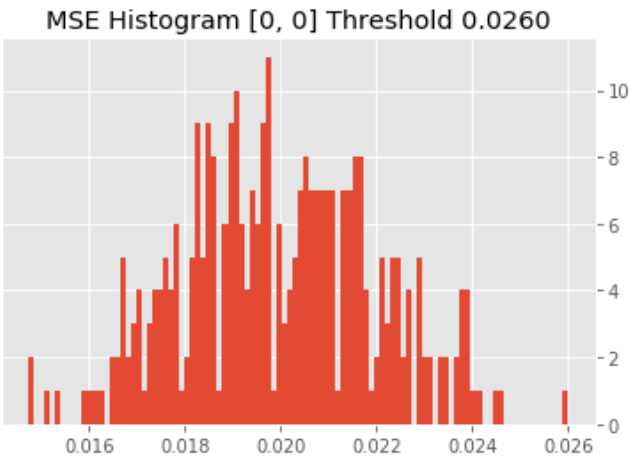
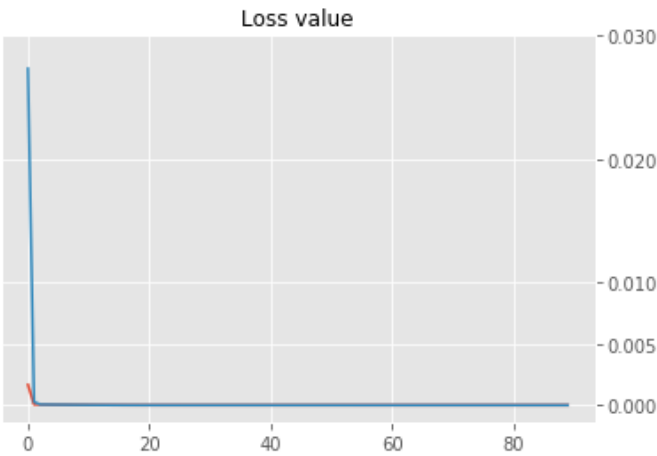


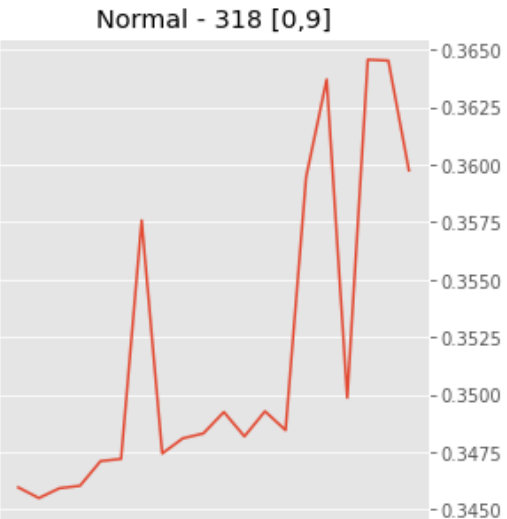
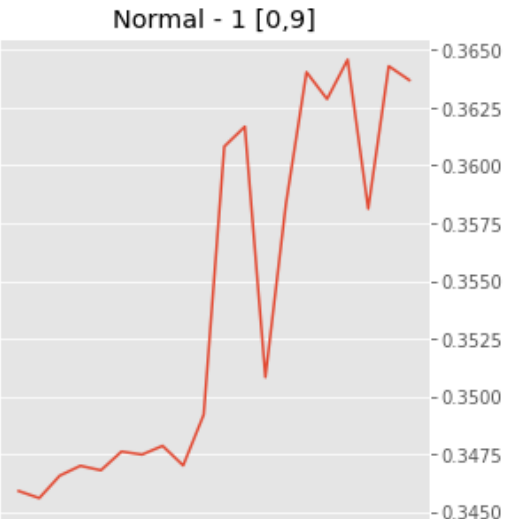
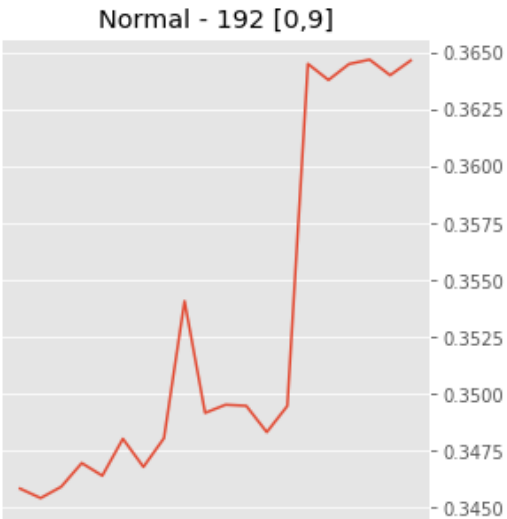
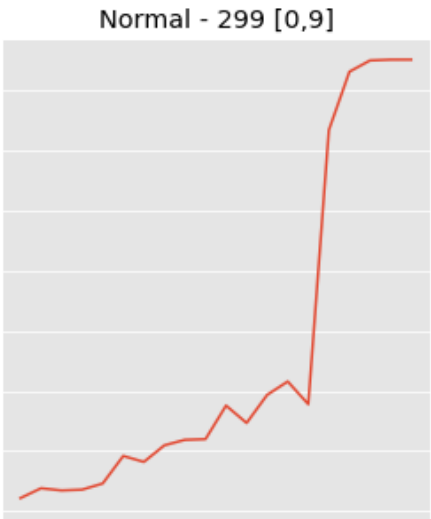
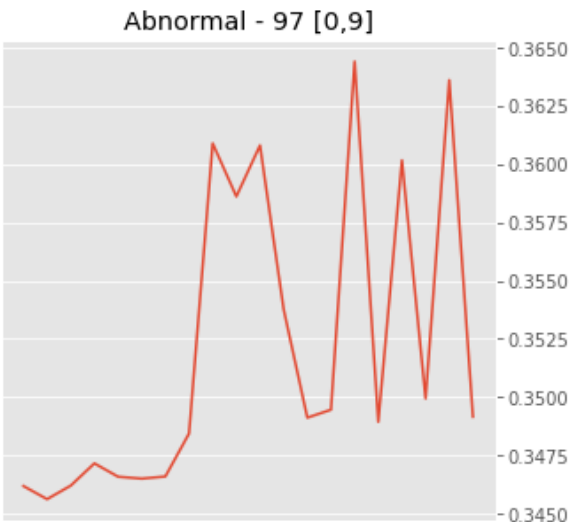
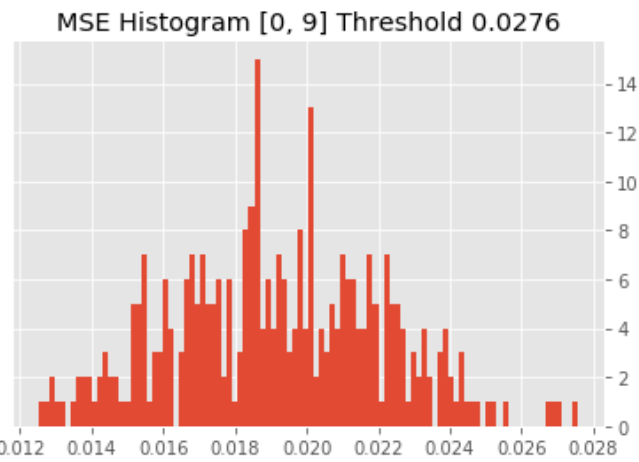
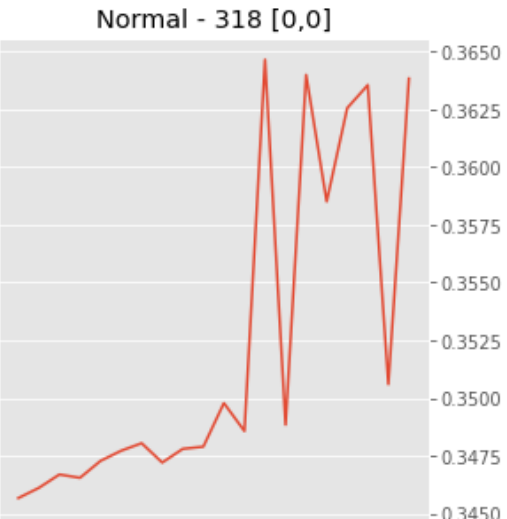
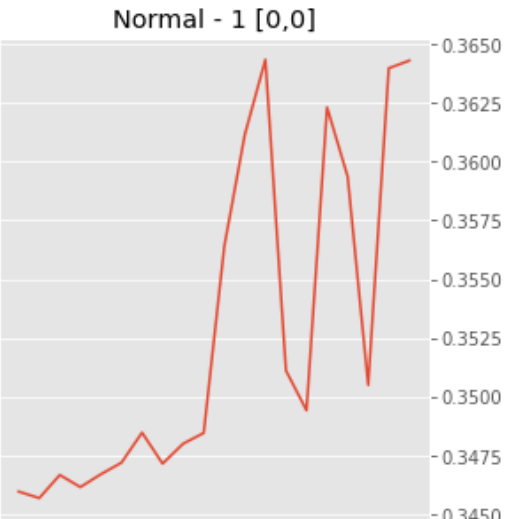
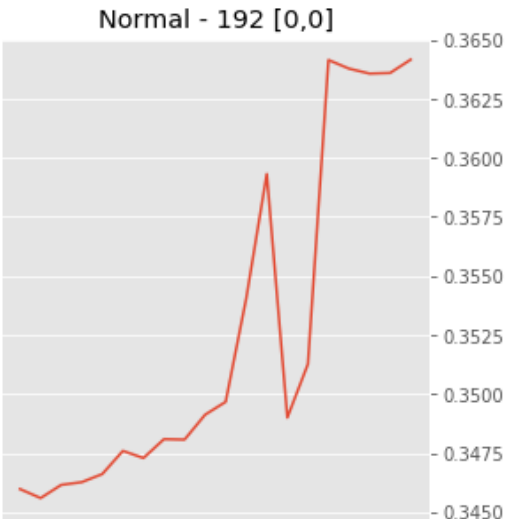
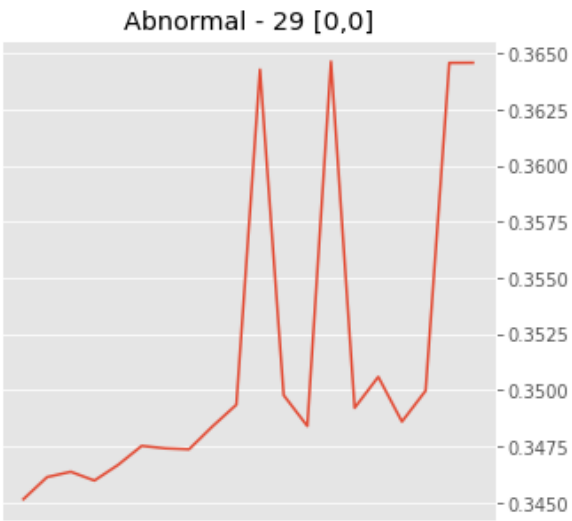
[illegible]

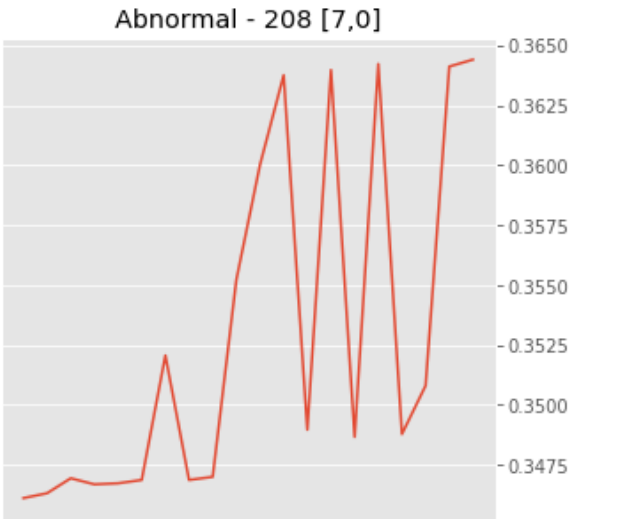
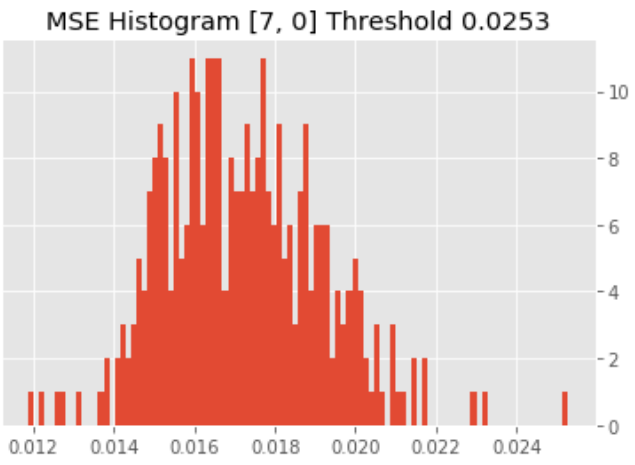
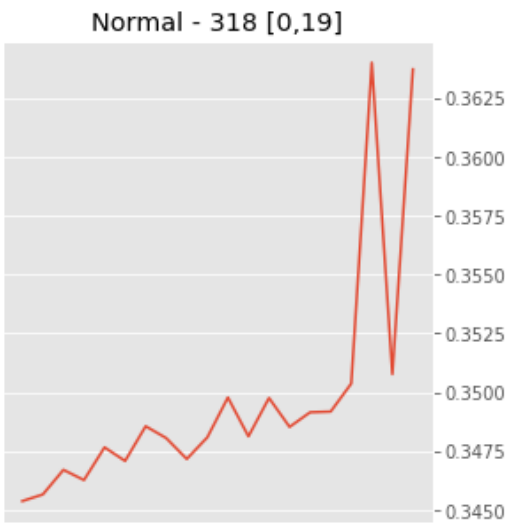
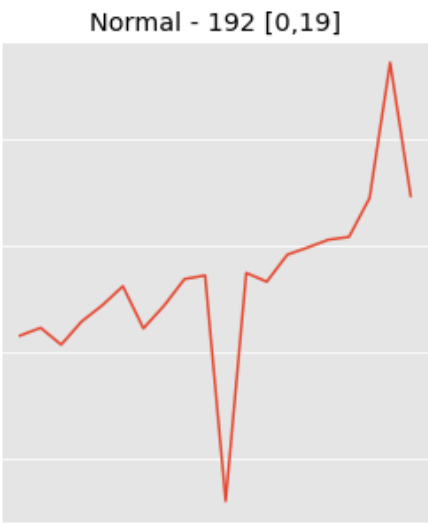
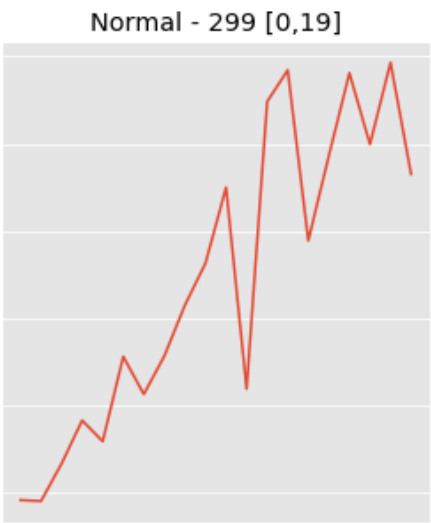
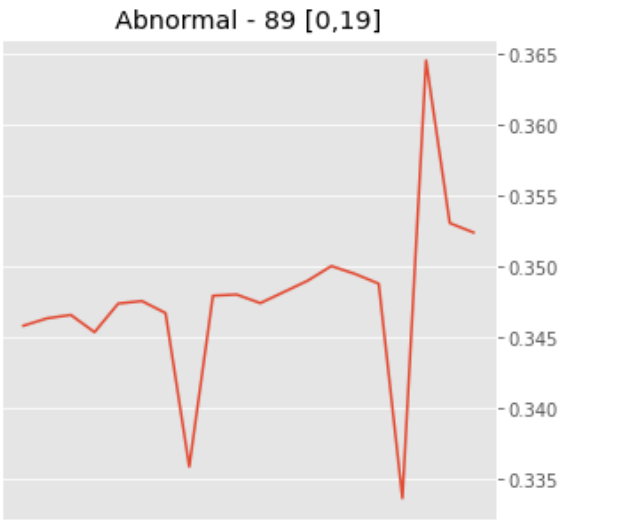
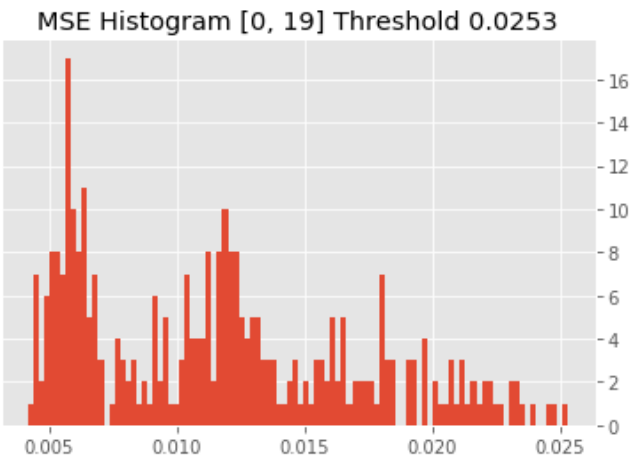
[illegible]

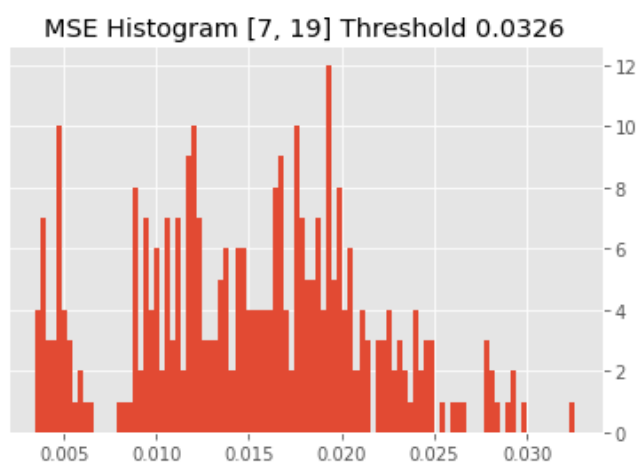
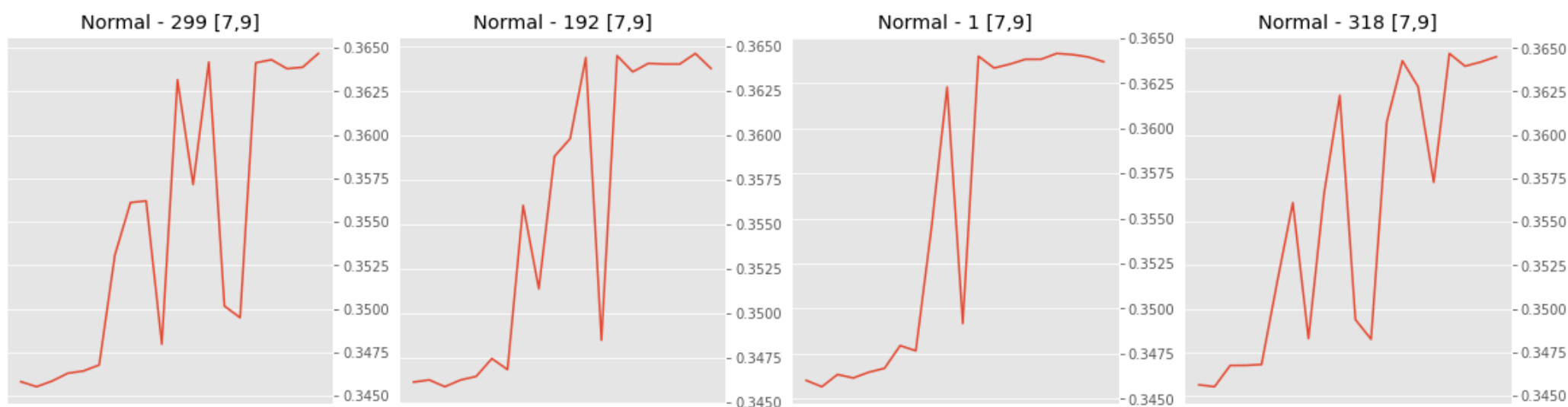
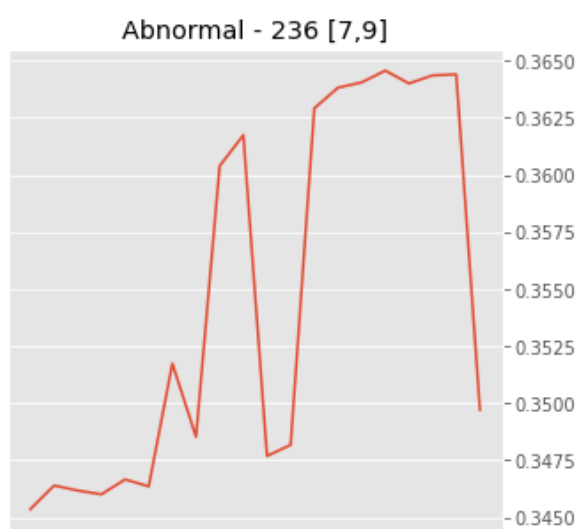
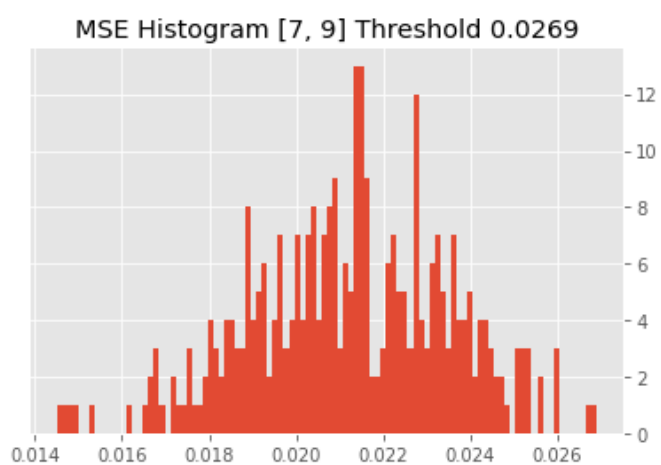
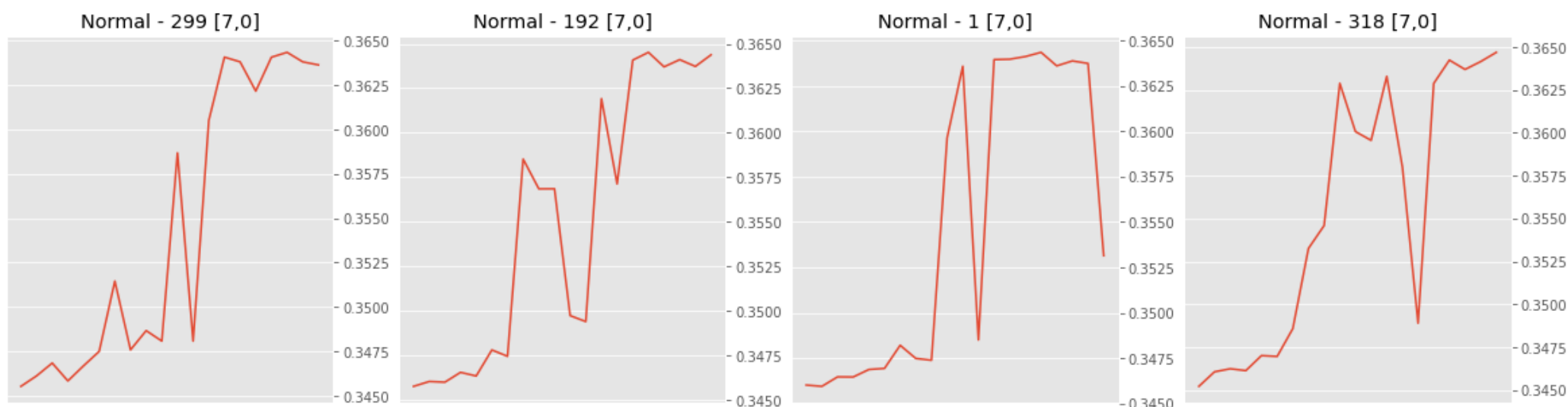
Learning rate: 5e-06  
Epoch 62/90  
314/320 [=====>.] - ETA: 0s - loss: 1.9363e-05 - mean\_squared\_error: 1.9363e-05  
Epoch 00062: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9365e-05 - mean\_squared\_error: 1.9365e-05 - val\_loss: 1.9444e-05 - val\_mean\_squared\_error: 1.9444e-05  
Learning rate: 5e-06  
Epoch 63/90  
315/320 [=====>.] - ETA: 0s - loss: 1.9341e-05 - mean\_squared\_error: 1.9341e-05  
Epoch 00063: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9343e-05 - mean\_squared\_error: 1.9343e-05 - val\_loss: 1.9437e-05 - val\_mean\_squared\_error: 1.9437e-05  
Learning rate: 5e-06  
Epoch 64/90  
317/320 [=====>.] - ETA: 0s - loss: 1.9328e-05 - mean\_squared\_error: 1.9328e-05  
Epoch 00064: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9329e-05 - mean\_squared\_error: 1.9329e-05 - val\_loss: 1.9428e-05 - val\_mean\_squared\_error: 1.9428e-05  
Learning rate: 5e-06  
Epoch 65/90  
319/320 [=====>.] - ETA: 0s - loss: 1.9304e-05 - mean\_squared\_error: 1.9304e-05  
Epoch 00065: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9303e-05 - mean\_squared\_error: 1.9303e-05 - val\_loss: 1.9387e-05 - val\_mean\_squared\_error: 1.9387e-05  
Learning rate: 5e-06  
Epoch 66/90  
319/320 [=====>.] - ETA: 0s - loss: 1.9284e-05 - mean\_squared\_error: 1.9284e-05  
Epoch 00066: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9284e-05 - mean\_squared\_error: 1.9284e-05 - val\_loss: 1.9372e-05 - val\_mean\_squared\_error: 1.9372e-05  
Learning rate: 5e-06  
Epoch 67/90  
316/320 [=====>.] - ETA: 0s - loss: 1.9262e-05 - mean\_squared\_error: 1.9262e-05  
Epoch 00067: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9263e-05 - mean\_squared\_error: 1.9263e-05 - val\_loss: 1.9339e-05 - val\_mean\_squared\_error: 1.9339e-05  
Learning rate: 5e-06  
Epoch 68/90  
317/320 [=====>.] - ETA: 0s - loss: 1.9243e-05 - mean\_squared\_error: 1.9243e-05  
Epoch 00068: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9244e-05 - mean\_squared\_error: 1.9244e-05 - val\_loss: 1.9327e-05 - val\_mean\_squared\_error: 1.9327e-05  
Learning rate: 5e-06  
Epoch 69/90  
315/320 [=====>.] - ETA: 0s - loss: 1.9231e-05 - mean\_squared\_error: 1.9231e-05  
Epoch 00069: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.9229e-05 - mean\_squared\_error: 1.9229e-05 - val\_loss: 1.9335e-05 - val\_mean\_squared\_error: 1.9335e-05  
Learning rate: 5e-06  
Epoch 70/90  
316/320 [=====>.] - ETA: 0s - loss: 1.9207e-05 - mean\_squared\_error: 1.9207e-05  
Epoch 00070: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9208e-05 - mean\_squared\_error: 1.9208e-05 - val\_loss: 1.9289e-05 - val\_mean\_squared\_error: 1.9289e-05  
Learning rate: 5e-06  
Epoch 71/90  
319/320 [=====>.] - ETA: 0s - loss: 1.9195e-05 - mean\_squared\_error: 1.9195e-05  
Epoch 00071: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9195e-05 - mean\_squared\_error: 1.9195e-05 - val\_loss: 1.9280e-05 - val\_mean\_squared\_error: 1.9280e-05  
Learning rate: 5e-06  
Epoch 72/90  
319/320 [=====>.] - ETA: 0s - loss: 1.9175e-05 - mean\_squared\_error: 1.9175e-05  
Epoch 00072: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9176e-05 - mean\_squared\_error: 1.9176e-05 - val\_loss: 1.9263e-05 - val\_mean\_squared\_error: 1.9263e-05  
Learning rate: 5e-06  
Epoch 73/90  
315/320 [=====>.] - ETA: 0s - loss: 1.9156e-05 - mean\_squared\_error: 1.9156e-05  
Epoch 00073: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9158e-05 - mean\_squared\_error: 1.9158e-05 - val\_loss: 1.9245e-05 - val\_mean\_squared\_error: 1.9245e-05  
Learning rate: 5e-06  
Epoch 74/90  
314/320 [=====>.] - ETA: 0s - loss: 1.9142e-05 - mean\_squared\_error: 1.9142e-05  
Epoch 00074: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.9144e-05 - mean\_squared\_error: 1.9144e-05 - val\_loss: 1.9285e-05 - val\_mean\_squared\_error: 1.9285e-05  
Learning rate: 5e-06  
Epoch 75/90  
314/320 [=====>.] - ETA: 0s - loss: 1.9134e-05 - mean\_squared\_error: 1.9134e-05  
Epoch 00075: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9133e-05 - mean\_squared\_error: 1.9133e-05 - val\_loss: 1.9219e-05 - val\_mean\_squared\_error: 1.9219e-05  
Learning rate: 5e-06  
Epoch 76/90  
315/320 [=====>.] - ETA: 0s - loss: 1.9110e-05 - mean\_squared\_error: 1.9110e-05  
Epoch 00076: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9109e-05 - mean\_squared\_error: 1.9109e-05 - val\_loss: 1.9188e-05 - val\_mean\_squared\_error: 1.9188e-05  
Learning rate: 5e-06  
Epoch 77/90  
317/320 [=====>.] - ETA: 0s - loss: 1.9102e-05 - mean\_squared\_error: 1.9102e-05  
Epoch 00077: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9102e-05 - mean\_squared\_error: 1.9102e-05 - val\_loss: 1.9179e-05 - val\_mean\_squared\_error: 1.9179e-05  
Learning rate: 5e-06  
Epoch 78/90  
318/320 [=====>.] - ETA: 0s - loss: 1.9081e-05 - mean\_squared\_error: 1.9081e-05  
Epoch 00078: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.9083e-05 - mean\_squared\_error: 1.9083e-05 - val\_loss: 1.9186e-05 - val\_mean\_squared\_error: 1.9186e-05  
Learning rate: 5e-06  
Epoch 79/90  
316/320 [=====>.] - ETA: 0s - loss: 1.9074e-05 - mean\_squared\_error: 1.9074e-05  
Epoch 00079: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9072e-05 - mean\_squared\_error: 1.9072e-05 - val\_loss: 1.9164e-05 - val\_mean\_squared\_error: 1.9164e-05  
Learning rate: 5e-06  
Epoch 80/90  
314/320 [=====>.] - ETA: 0s - loss: 1.9057e-05 - mean\_squared\_error: 1.9057e-05  
Epoch 00080: val\_loss did not improve from 0.00002

320/320 [=====] - 4s 11ms/sample - loss: 1.9056e-05 - mean\_squared\_error: 1.9056e-05 - val\_loss: 1.9170e-05 - val\_mean\_squared\_error: 1.9170e-05  
Learning rate: 5e-06  
Epoch 81/90  
314/320 [=====>.] - ETA: 0s - loss: 1.9042e-05 - mean\_squared\_error: 1.9042e-05  
Epoch 00081: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.9042e-05 - mean\_squared\_error: 1.9042e-05 - val\_loss: 1.9134e-05 - val\_mean\_squared\_error: 1.9134e-05  
Learning rate: 2.5e-06  
Epoch 82/90  
316/320 [=====>.] - ETA: 0s - loss: 1.9004e-05 - mean\_squared\_error: 1.9004e-05  
Epoch 00082: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.9003e-05 - mean\_squared\_error: 1.9003e-05 - val\_loss: 1.9099e-05 - val\_mean\_squared\_error: 1.9099e-05  
Learning rate: 2.5e-06  
Epoch 83/90  
317/320 [=====>.] - ETA: 0s - loss: 1.8997e-05 - mean\_squared\_error: 1.8997e-05  
Epoch 00083: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.8997e-05 - mean\_squared\_error: 1.8997e-05 - val\_loss: 1.9087e-05 - val\_mean\_squared\_error: 1.9087e-05  
Learning rate: 2.5e-06  
Epoch 84/90  
314/320 [=====>.] - ETA: 0s - loss: 1.8989e-05 - mean\_squared\_error: 1.8989e-05  
Epoch 00084: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.8990e-05 - mean\_squared\_error: 1.8990e-05 - val\_loss: 1.9091e-05 - val\_mean\_squared\_error: 1.9091e-05  
Learning rate: 2.5e-06  
Epoch 85/90  
315/320 [=====>.] - ETA: 0s - loss: 1.8984e-05 - mean\_squared\_error: 1.8984e-05  
Epoch 00085: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.8984e-05 - mean\_squared\_error: 1.8984e-05 - val\_loss: 1.9092e-05 - val\_mean\_squared\_error: 1.9092e-05  
Learning rate: 2.5e-06  
Epoch 86/90  
319/320 [=====>.] - ETA: 0s - loss: 1.8978e-05 - mean\_squared\_error: 1.8978e-05  
Epoch 00086: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.8977e-05 - mean\_squared\_error: 1.8977e-05 - val\_loss: 1.9069e-05 - val\_mean\_squared\_error: 1.9069e-05  
Learning rate: 2.5e-06  
Epoch 87/90  
315/320 [=====>.] - ETA: 0s - loss: 1.8968e-05 - mean\_squared\_error: 1.8968e-05  
Epoch 00087: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.8970e-05 - mean\_squared\_error: 1.8970e-05 - val\_loss: 1.9070e-05 - val\_mean\_squared\_error: 1.9070e-05  
Learning rate: 2.5e-06  
Epoch 88/90  
319/320 [=====>.] - ETA: 0s - loss: 1.8960e-05 - mean\_squared\_error: 1.8960e-05  
Epoch 00088: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 12ms/sample - loss: 1.8962e-05 - mean\_squared\_error: 1.8962e-05 - val\_loss: 1.9059e-05 - val\_mean\_squared\_error: 1.9059e-05  
Learning rate: 2.5e-06  
Epoch 89/90  
319/320 [=====>.] - ETA: 0s - loss: 1.8956e-05 - mean\_squared\_error: 1.8956e-05  
Epoch 00089: val\_loss did not improve from 0.00002  
320/320 [=====] - 4s 11ms/sample - loss: 1.8956e-05 - mean\_squared\_error: 1.8956e-05 - val\_loss: 1.9068e-05 - val\_mean\_squared\_error: 1.9068e-05  
Learning rate: 2.5e-06  
Epoch 90/90  
315/320 [=====>.] - ETA: 0s - loss: 1.8947e-05 - mean\_squared\_error: 1.8947e-05  
Epoch 00090: val\_loss improved from 0.00002 to 0.00002, saving model to CA3ModelV1\_model.hdf5  
320/320 [=====] - 4s 11ms/sample - loss: 1.8948e-05 - mean\_squared\_error: 1.8948e-05 - val\_loss: 1.9052e-05 - val\_mean\_squared\_error: 1.9052e-05  
(32, 20)  
Save threshold\_data: (32, 20)



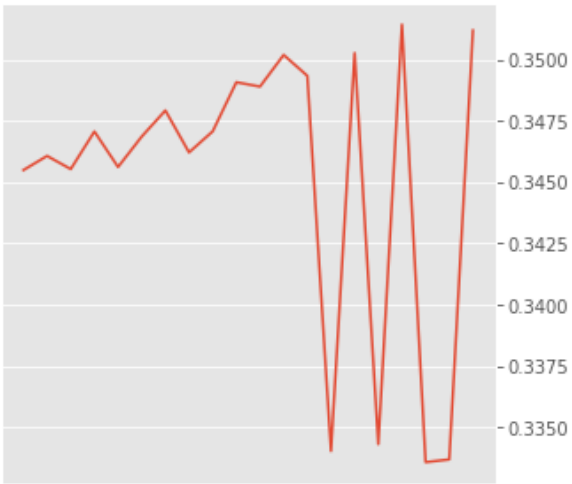








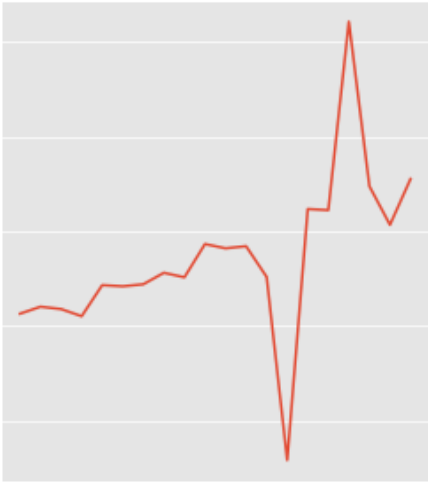
Abnormal - 350 [7,19]



Normal - 299 [7,19]



Normal - 192 [7,19]



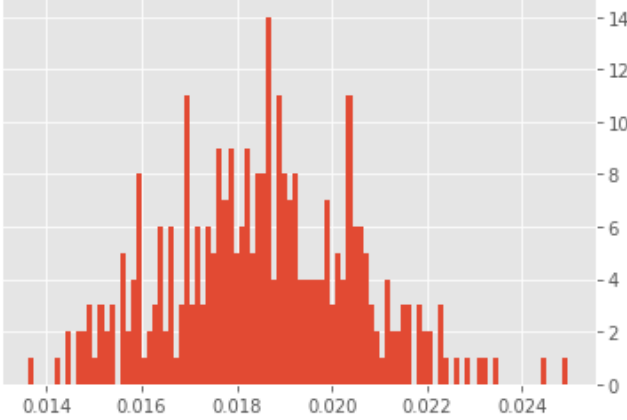
Normal - 1 [7,19]



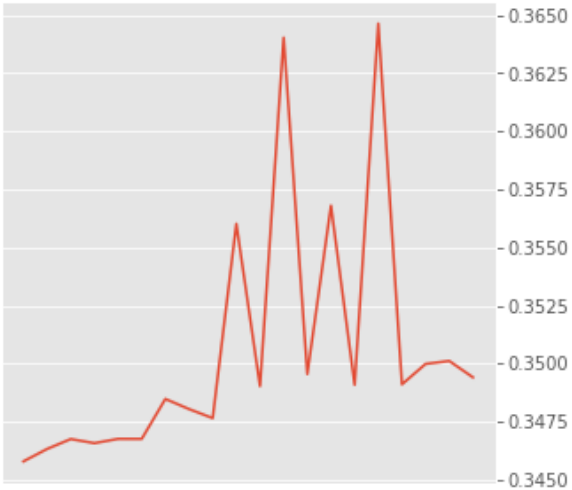
Normal - 318 [7,19]



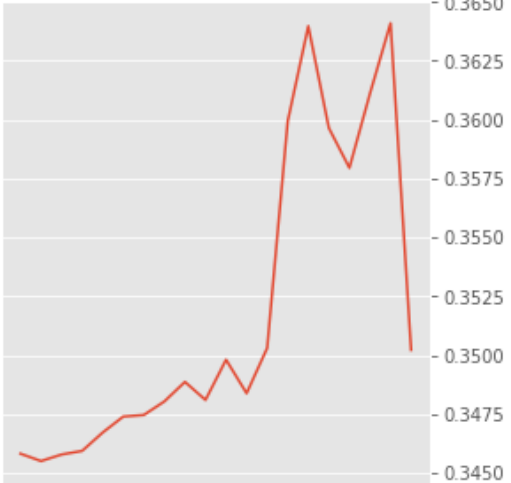
MSE Histogram [15, 0] Threshold 0.0250



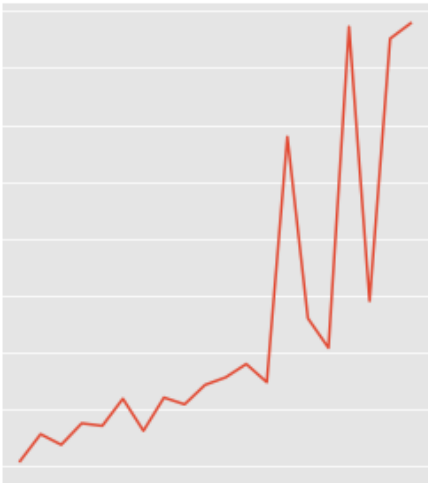
Abnormal - 43 [15,0]



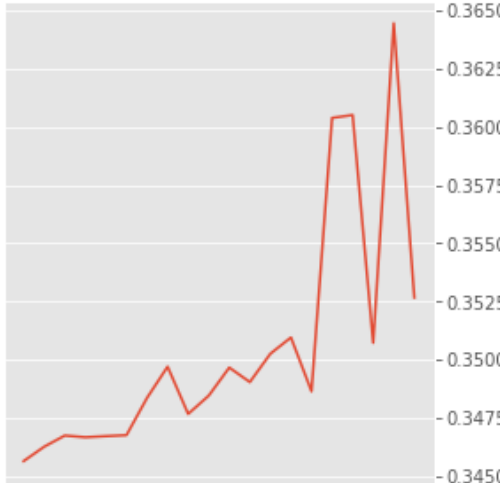
Normal - 299 [15,0]



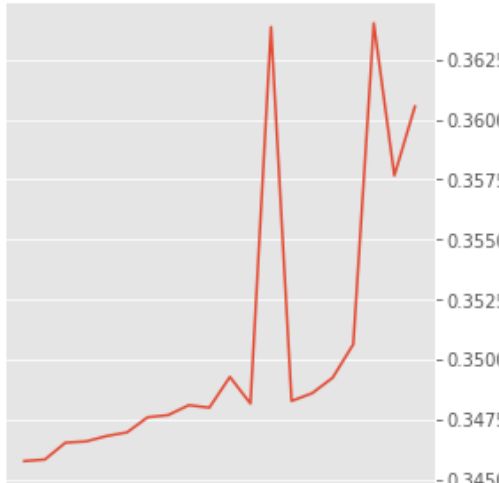
Normal - 192 [15,0]



Normal - 1 [15,0]

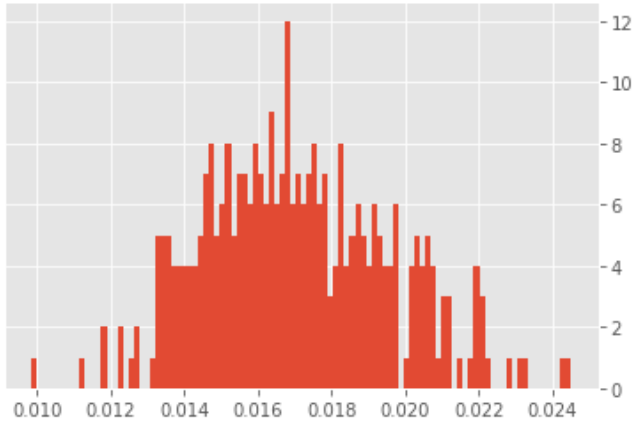


Normal - 318 [15,0]

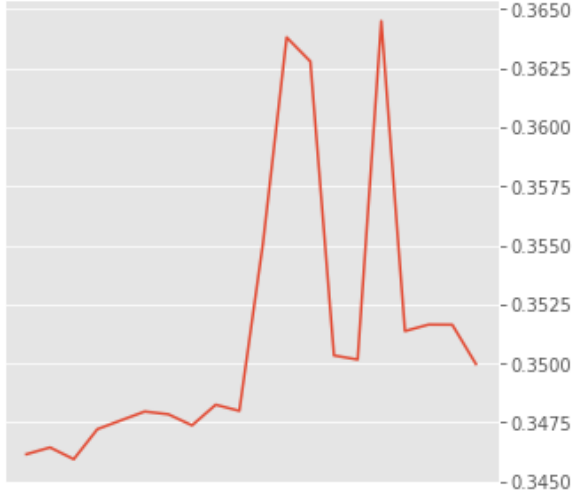




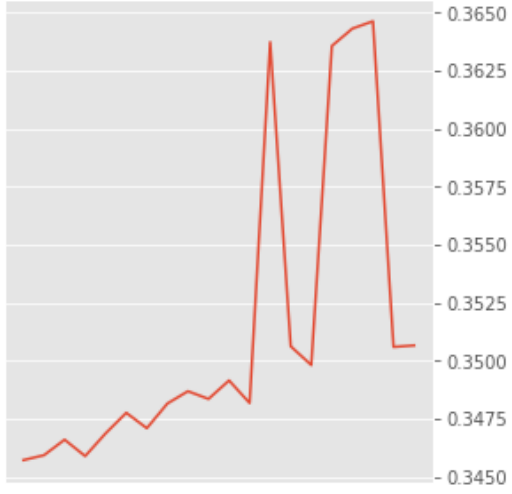
MSE Histogram [15, 9] Threshold 0.0245



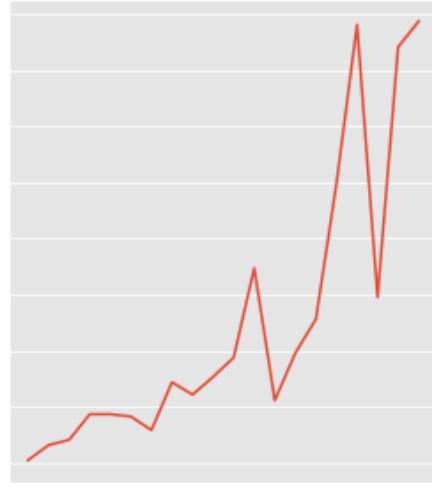
Abnormal - 71 [15,9]



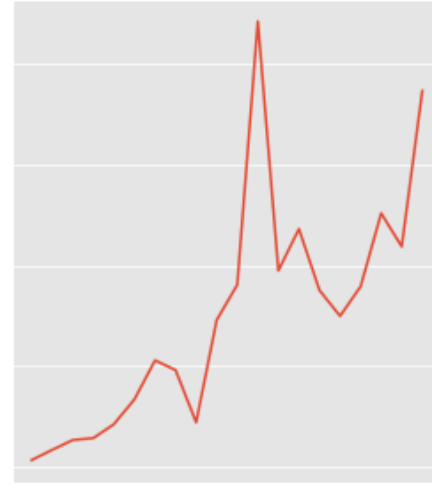
Normal - 299 [15,9]



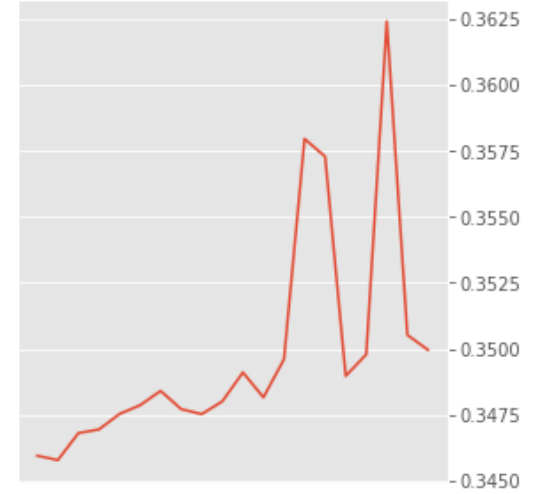
Normal - 192 [15,9]



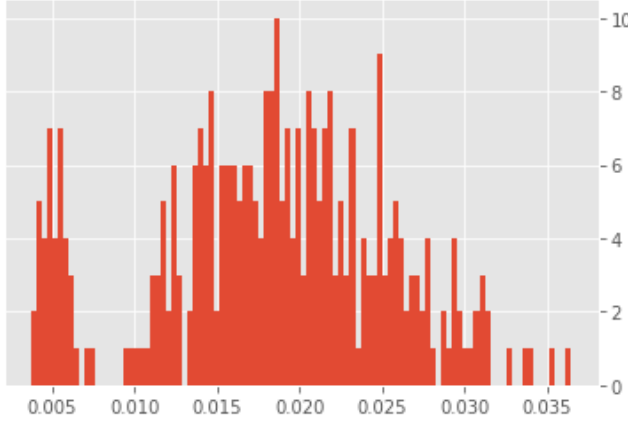
Normal - 1 [15,9]



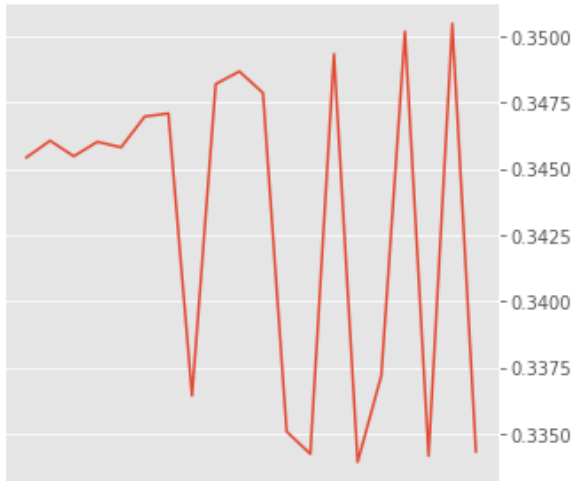
Normal - 318 [15,9]

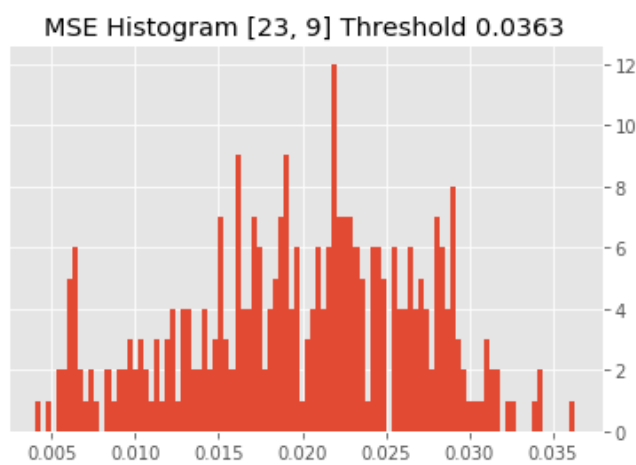
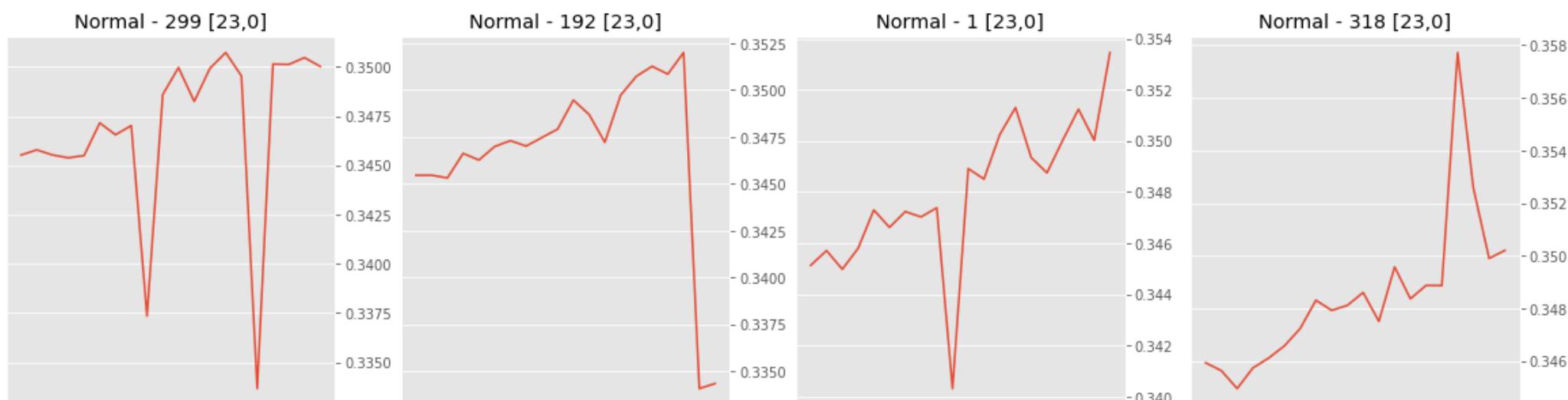
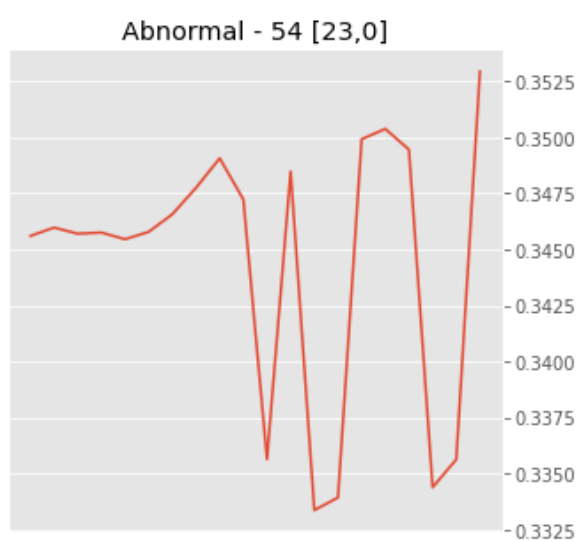
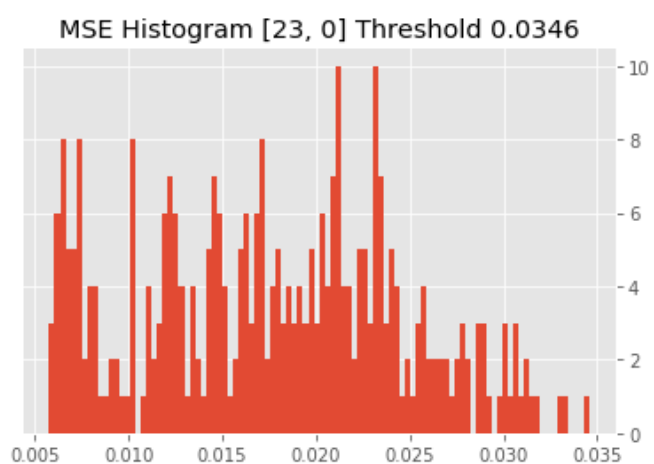
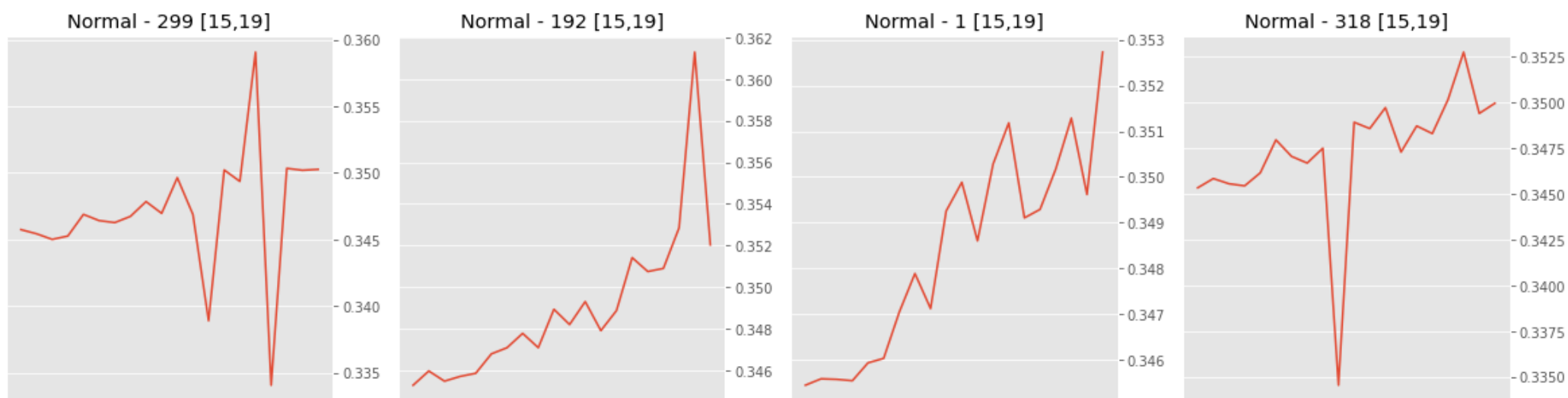


MSE Histogram [15, 19] Threshold 0.0365

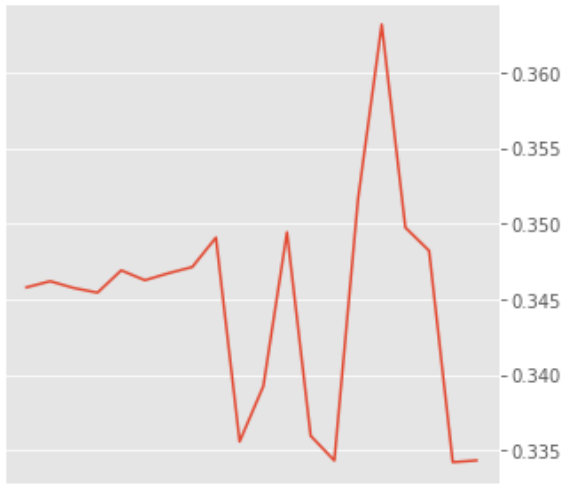


Abnormal - 310 [15,19]

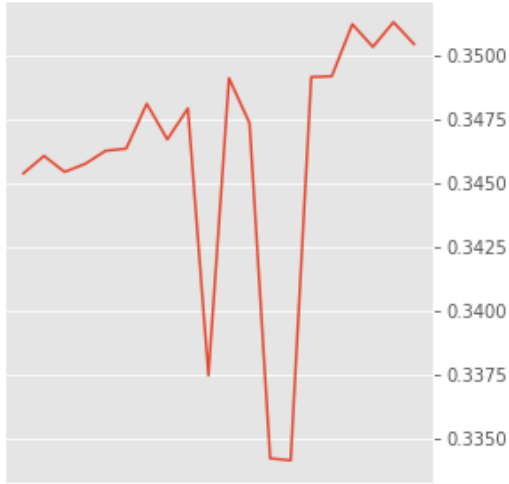




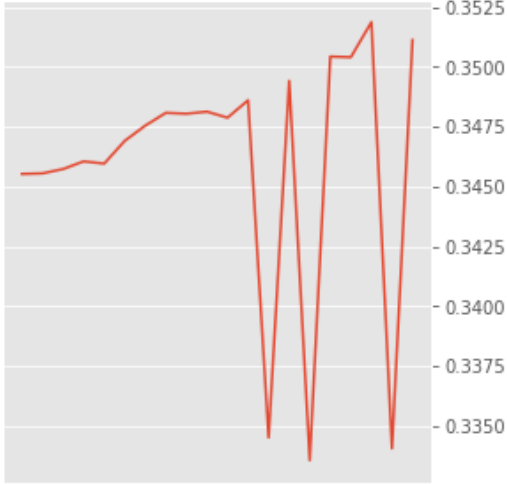
Abnormal - 224 [23,9]



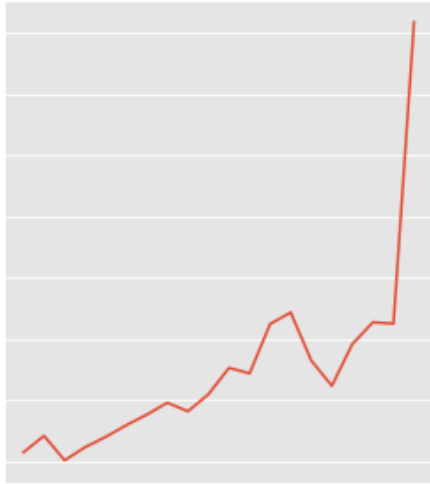
Normal - 299 [23,9]



Normal - 192 [23,9]



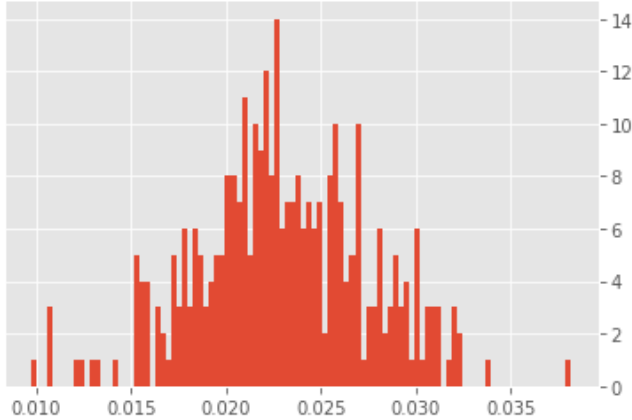
Normal - 1 [23,9]



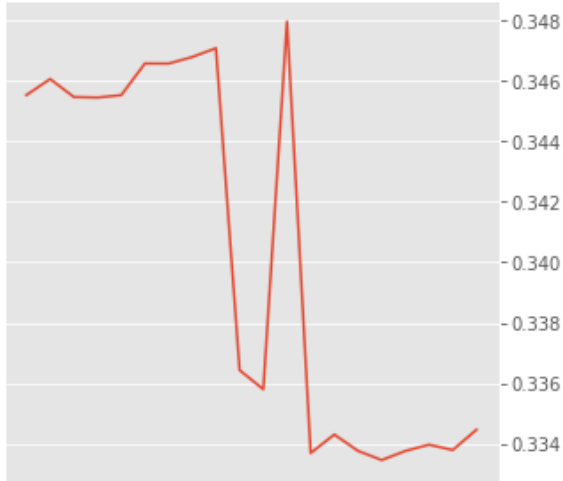
Normal - 318 [23,9]



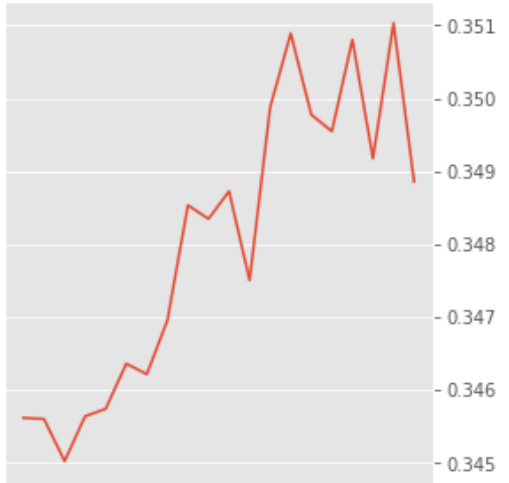
MSE Histogram [23, 19] Threshold 0.0382



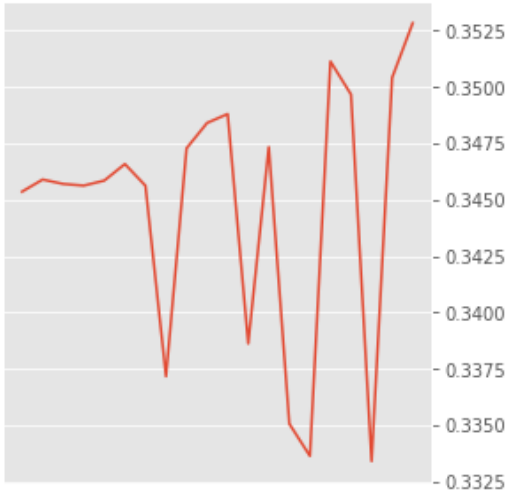
Abnormal - 388 [23,19]



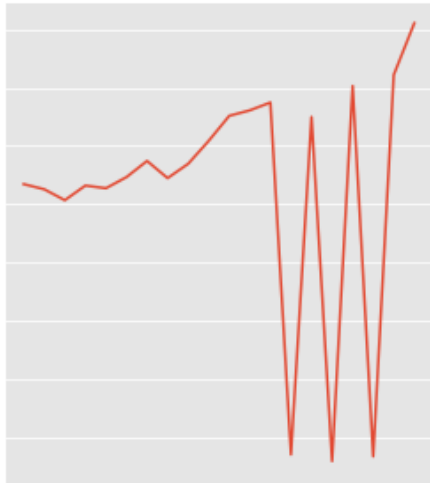
Normal - 299 [23,19]



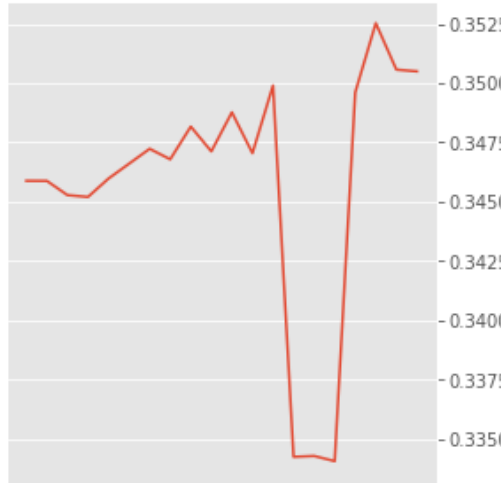
Normal - 192 [23,19]

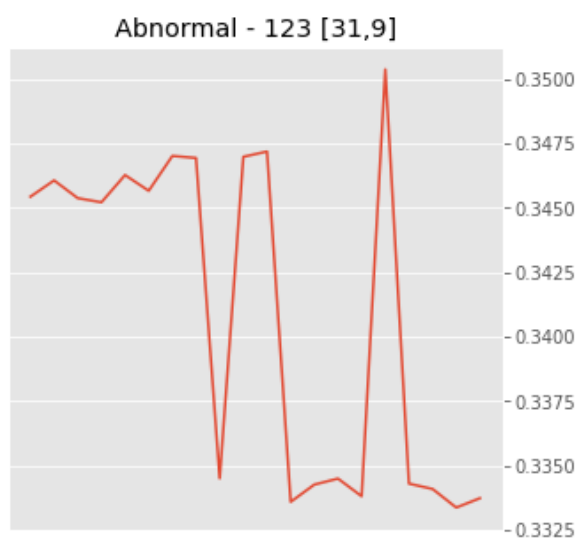
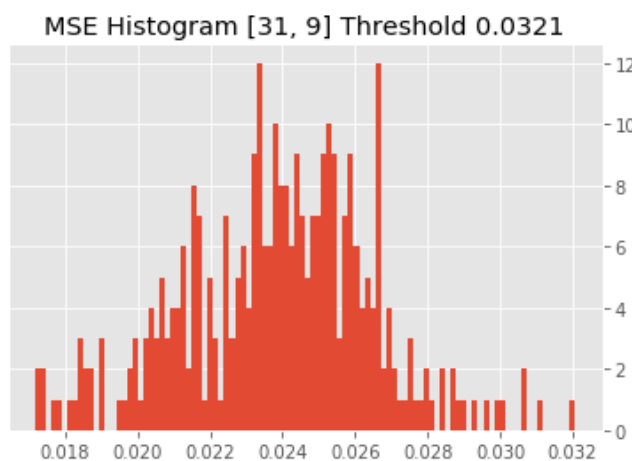
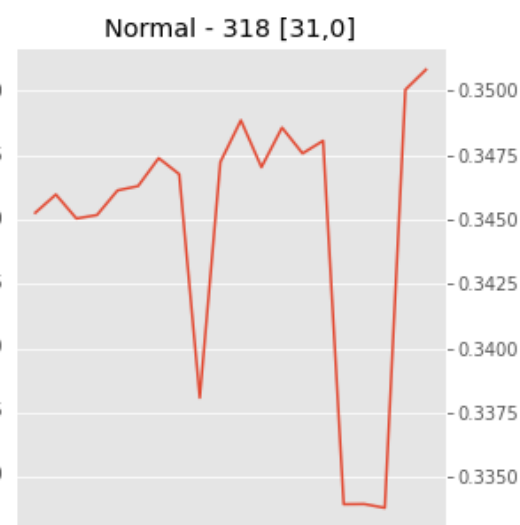
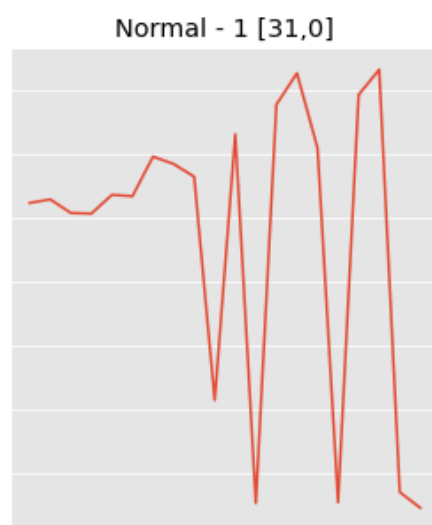
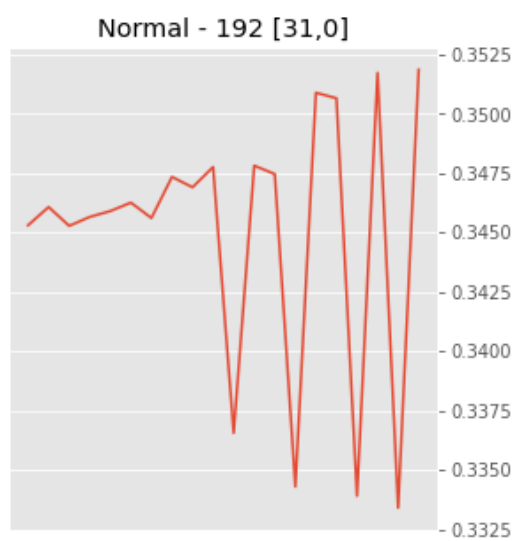
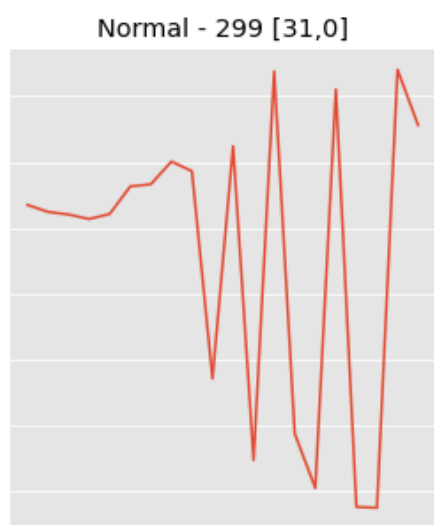
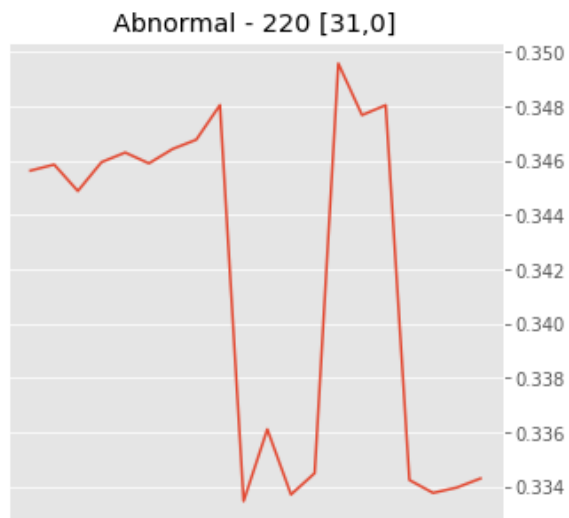
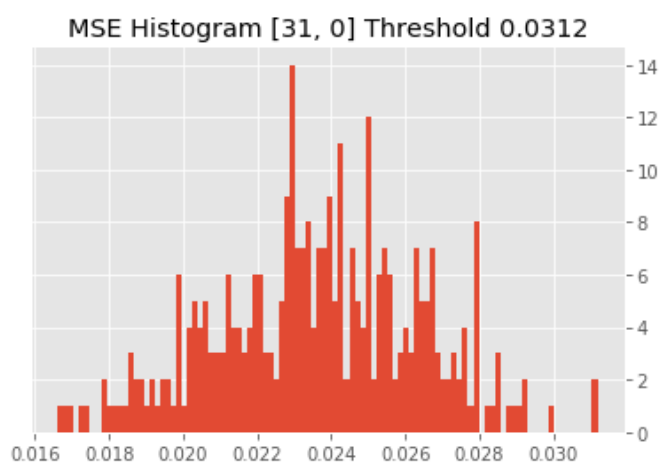


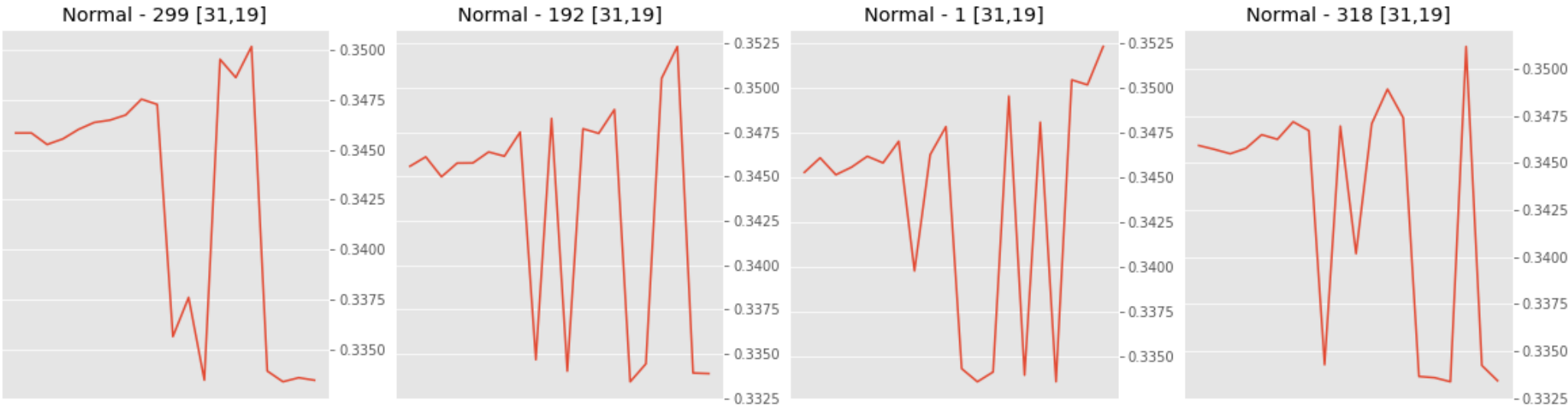
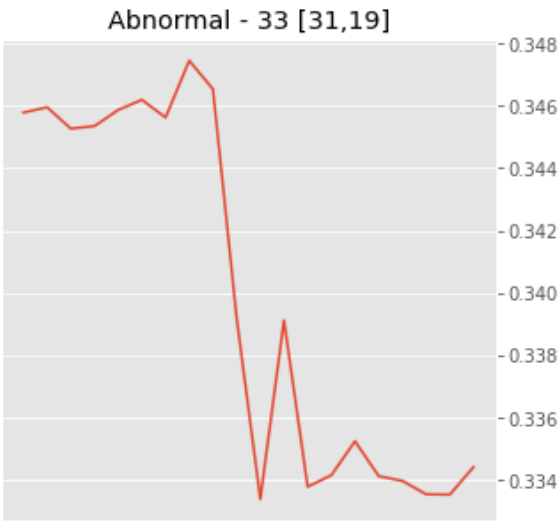
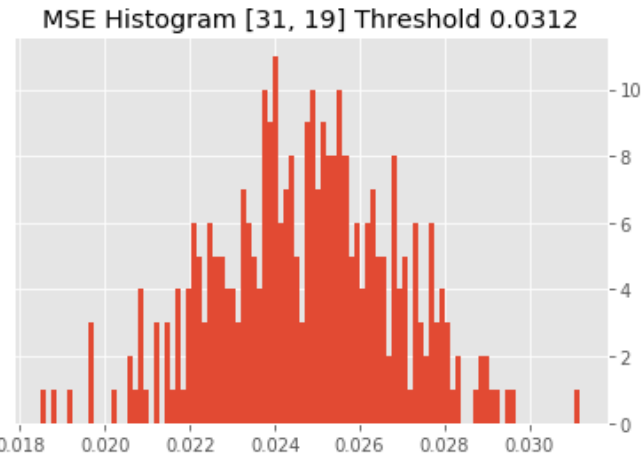
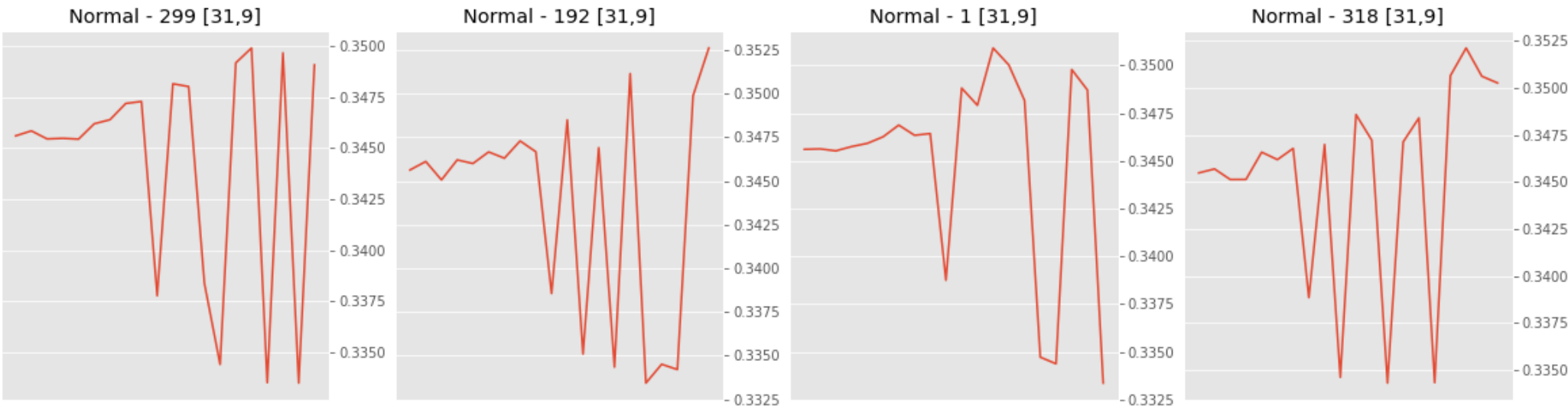
Normal - 1 [23,19]



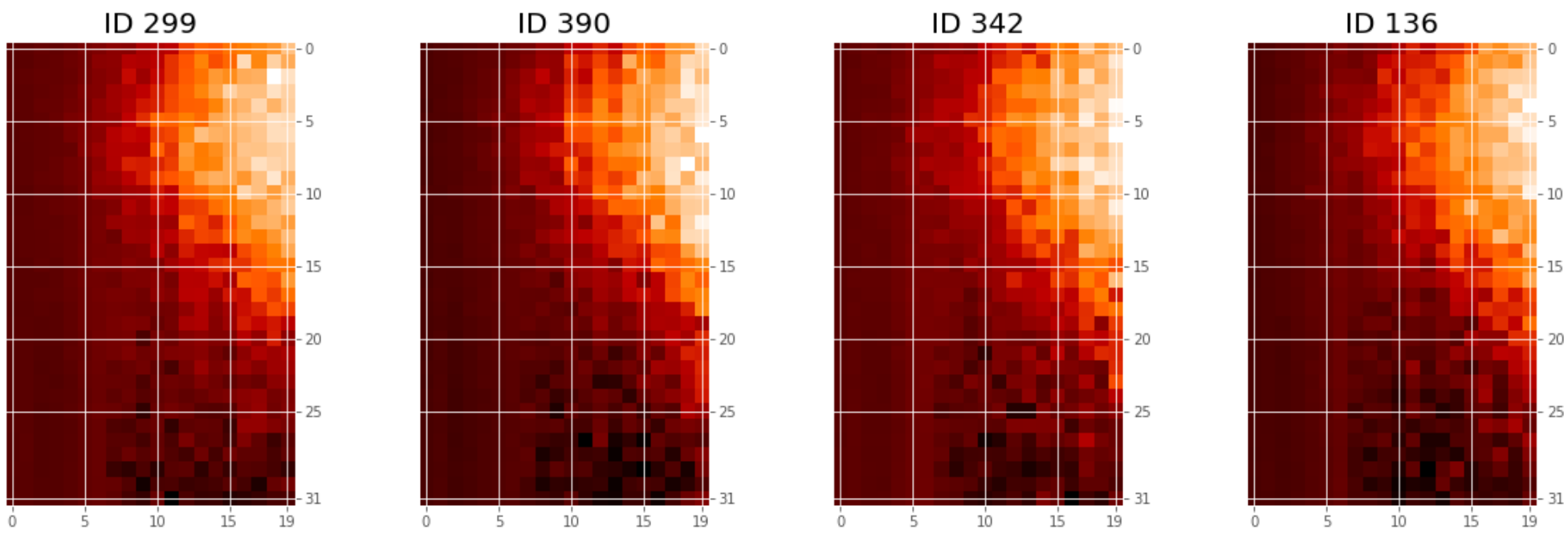
Normal - 318 [23,19]



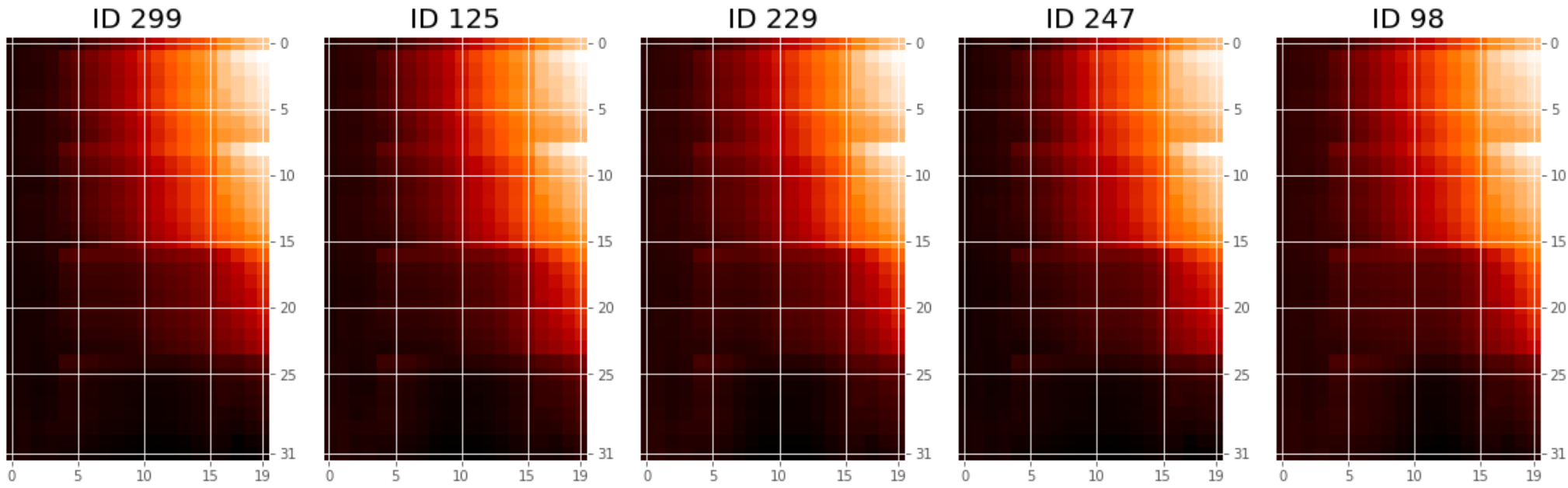




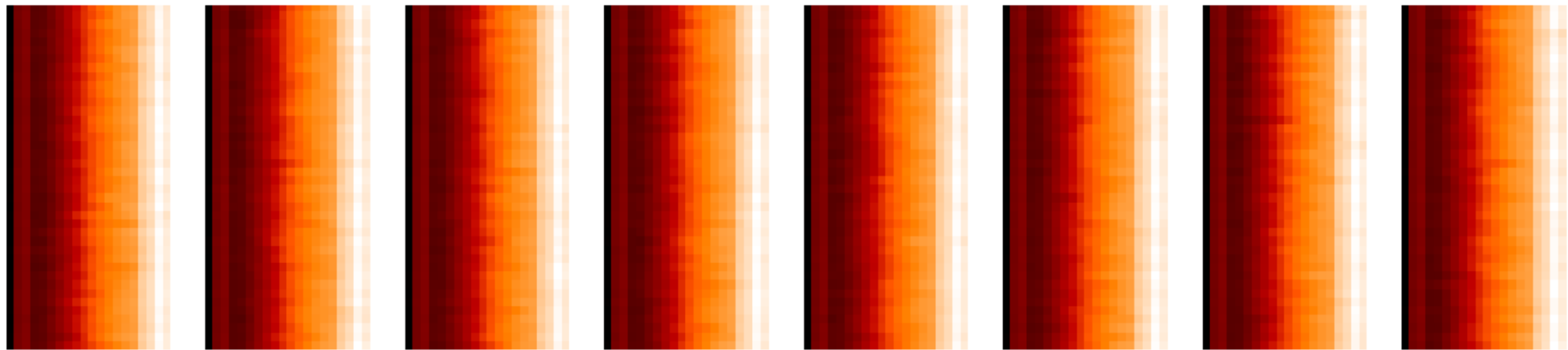
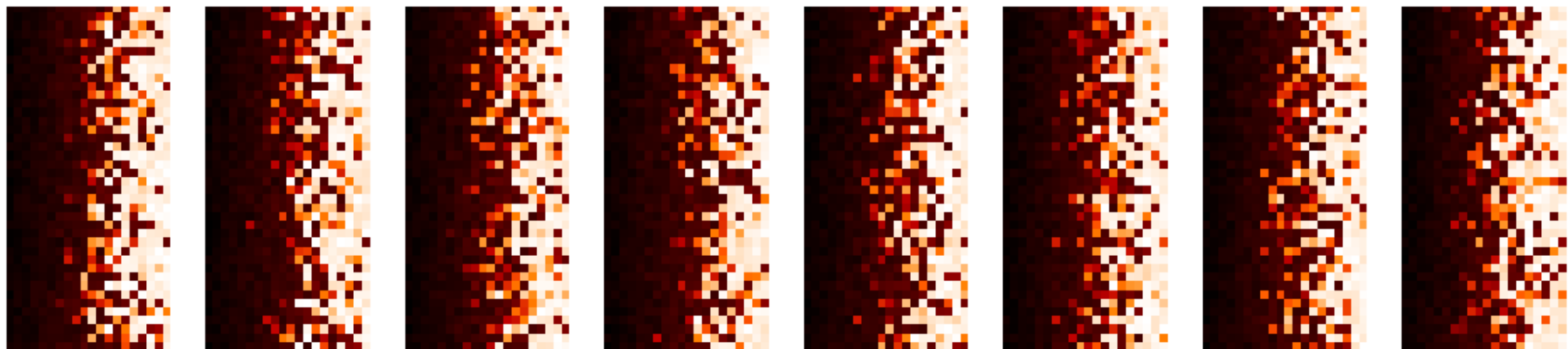
Training data, shape: (320, 32, 20, 20, 1)  
Decoded Training data, shape: (320, 32, 20, 20, 1)  
Training Data - Borad Temperature



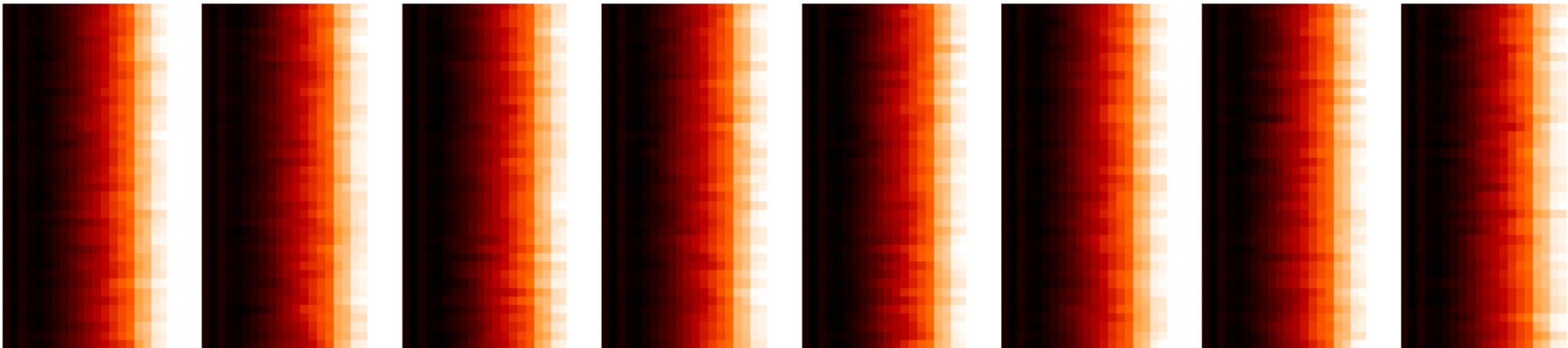
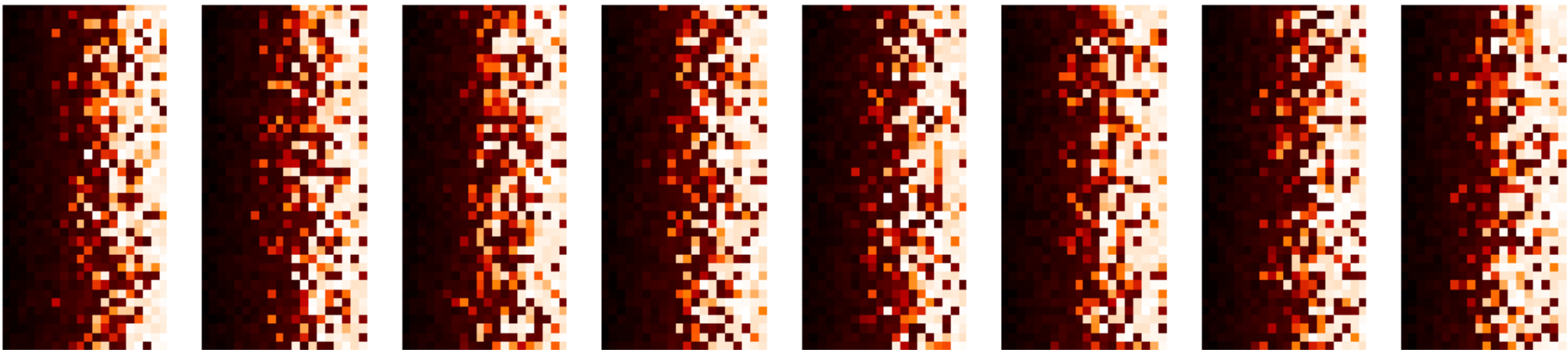
Encoded Training Data - Borad Temperature



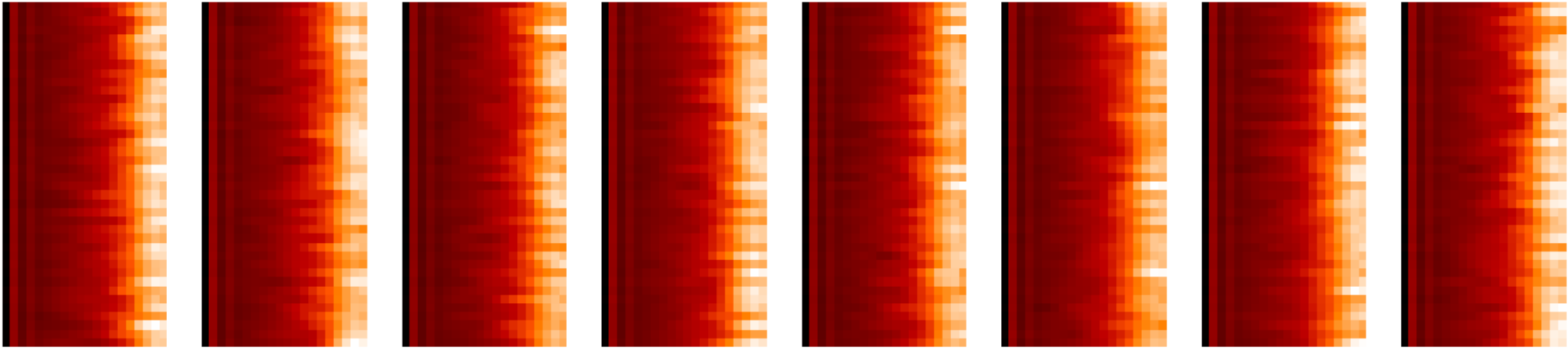
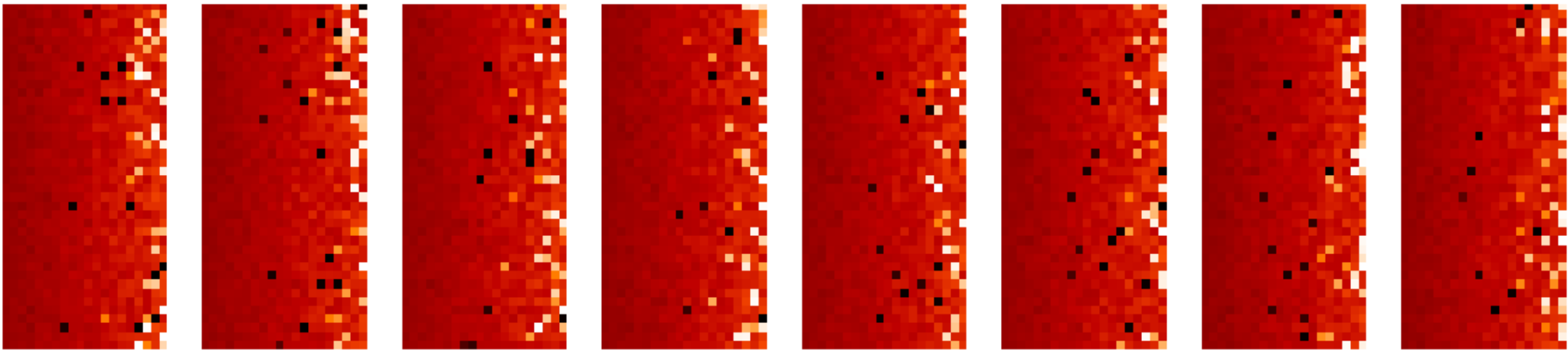
Training vs Encoded Data - Chip [0, 0] Temperature



Training vs Encoded Data - Chip [0, 9] Temperature

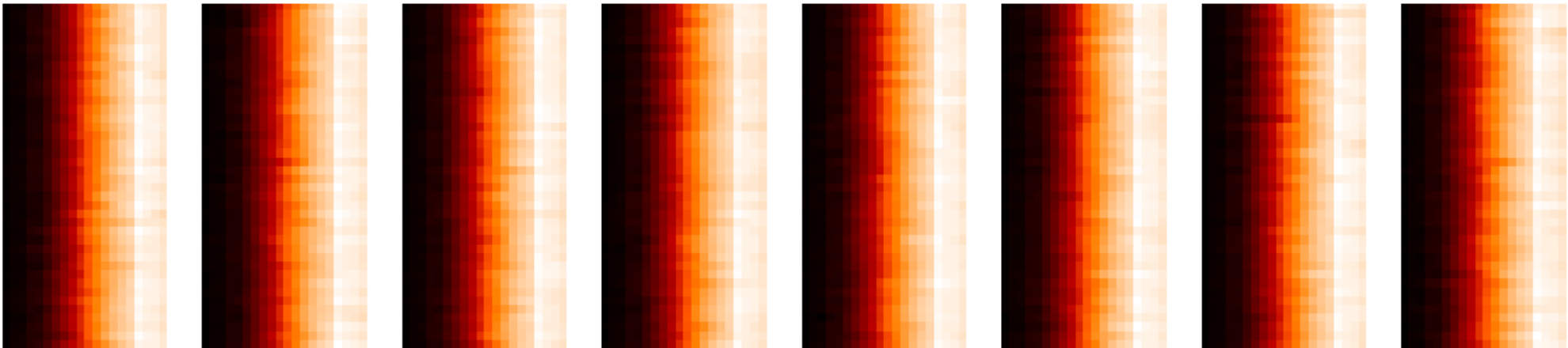
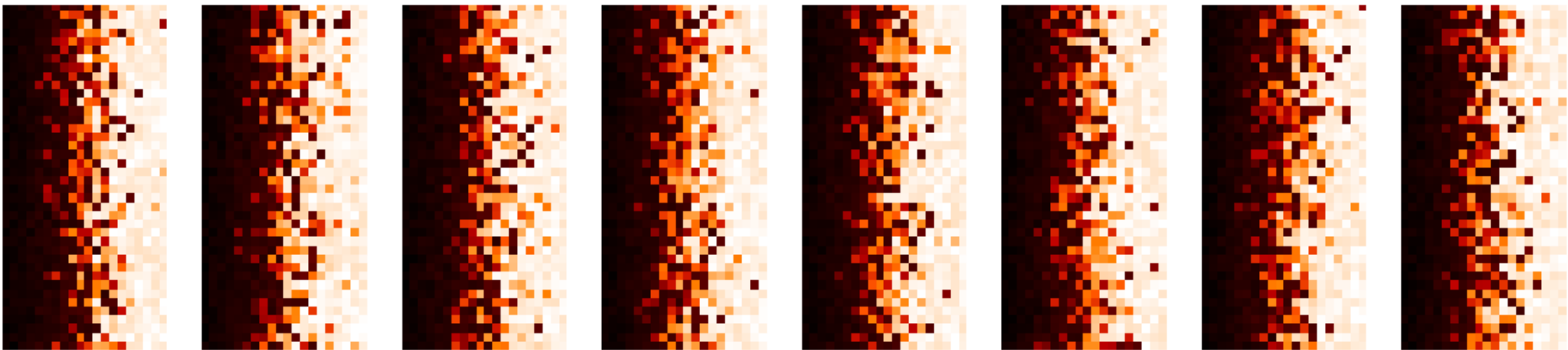


Training vs Encoded Data - Chip [0, 19] Temperature

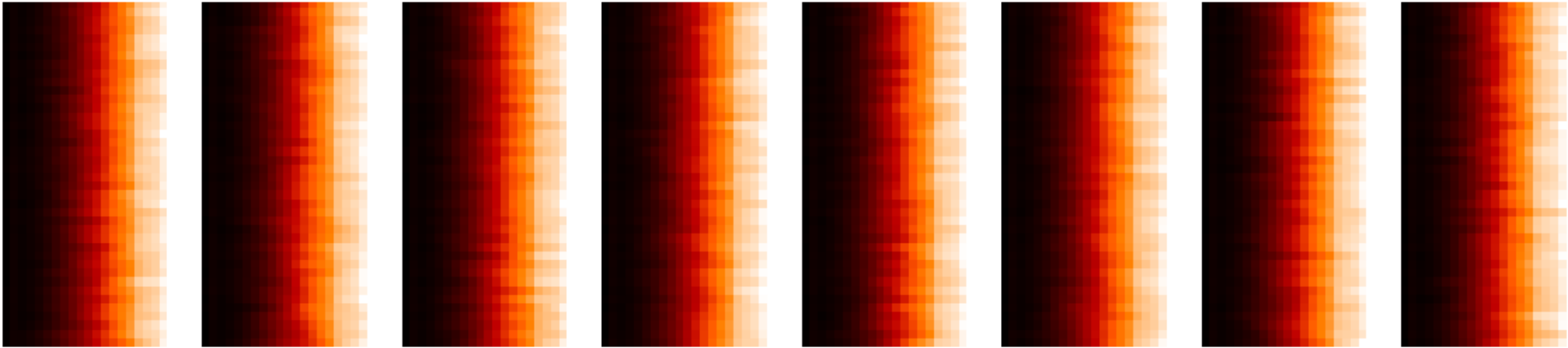
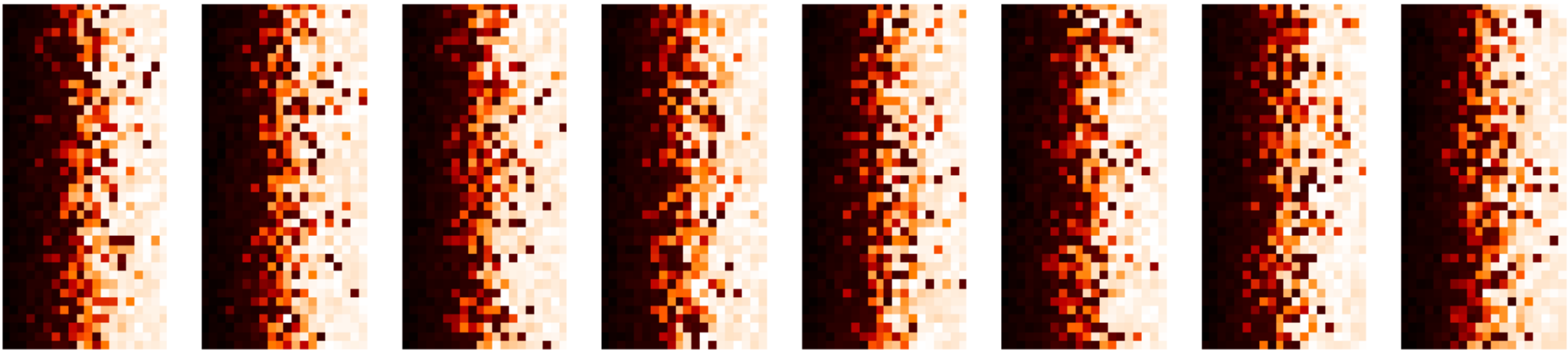


Training vs Encoded Data - Chip [7, 0] Temperature

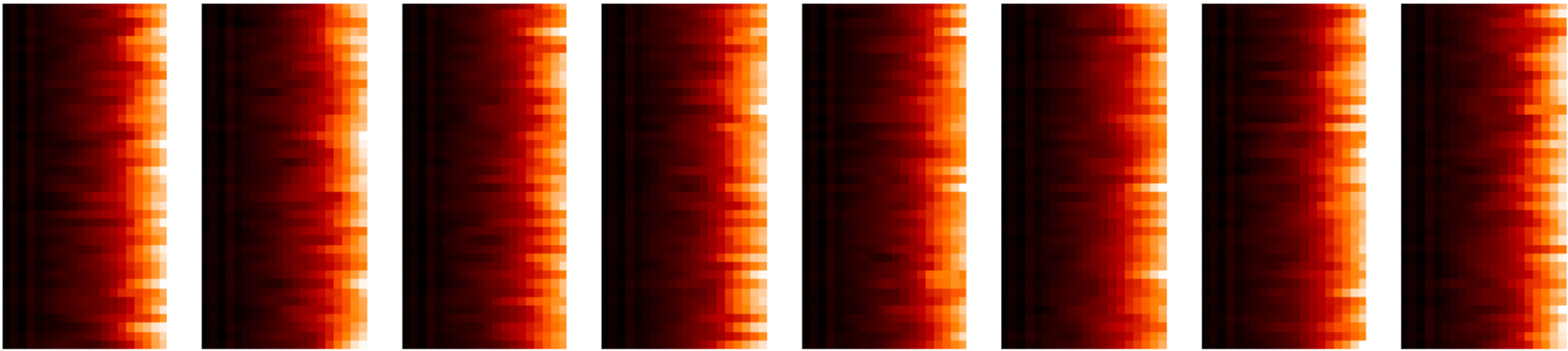
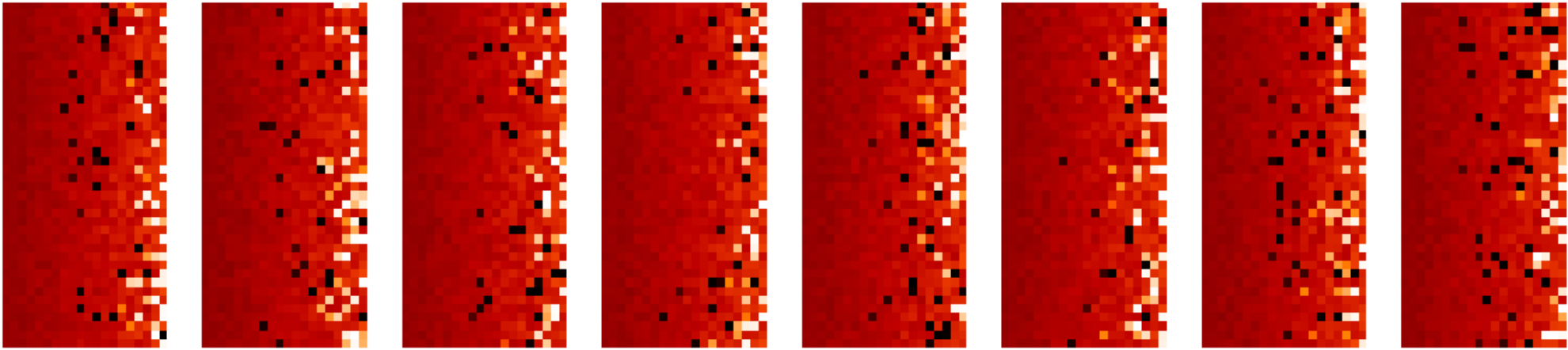




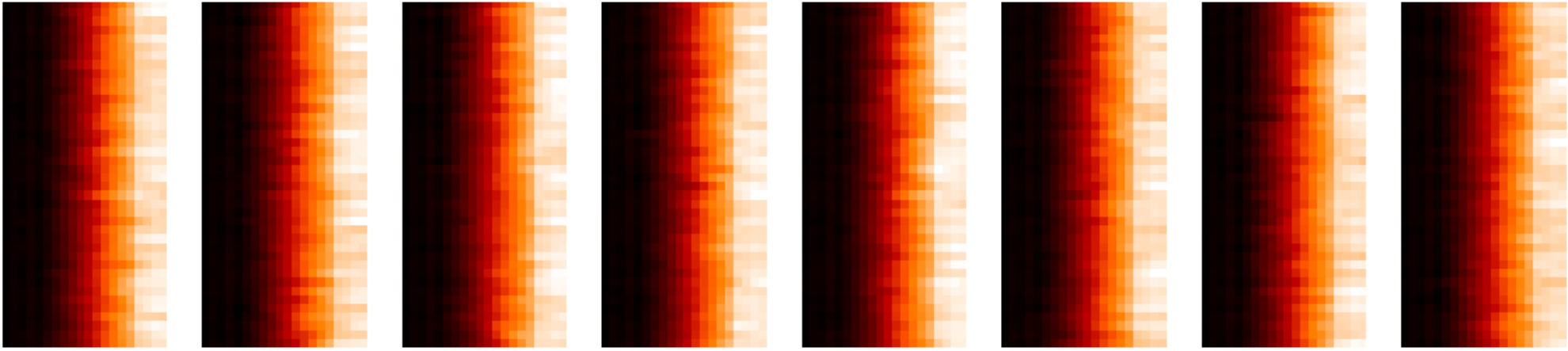
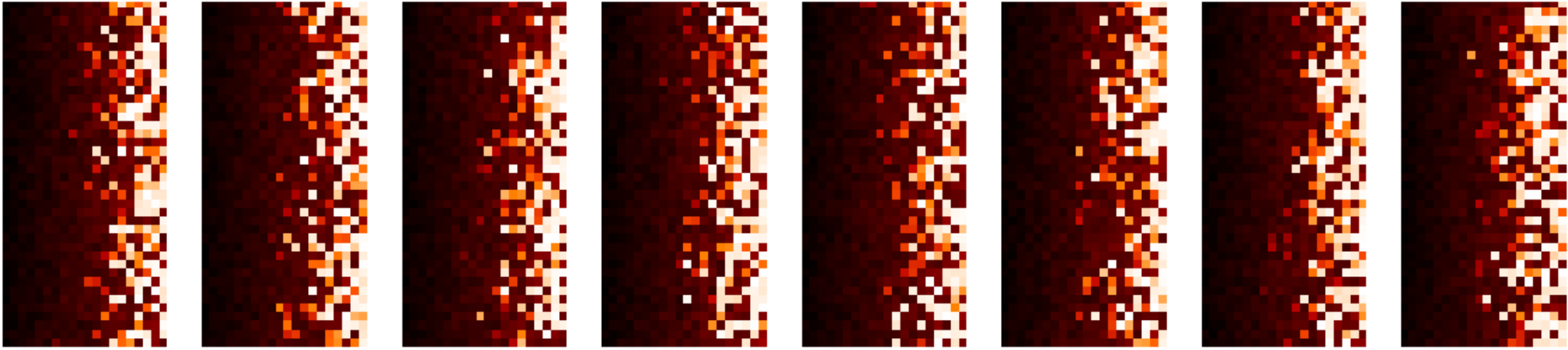
Training vs Encoded Data - Chip [7, 9] Temperature



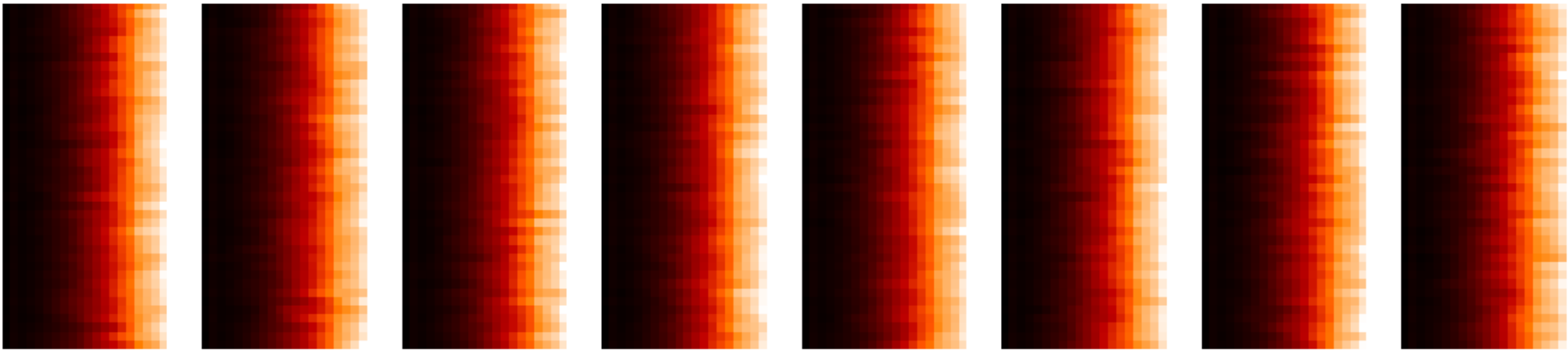
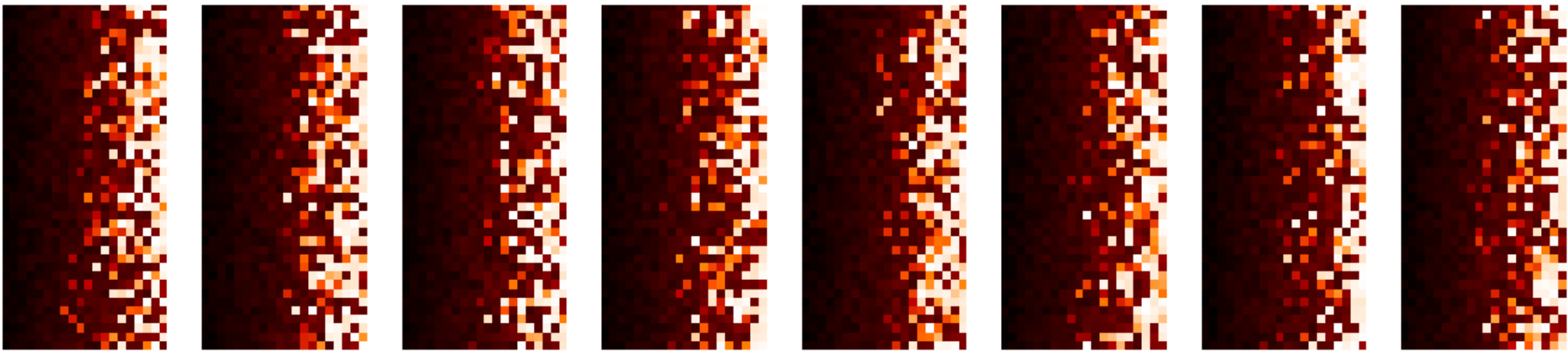
Training vs Encoded Data - Chip [7, 19] Temperature



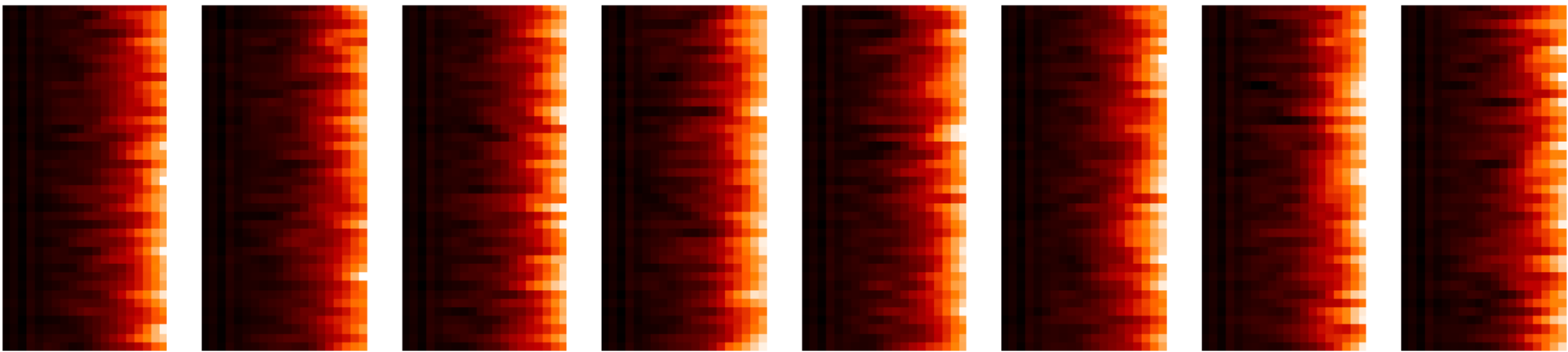
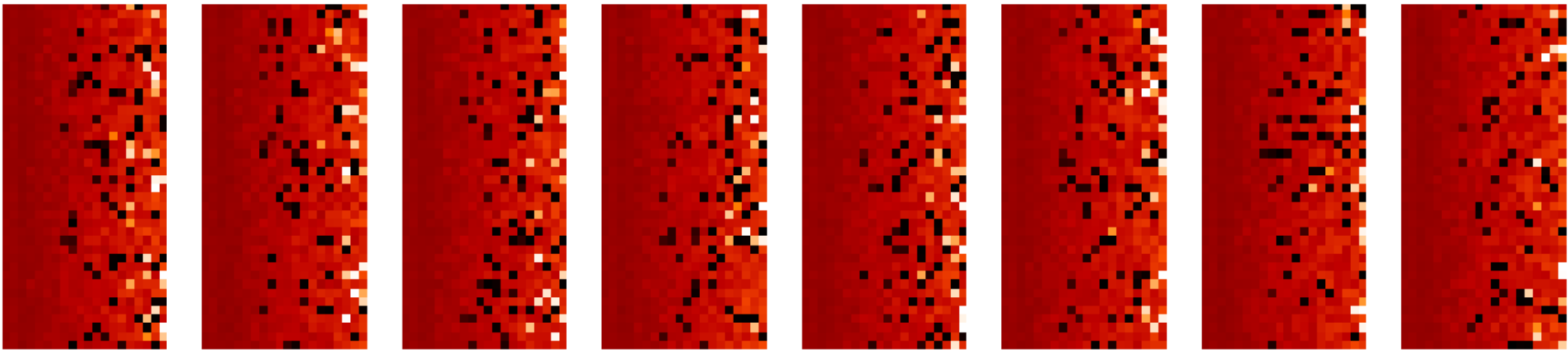
Training vs Encoded Data - Chip [15, 0] Temperature



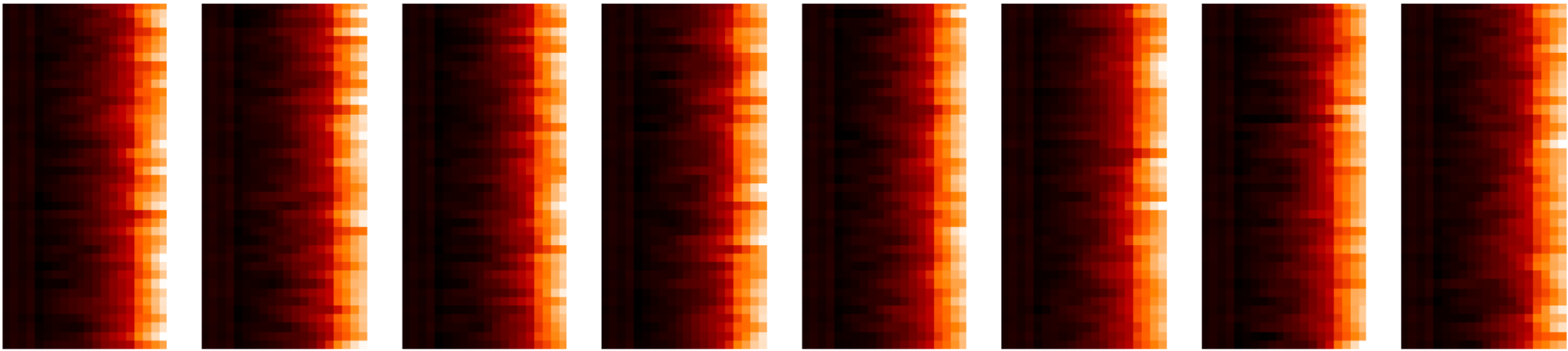
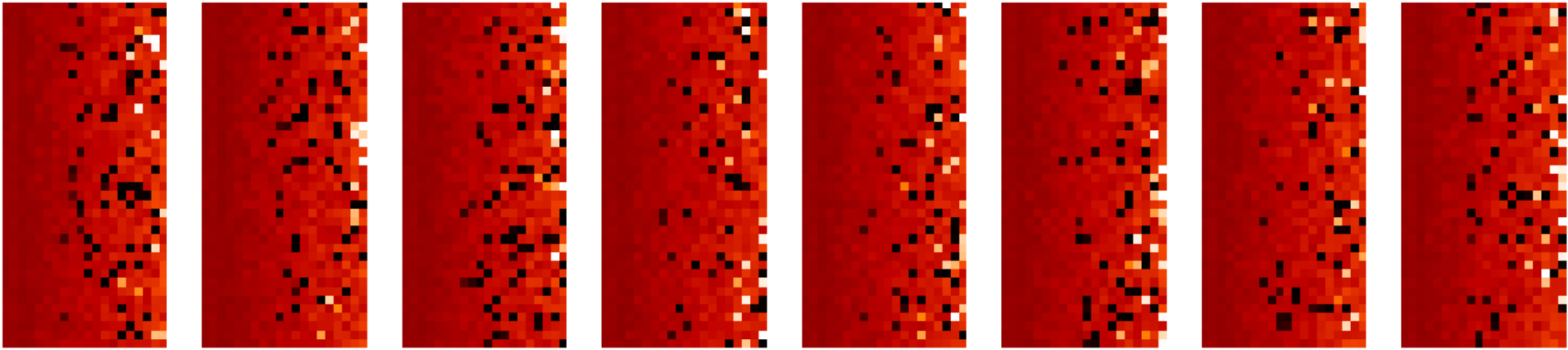
Training vs Encoded Data - Chip [15, 9] Temperature



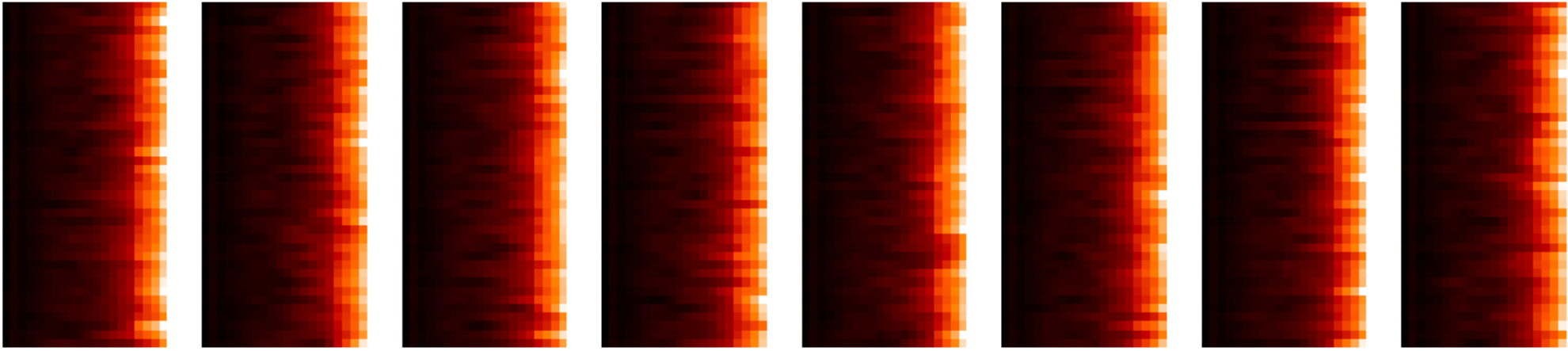
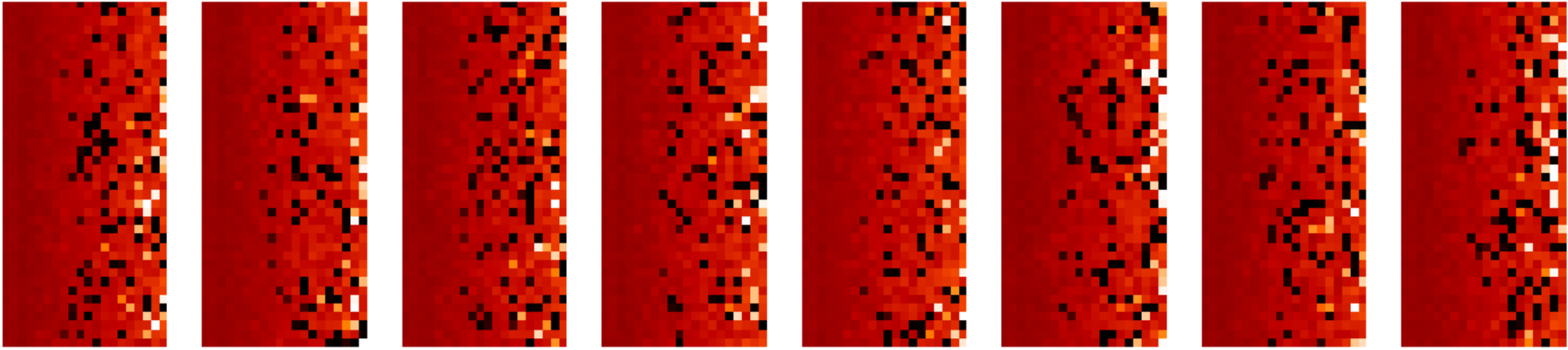
Training vs Encoded Data - Chip [15, 19] Temperature



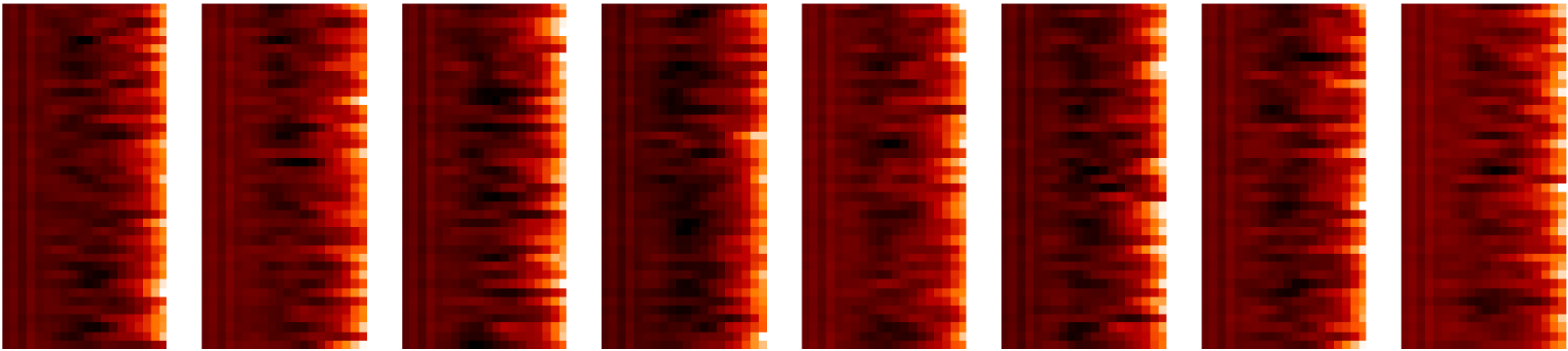
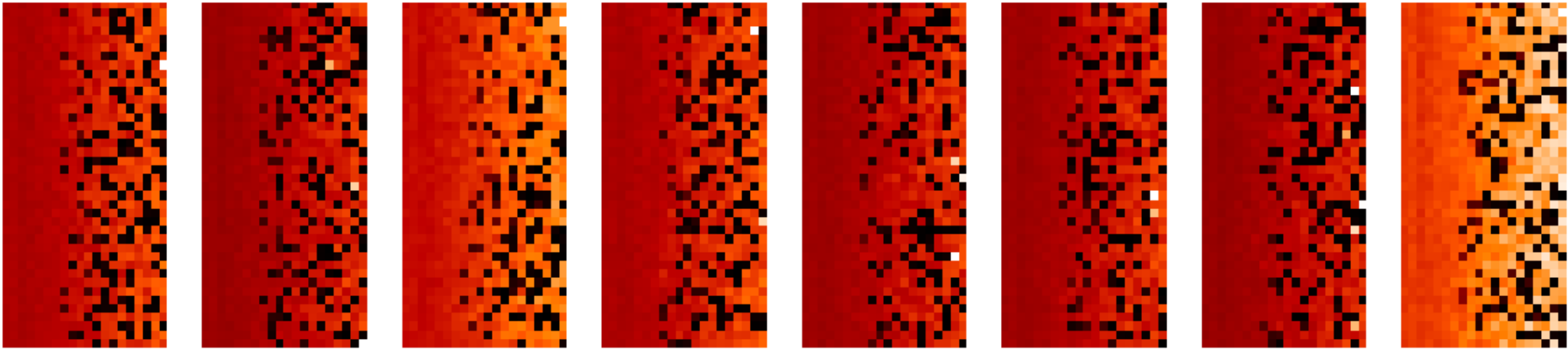
Training vs Encoded Data - Chip [23, 0] Temperature



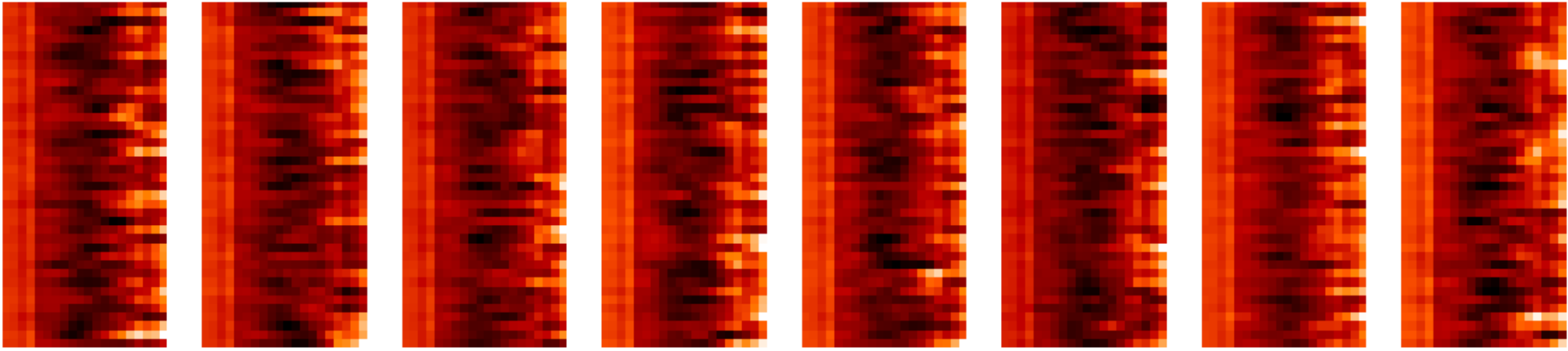
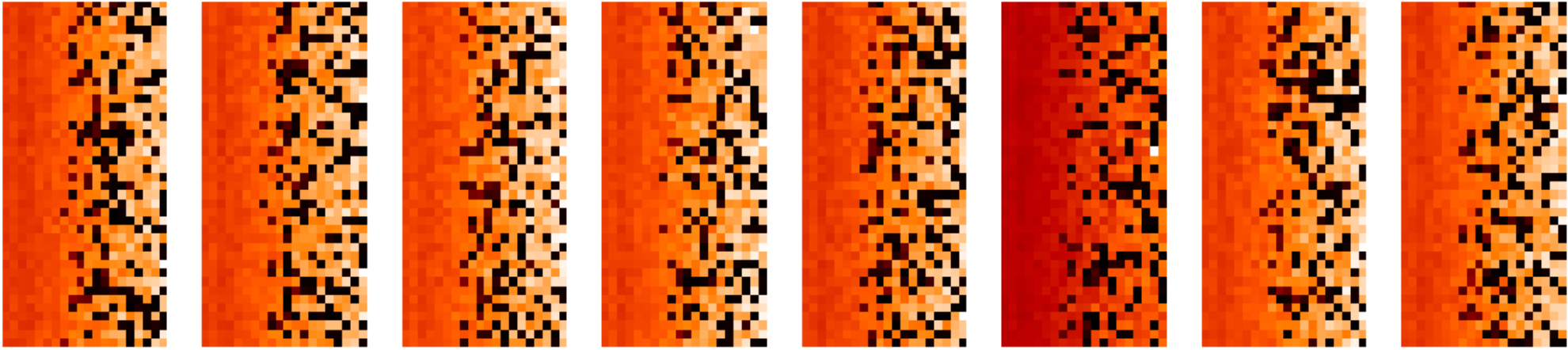
Training vs Encoded Data - Chip [23, 9] Temperature



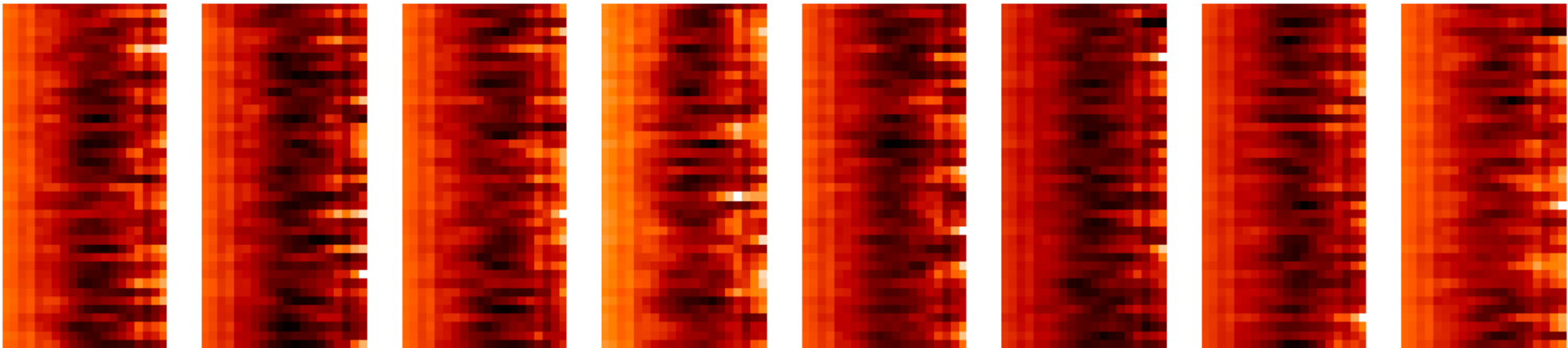
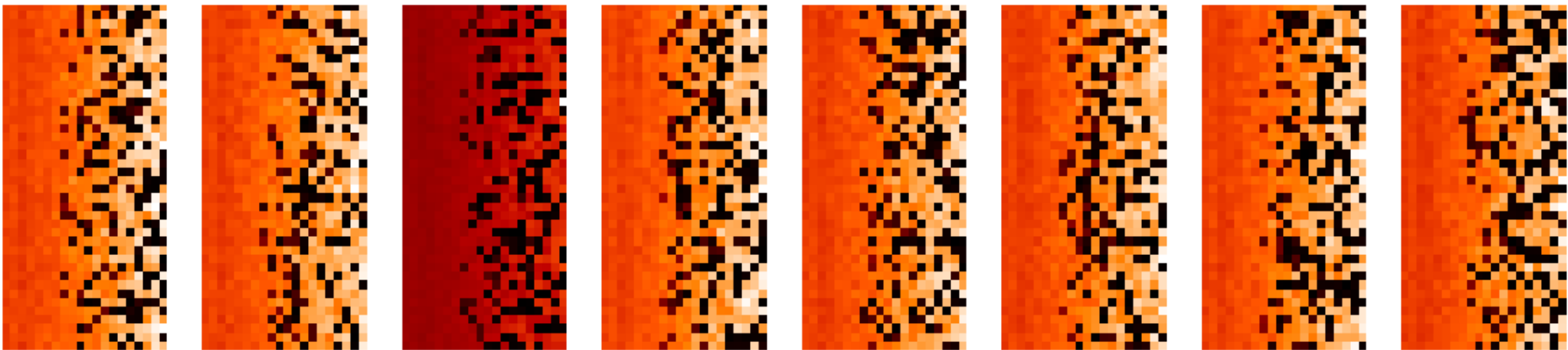
Training vs Encoded Data - Chip [23, 19] Temperature



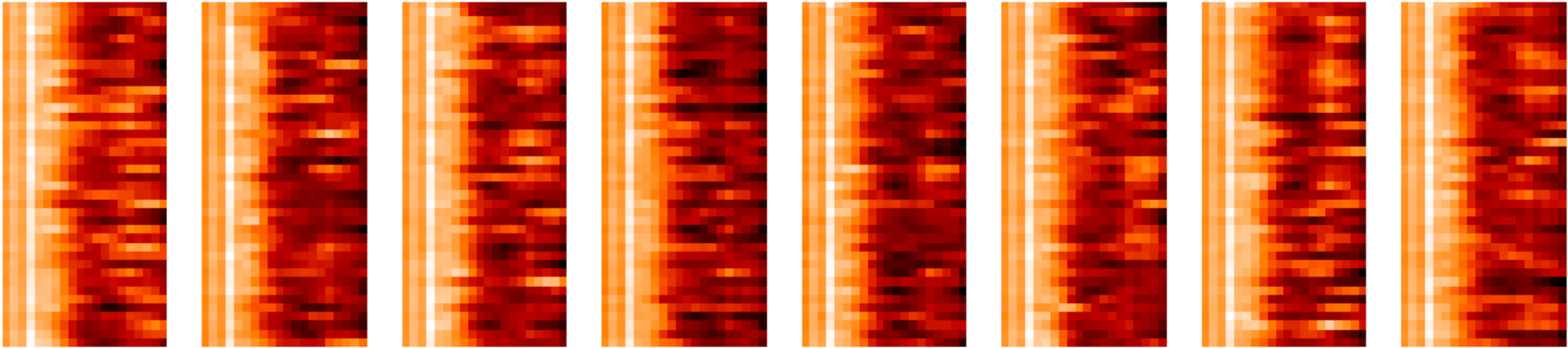
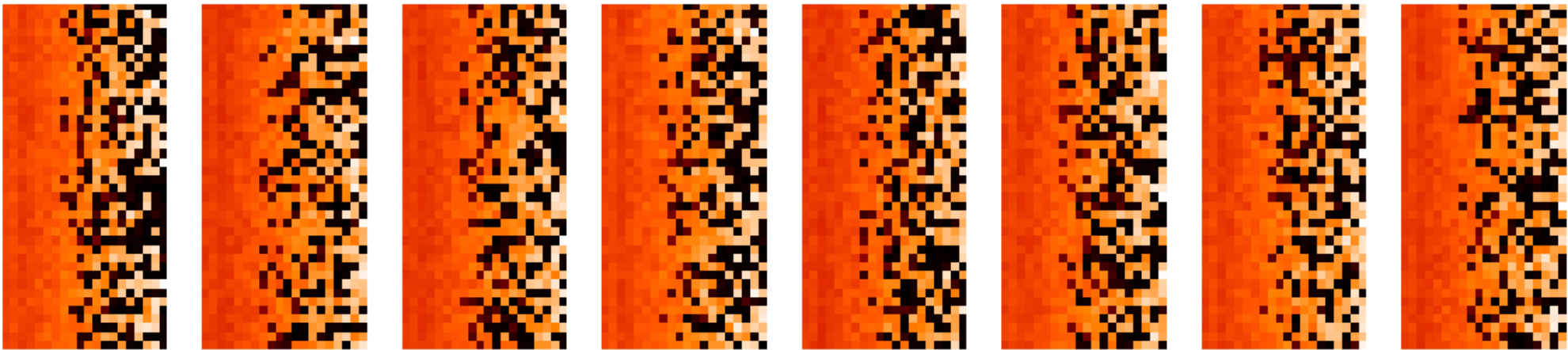
Training vs Encoded Data - Chip [31, 0] Temperature



Training vs Encoded Data - Chip [31, 9] Temperature



Training vs Encoded Data - Chip [31, 19] Temperature



In [48]: