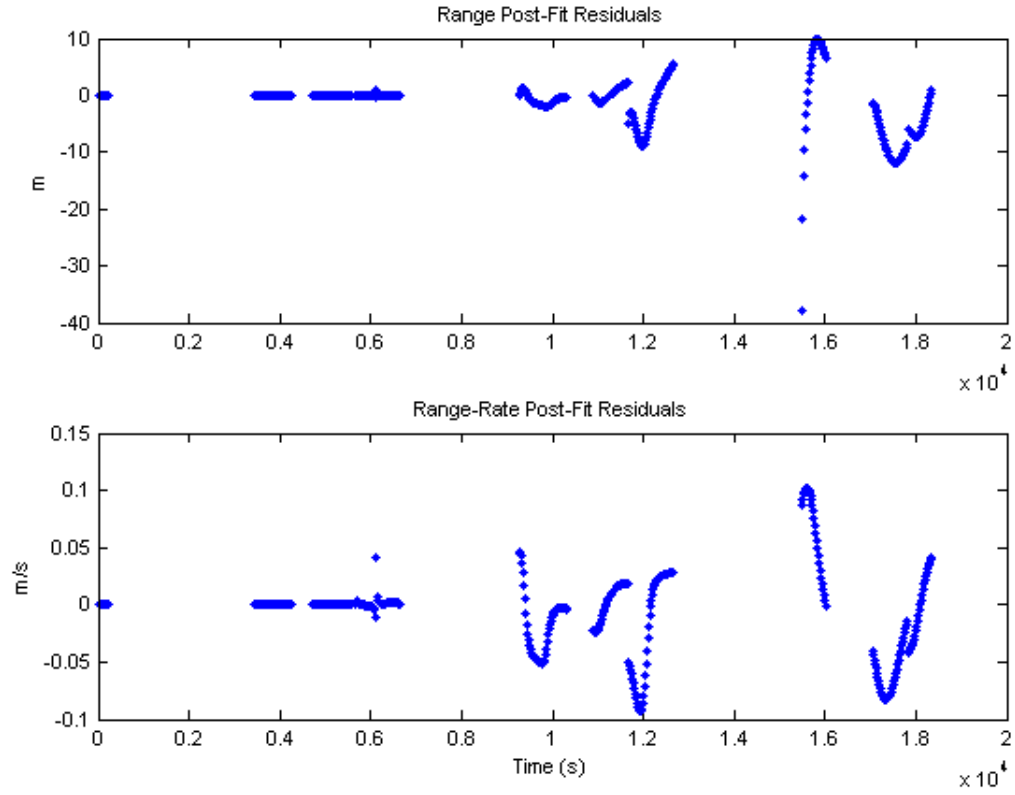

Figure 1: Postfit Residuals, No SNC

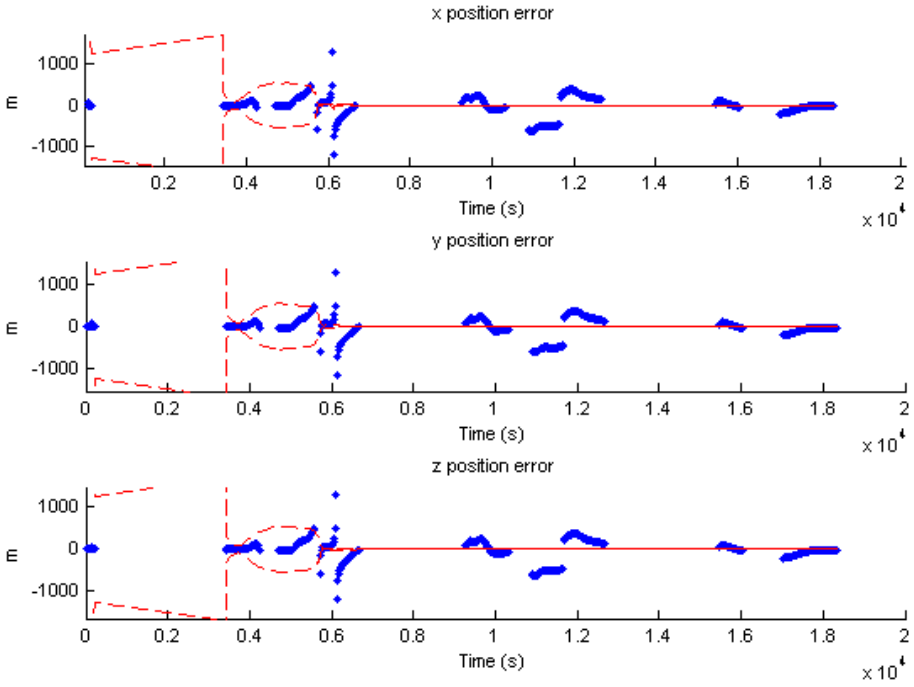

Figure 2: Position Errors, No SNC

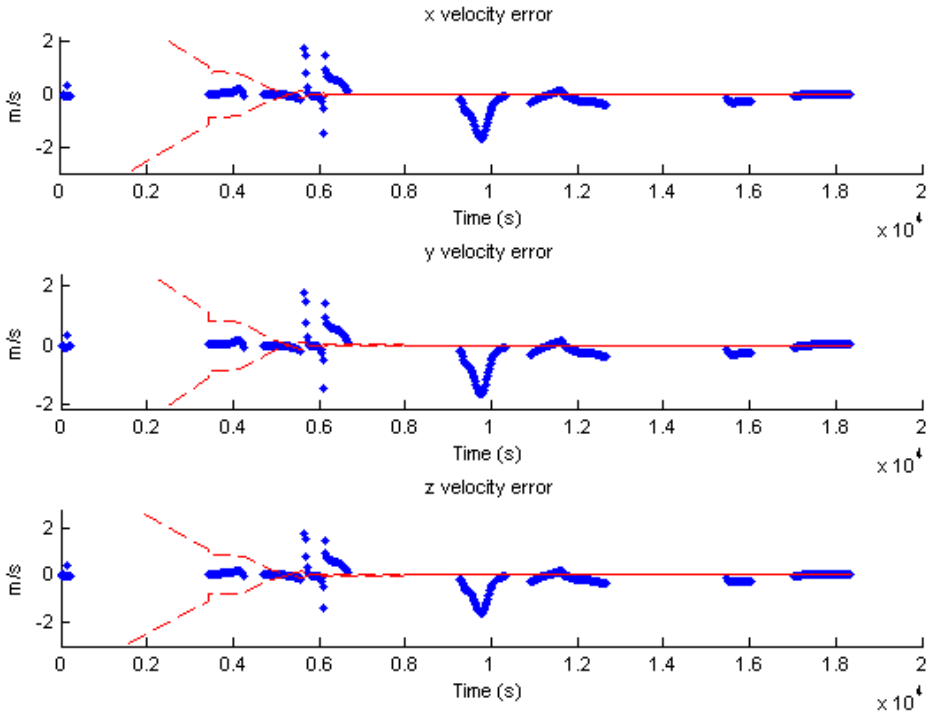

Figure 3: VelocityErrors, No SNC

The filter covariance collapses due to computer precision in estimating it at every observation. This causes the Kalman gain to collapse as well, which makes the filter completely discount the observations. The postfit residual becomes large when not listening to the data, and the state errors aren't very close to truth.

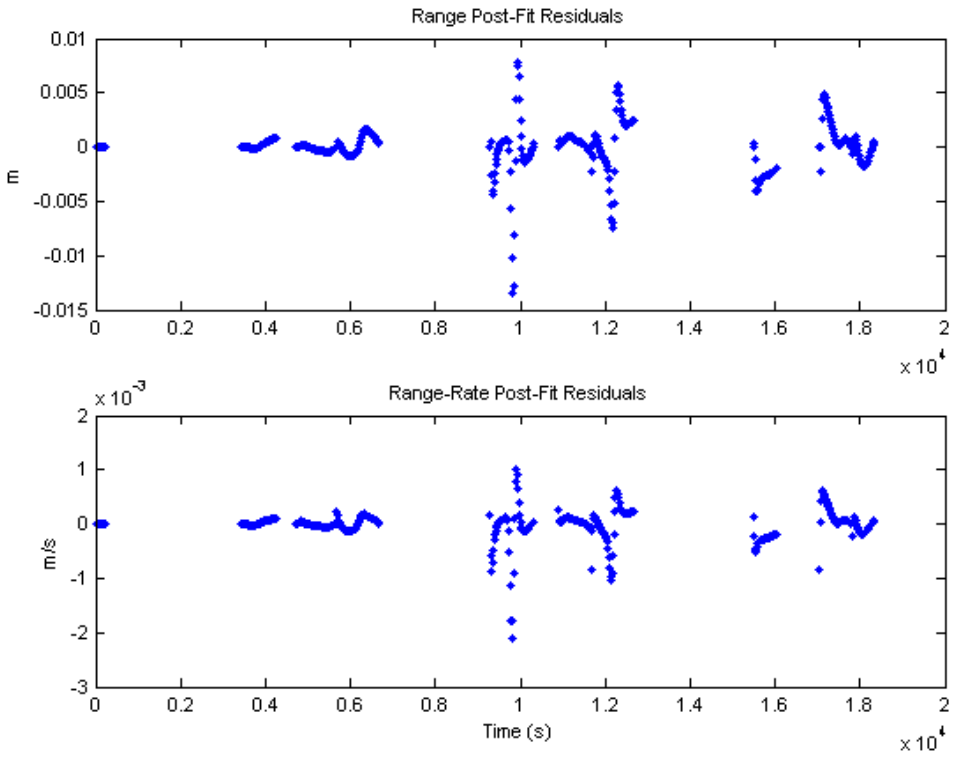

Figure 4: Postfit Residuals, with SNC (sigma = 2e-5)

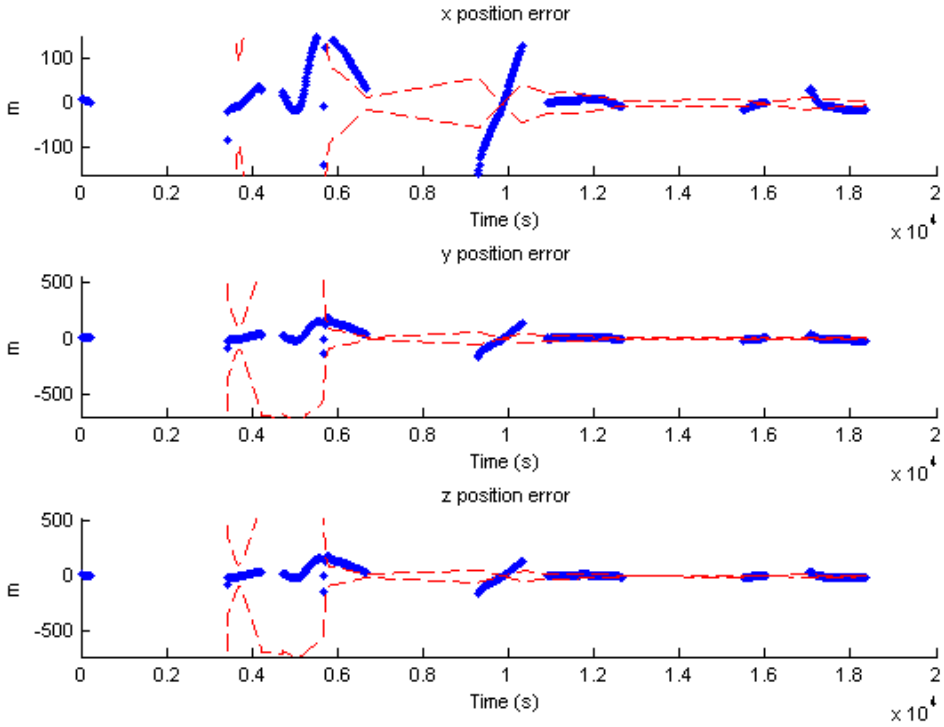

Figure 5: Position Error, with SNC (sigma = 2e-5)

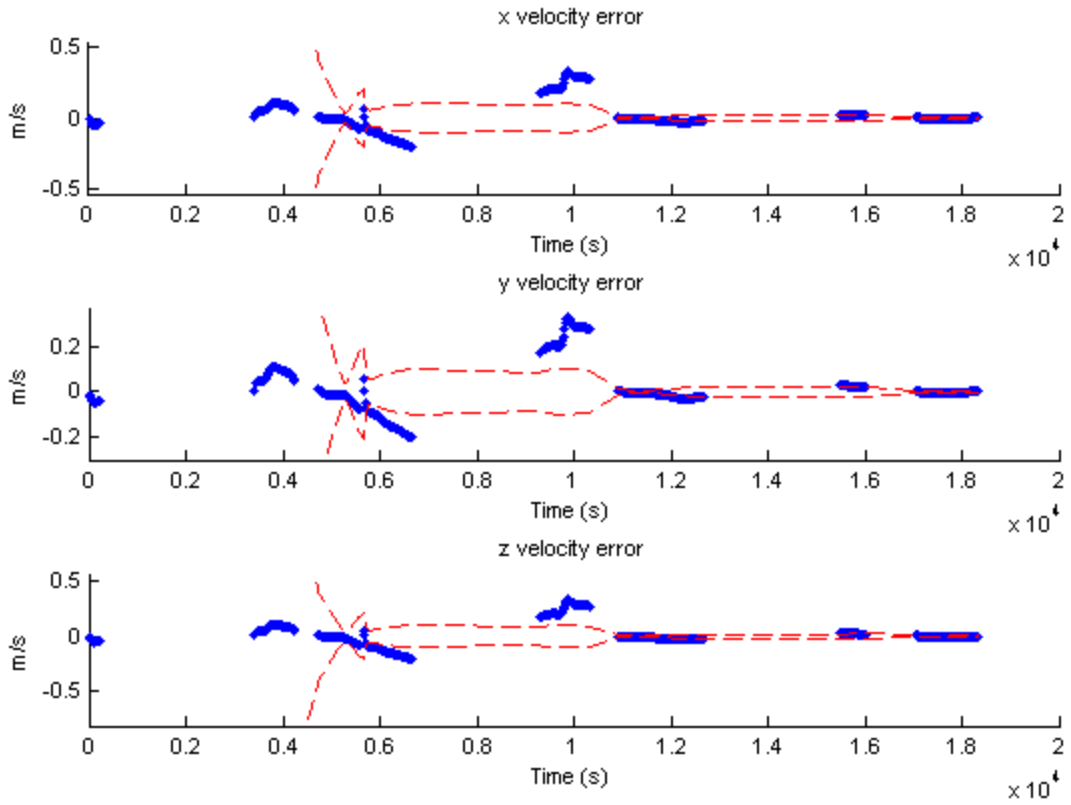

Figure 6: Velocity Error, with SNC (sigma = 2e-5)

The SNC results are better because the state covariance doesn't collapse, allowing the filter to incorporate measurement data. Larger sigma leads to higher covariance envelopes, and makes observations more important to the filter by increasing the Kalman gain. This is good when you have a bad *a priori*. Smaller sigmas do the opposite.