Taking fewer snapshots to form the correlation matrix R that is used in the MVDR power spectrum leads to more peaks in the spectral output, while taking the maximum number of snapshots to form R shows only two peaks. It can be surmised that fewer snapshots leads to less “smoothing” of the snapshots (higher variance in the estimates of R) and thus the higher number of local peaks. As the number of snapshots increases to 20, the spectral estimate is smoother and displays less peaks.

Taking all snapshots to form R really smooths out the spectral estimate, but is the most accurate if the signal statistics are stationary relative to the snapshot window.

The effect of adding noise to the diagonal of R causes the spectral estimates with few snapshots to be more accurate than the spectral estimate without noise (for the same number of snapshots). R is more well-conditioned, making the inversion of R less susceptible to noise enhancement, which is likely the cause of the higher number of peaks when the number of snapshots is small and R is not diagonally loaded.