Biases in CNC analysis

Update : Now estimating the statistics from full MMF analysis

Notation

q —> SNR
AK —> (**A**ll **K**nown) Size & location is assumed perfectly known
SK —> (**S**ize **K**nown) Size of the cluster is assumed perfectly known
LK —> (**L**ocation **K**nown) Location of the cluster is assumed perfectly known
NK —> (**N**o **K**nown)

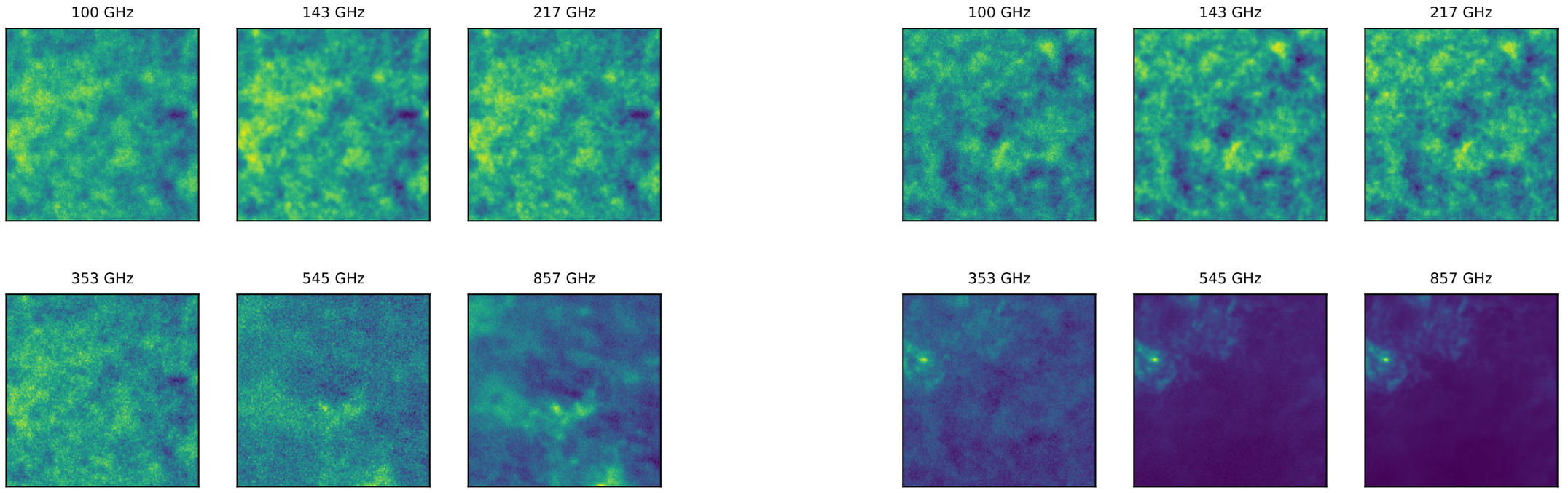
All cases are now real as there is no sense in which the noise variance can be assumed known

Some details to bear in mind:

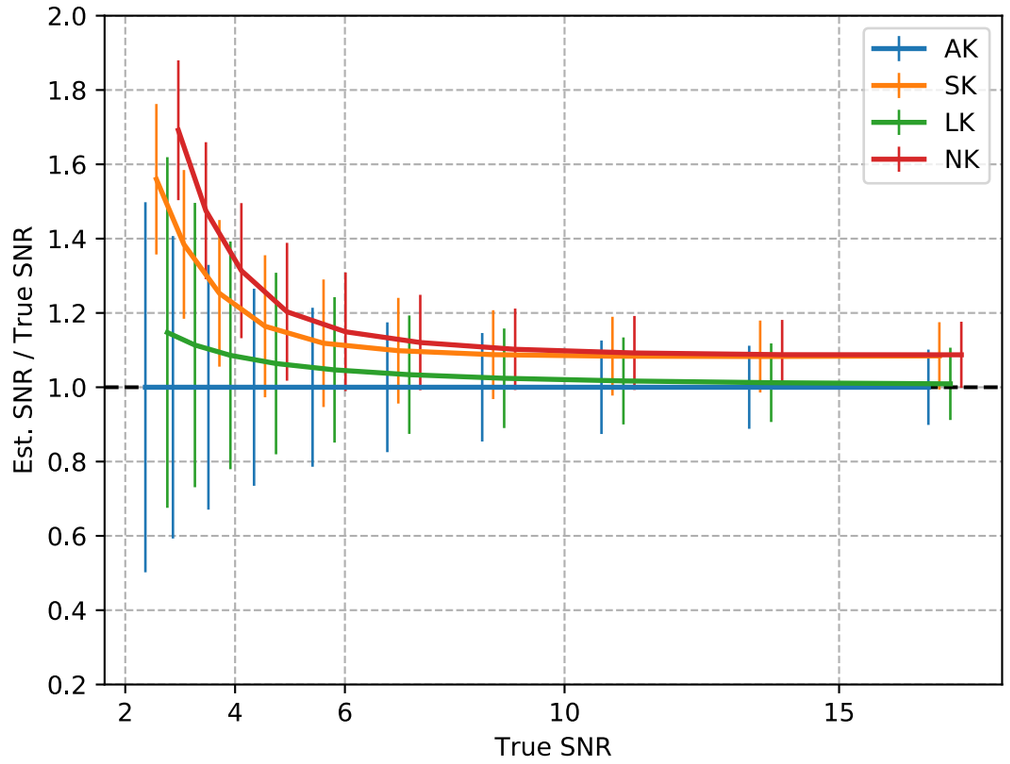
- In most likelihood analyses, the noise covariance needs to be measured from data.
- In MF analysis, the case is no different. Note that the noise covariance depends on measurement noise as well as subtle foreground details, which in principle may only be measured once you have the data.

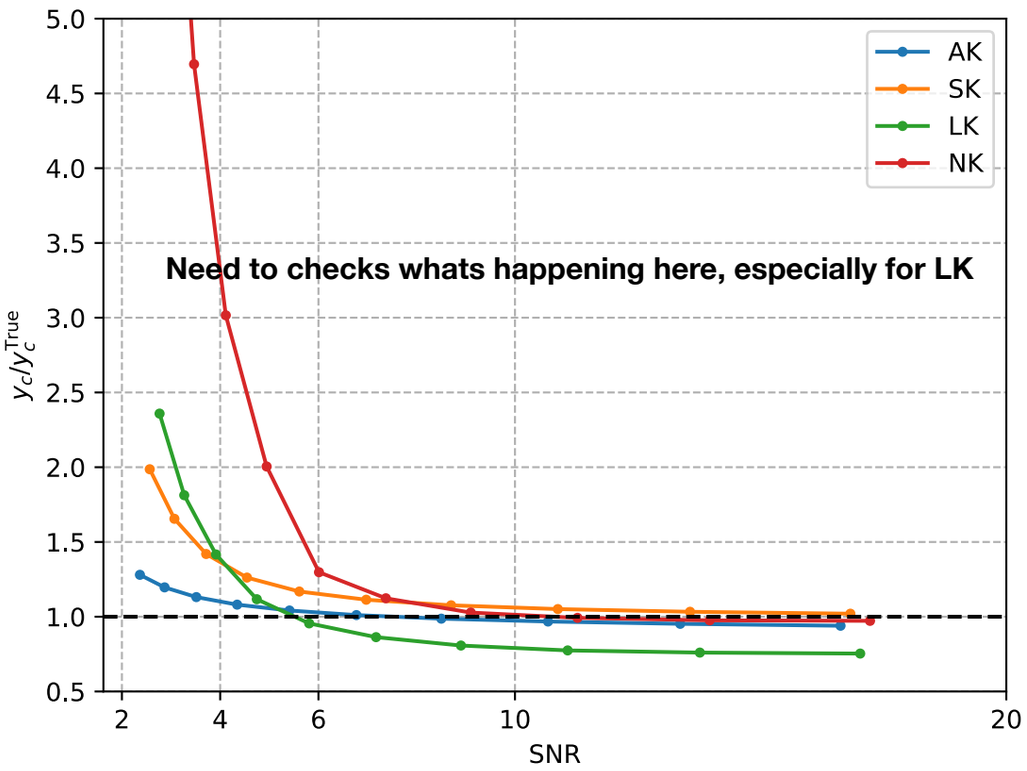
Sky simulation using Planck Sky model

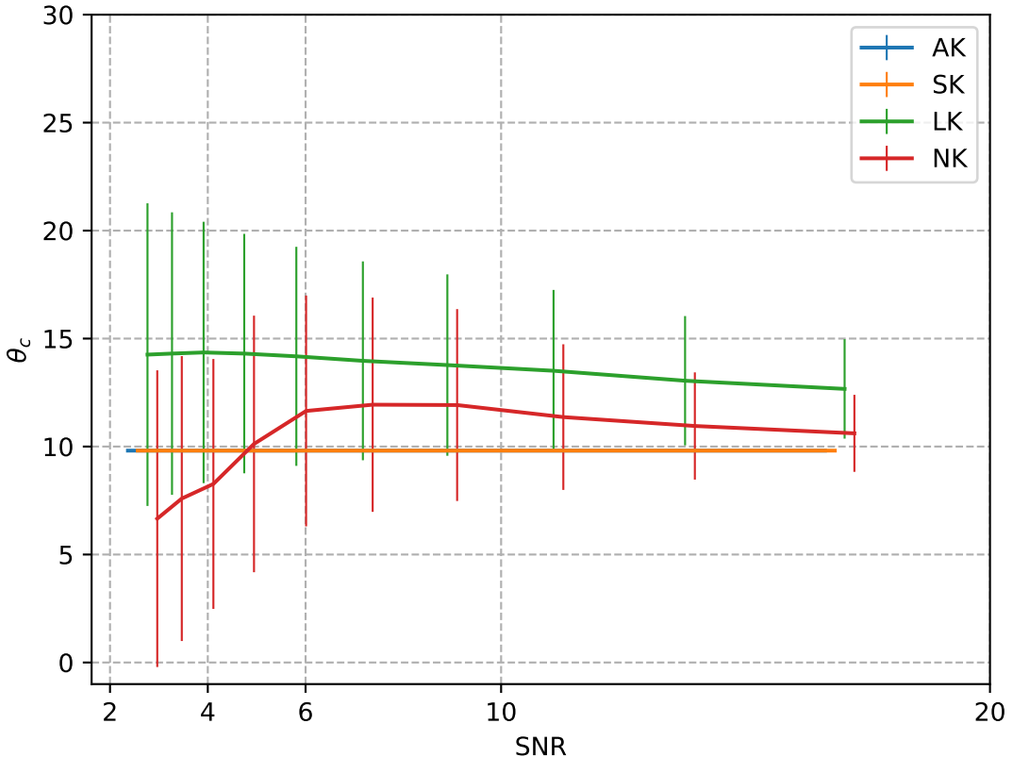
Statistics averaged over 20 different sky patches. The noise properties change significantly across. Example of two different sky location shown here.



$\mathbf{q}, y_c, \theta_c$







Comments:

- LK SNR converges to that estimated from AK for high q
- When location unknown, the SNR seems to be systematically higher. (Is this true for even higher SNR ?)
- y_c estimates seem skewed even in the AK case for low SNR (could be just low number statistics, also little control over foreground bias).
- LK behaviour of y_c is odd. Are these foreground biases? Can easily explain why is high at low snr and low and high snr. Need to check.