red line in each box-plot indicates the median uncertainty ratio, the bottom and top edges of the solid rectangles show the first and third quartile respectively. The bottom and top of each box-plot shows the minimum and maximum uncertainty ratio respectively per model. The four boxplots per grain density correspond from left to right to four noise levels, *i.e.* 5, 20, 50, and 100 nT. The upper 4 panels (a-d) refer to a 50 μm thick sample. The lower 4 panels (e-h) refer to a sample with a thickness of 75 μm. Each set of four panels (a-d or e-h) have a sampling interval of respectively 1, 2, 4, and 5 μm.

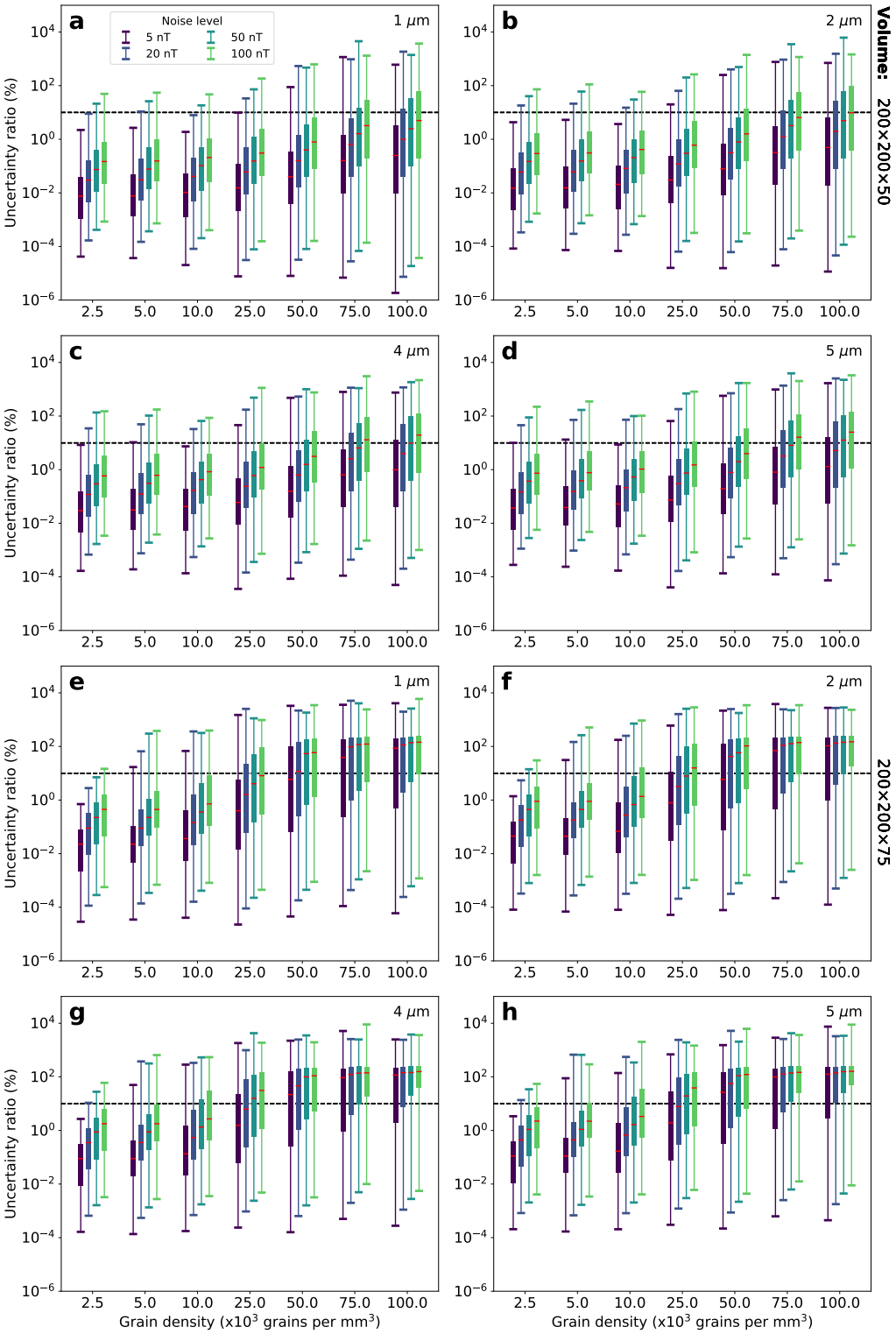

Figure S2. Boxplots showing the distribution of the uncertainty ratio in a 200×200 μm^2 domain, similar to Figure S1.

2. Extra signal strength figures

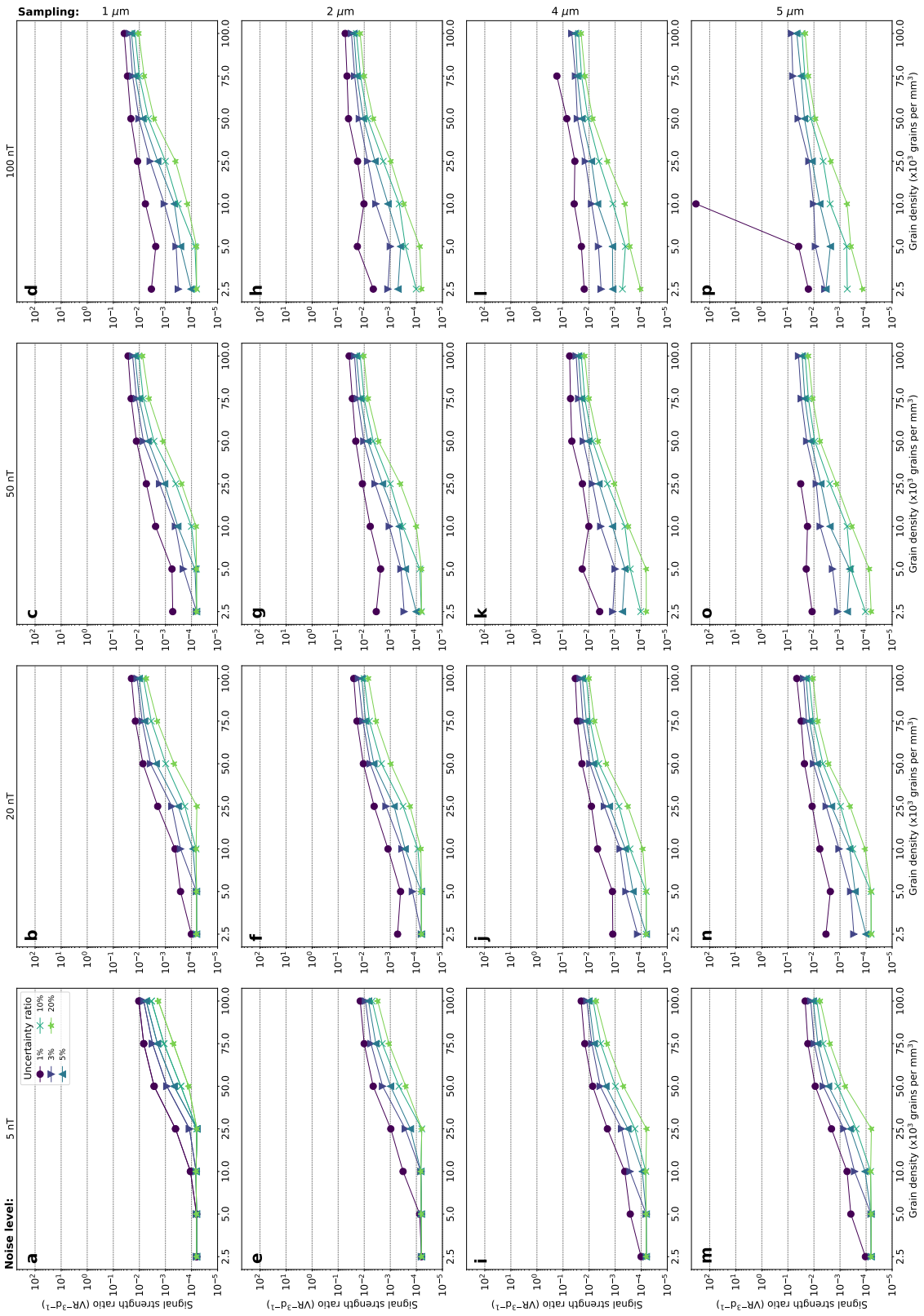

Figure S3. 99% resolved SSR plotted against grain density for different uncertainty ratios for the 500×500 μm^2 sample surface. Each row panels is created with a different sampling interval, that is from top to bottom, 1, 2, 4, and 5 μm. Each column represents a different noise level, that is from left to right, 5, 20, 50, and 100 nT. Each panel contains five lines corresponding to different uncertainty ratios, namely, 1% (circle), 3% (upper base triangle), 5% (lower base triangle), 10% (cross), and 20% (star). Some points are missing, because no SSR could be found then for which 99% of the grains pass the uncertainty criterion.

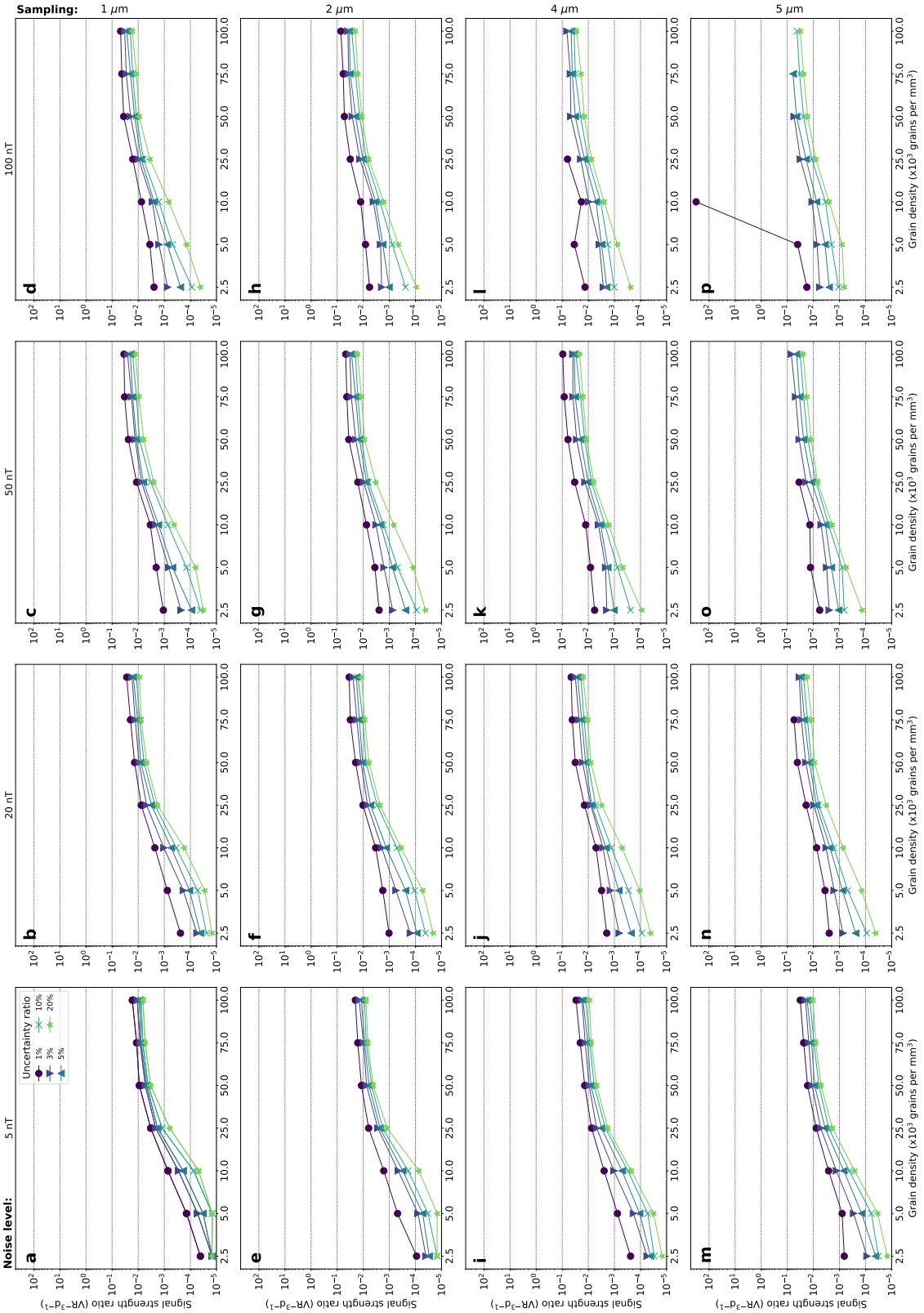

Figure S4. See Figure S3, now plotted for a domain of $500 \times 500\ \mu m^2$ and a thickness of 75 μm.

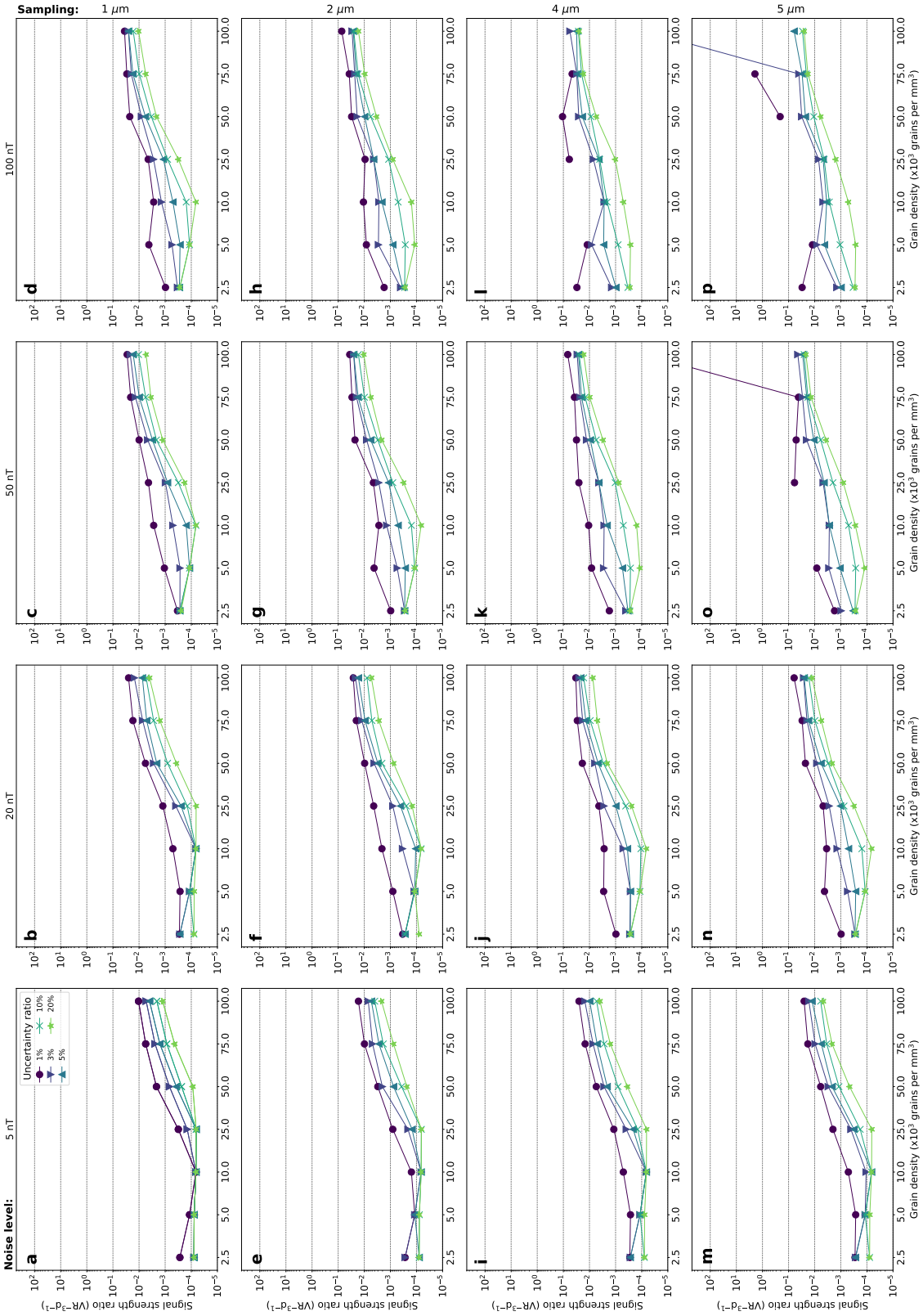

Figure S5. See Figure S3, now plotted for a domain of 200×200 μm^2 and a thickness of 50 μm. The missing point in panel o has a SSR of 3.37×10^4 for a grain density of 10^5 grains per mm^3 and an uncertainty ratio of 1%. The missing point in panel p has a SSR of 3.37×10^4 for a grain density of 10^5 grains per mm^3 and an uncertainty ratio of 3%.

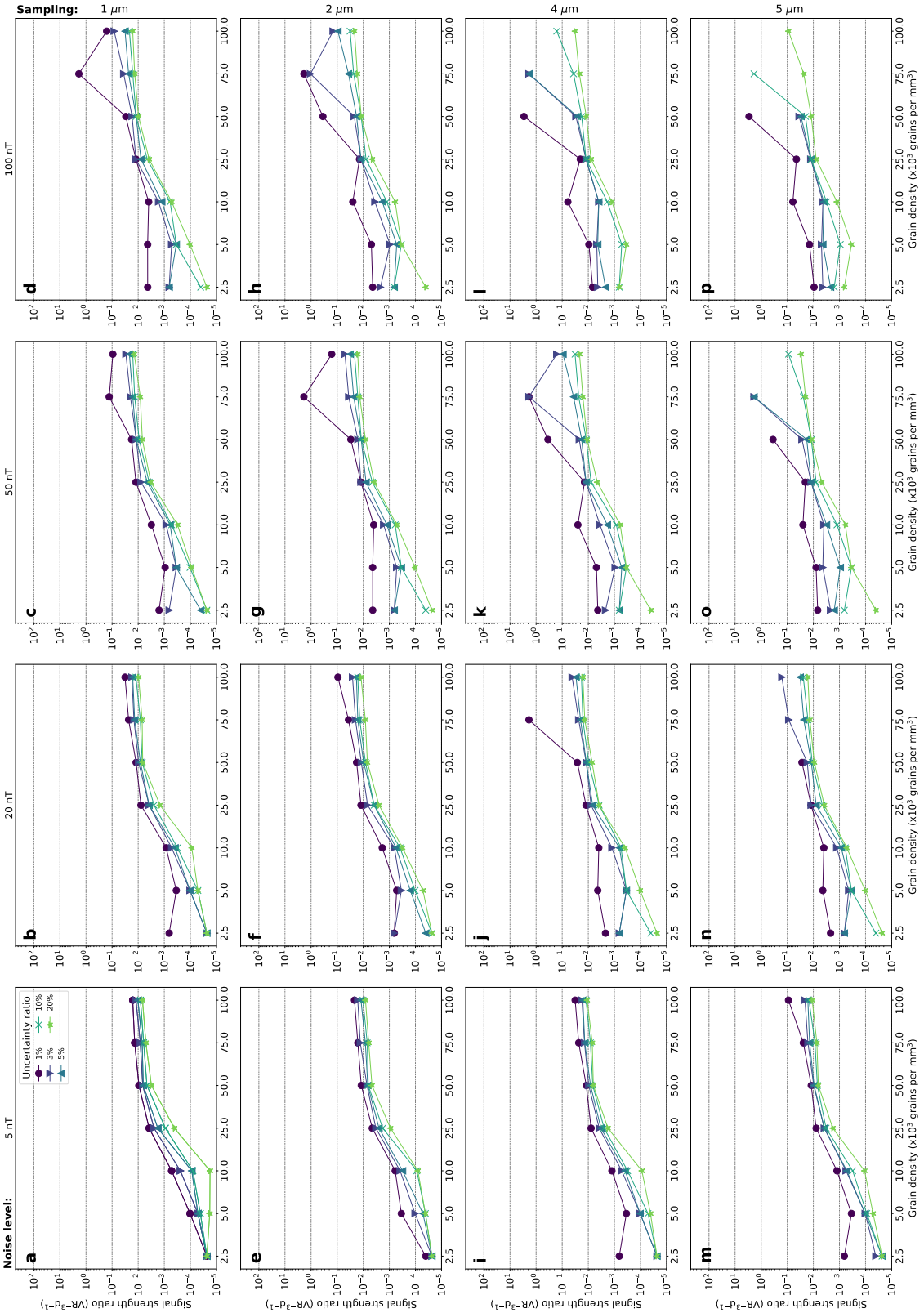

Figure S6. See Figure S3, now plotted for a domain of $200 \times 200\ \mu m^2$ and a thickness of 75 μm.