



**Figure 4 — figure supplement 1. Variance gain control in Gaussian stimuli.**

(a) While the dominant change between the two epochs is the change in variance (by construction), the low variance trials also tend to have slightly higher means. (b) ORN gain estimated by dividing the standard deviation of the response by the standard deviation of the stimulus, for each trial, vs. the standard deviation of the stimulus (cf. Fig. 4f). (c) Input-output curves for the ab3A ORN uncorrected for the change in the mean stimulus. The blue curve intersects the red curve, and is steeper than the red curve, suggesting that gain during the low variance epoch is higher than the gain during the low variance epoch. (d) ORN gain during high and low variance epochs, without correcting for the change in the mean stimulus. Each trial appears in the plot as one blue point (for the low variance epoch) and one red point (for the high variance epoch). (e) Filters used in this analysis. Filters backed out of low variance (blue) or high variance (red) epochs alone are very similar. Therefore, we averaged all filters (black) and used that averaged filter to project all the stimulus in this dataset. (f) Coefficient of determination ( $r^2$ ) vs. the standard deviation of the stimulus. ~80% of trials had  $r^2 > 0.8$ . (g) Coefficient of determination ( $r^2$ ) vs. trial-wise ORN gain in the high and low variance epoch. Dashed lines in (f-g) indicate the median  $r^2$  during the high and low variance epoch.