



**Figure 2 - figure supplement 1: Single enhancer models recreate observed transcriptional bursting properties.** To investigate whether our model is accurately simulating our experimental system, we compared the transcriptional burst properties produced by model simulations of transcription to those observed experimentally (see Supplementary Figure 10 for description of burst properties). A. Graphs of average values of transcriptional burst properties, total mRNA produced during nc14, burst frequency, burst duration, and burst size associated with the proximal enhancer as a function of egg length. In A and B, simulated data are represented with solid lines and experimental data are shown with dotted lines. B. Graphs of average values of transcriptional burst properties as in A, associated with the distal enhancer. For both the proximal and distal enhancers, our model is largely able to recapitulate the experimentally observed transcriptional burst properties associated with each enhancer. C. The median and CV values of the model parameters for the proximal enhancer in the top 10 performing parameter sets. D. The median and CV values of the model parameters for the distal enhancer in the top 10 performing parameter sets. Explanations of model parameters are given in the Methods. Error bars represent 95% confidence intervals.