



# CHARA Classic Throughput.





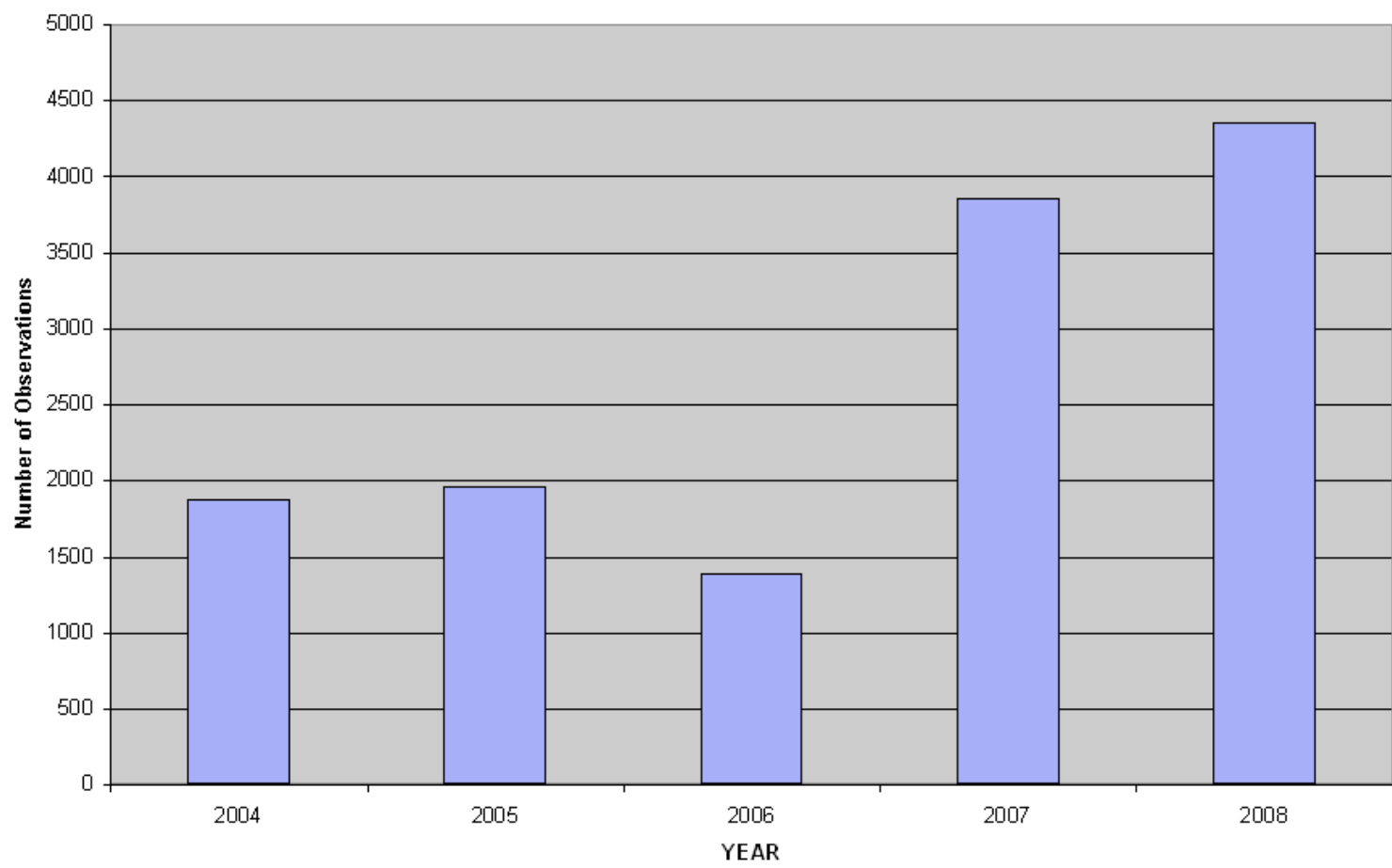
# Data Pool: All 2004/5/6/7/8 Data

- Automated editing – Fringe  $> 1.1$  Noise Power
- Took approximately 180 minutes to crunch.  
(Once I got the software right... which took longer)
- $V < 0$  and  $V > 1$  thrown away.
- Probably not reliable for science.
- K magnitudes extracted from 2MASS.
- Stars without 2MASS data thrown away.



# Amount of Data

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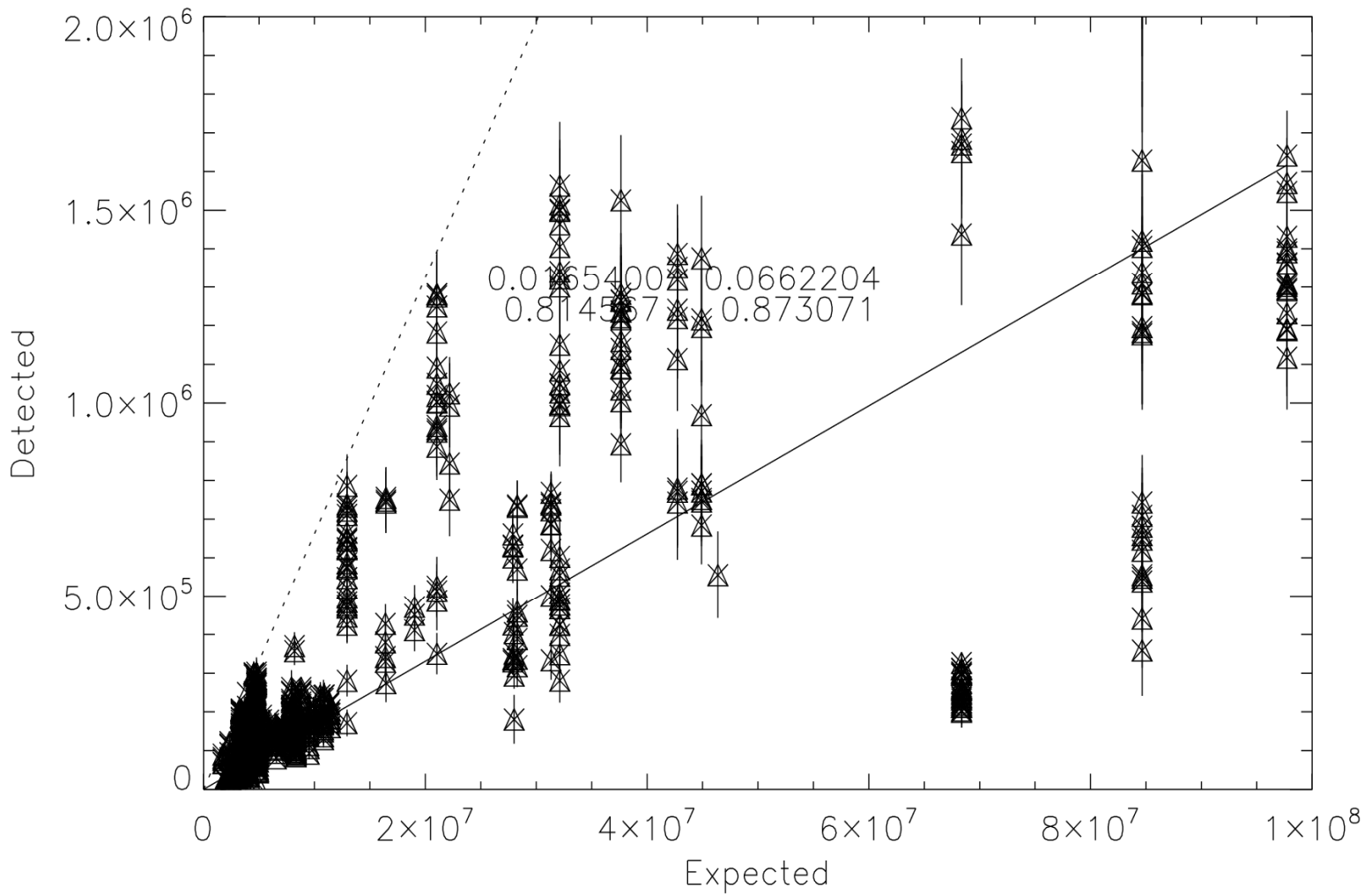
# K Mags are converted to a photon count.

- In K band there are  $4.31 \times 10^9$  Photons  $\text{m}^{-2} \text{s}^{-1} \text{mm}^{-1}$
- Two 1m telescopes:  $2 \times \pi \times 0.25 = 1.57 \text{ m}^2$
- All data calibrated to 1 second.
- This assumes the NIRO readout mode behaves.
- K band is 0.35  $\mu\text{m}$  wide.
- All of this results in  $N_{\text{ph}} = 2.37 \times 10^{(9 - M/2.5)}$
- Camera Gain = 0.3, DQE = 60%.



# Some Example Data

October 2008



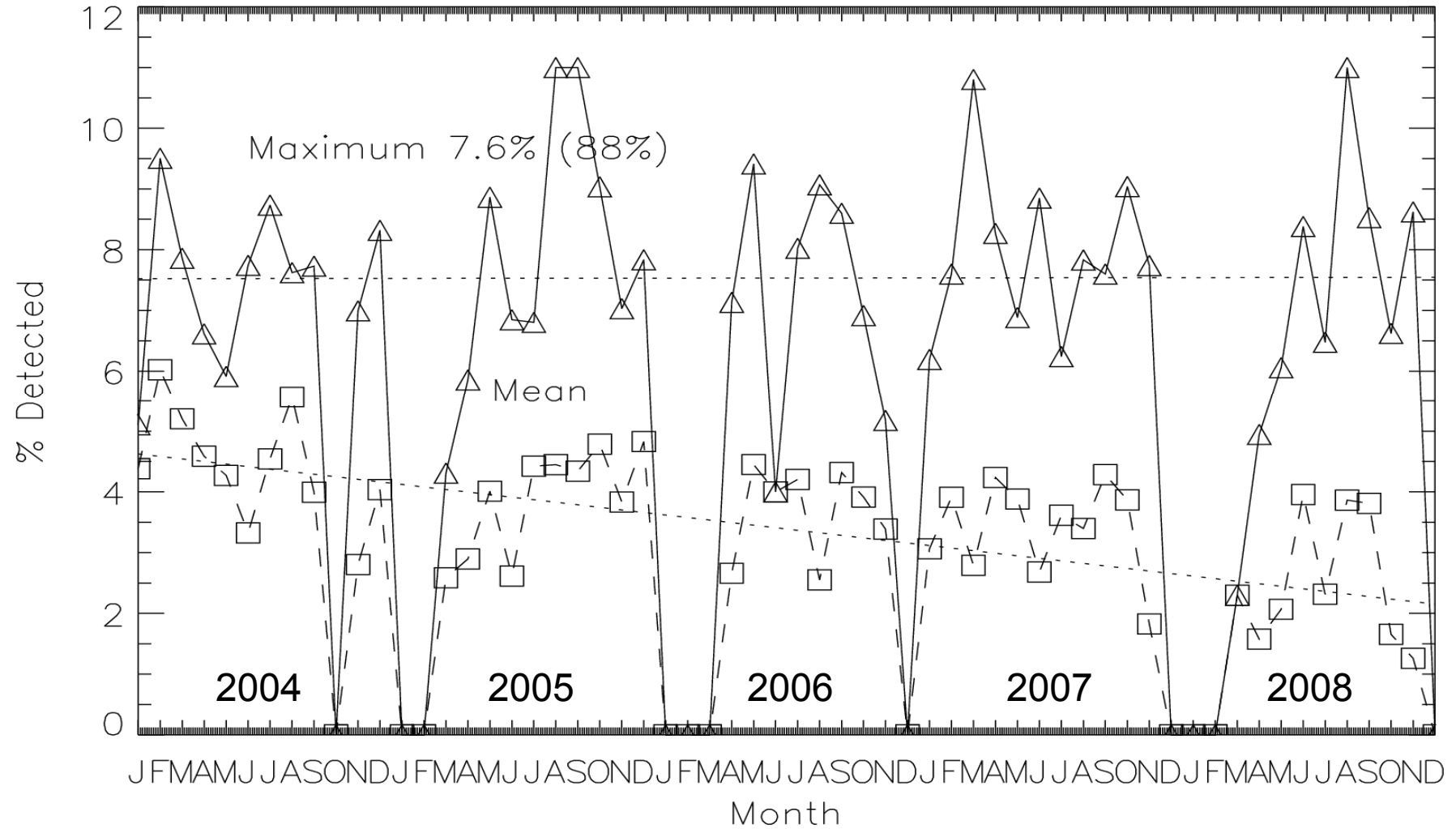
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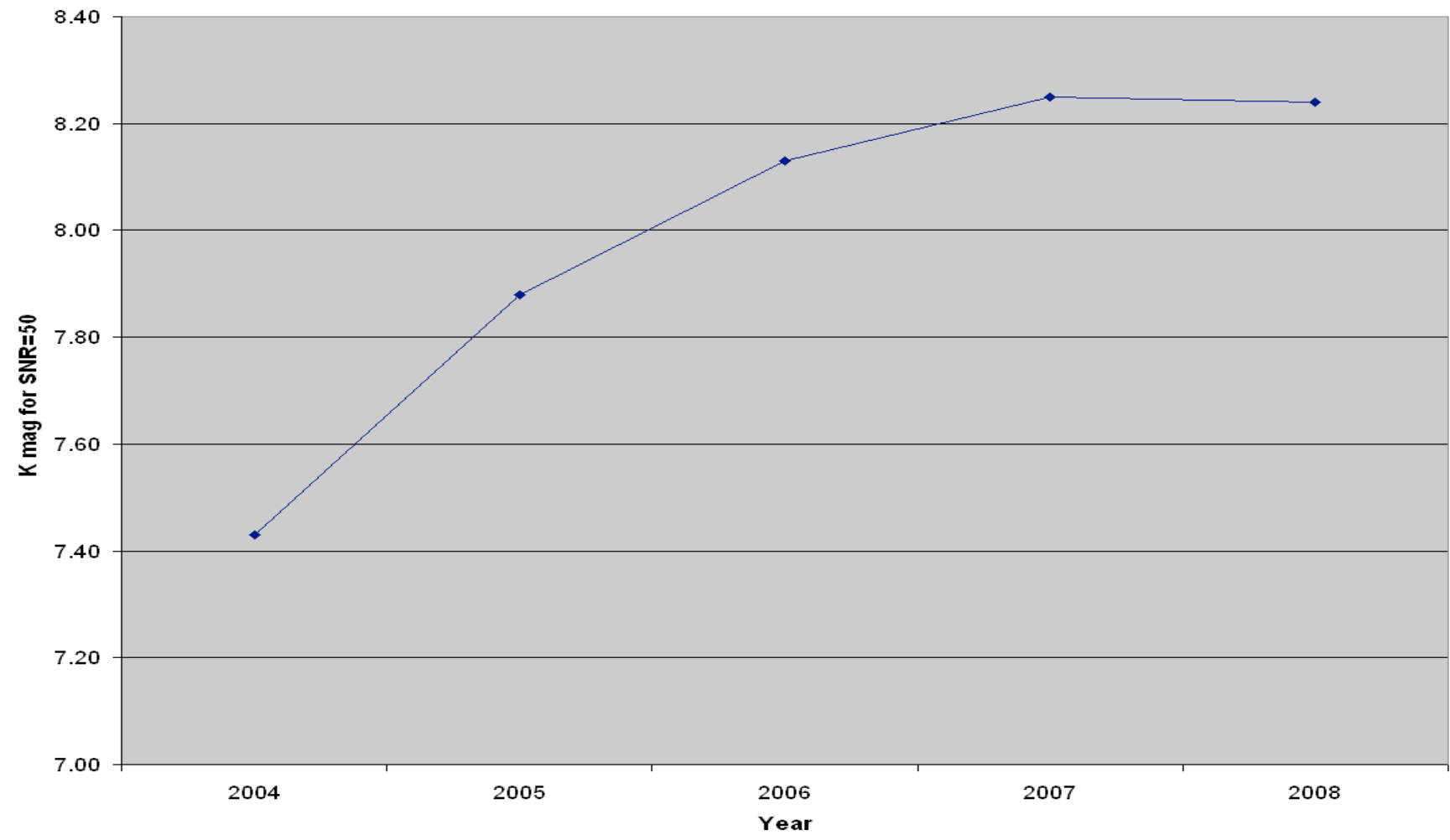
# Throughput







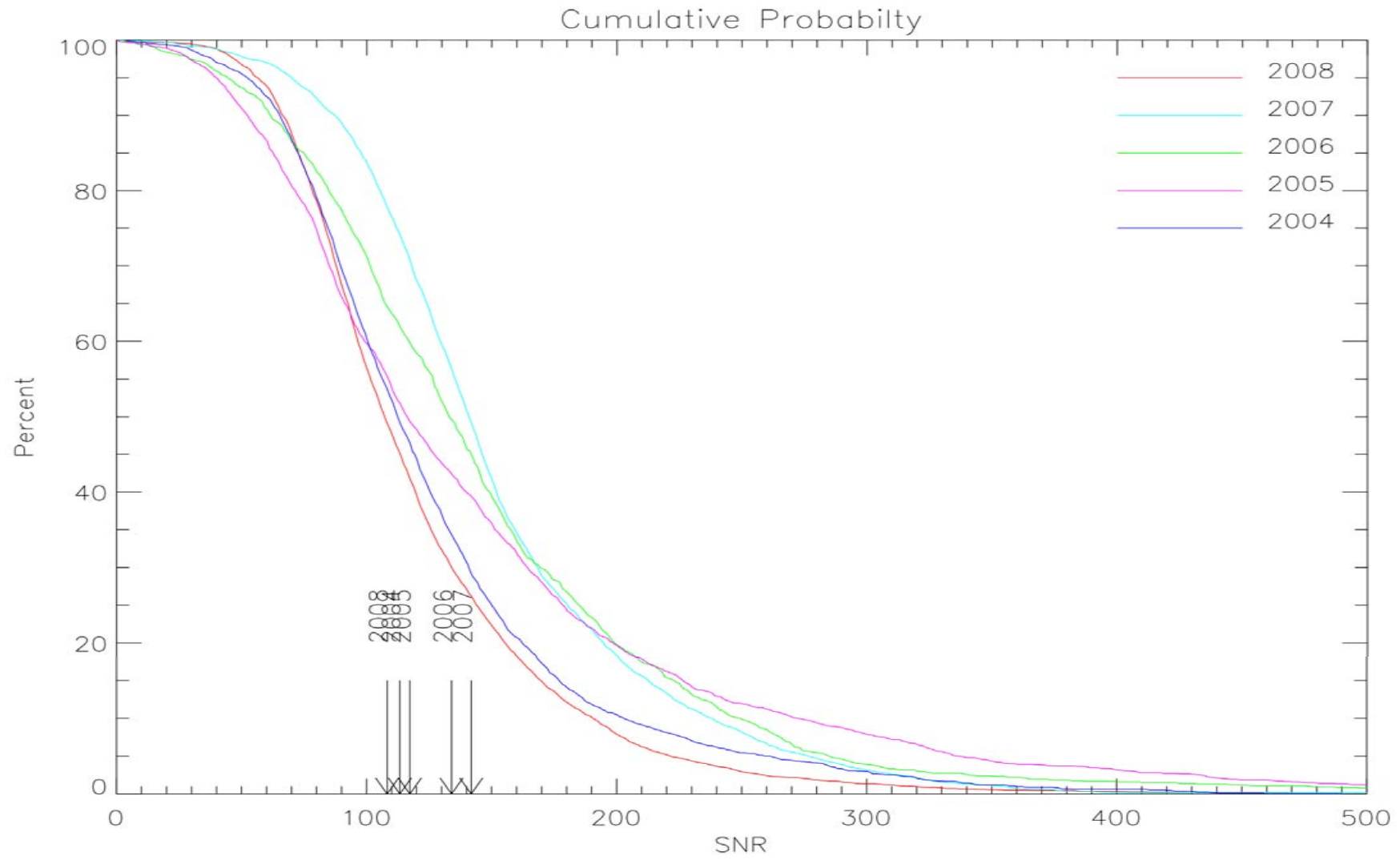
$$\text{SNR} \sim V * \text{sqrt}(N)$$



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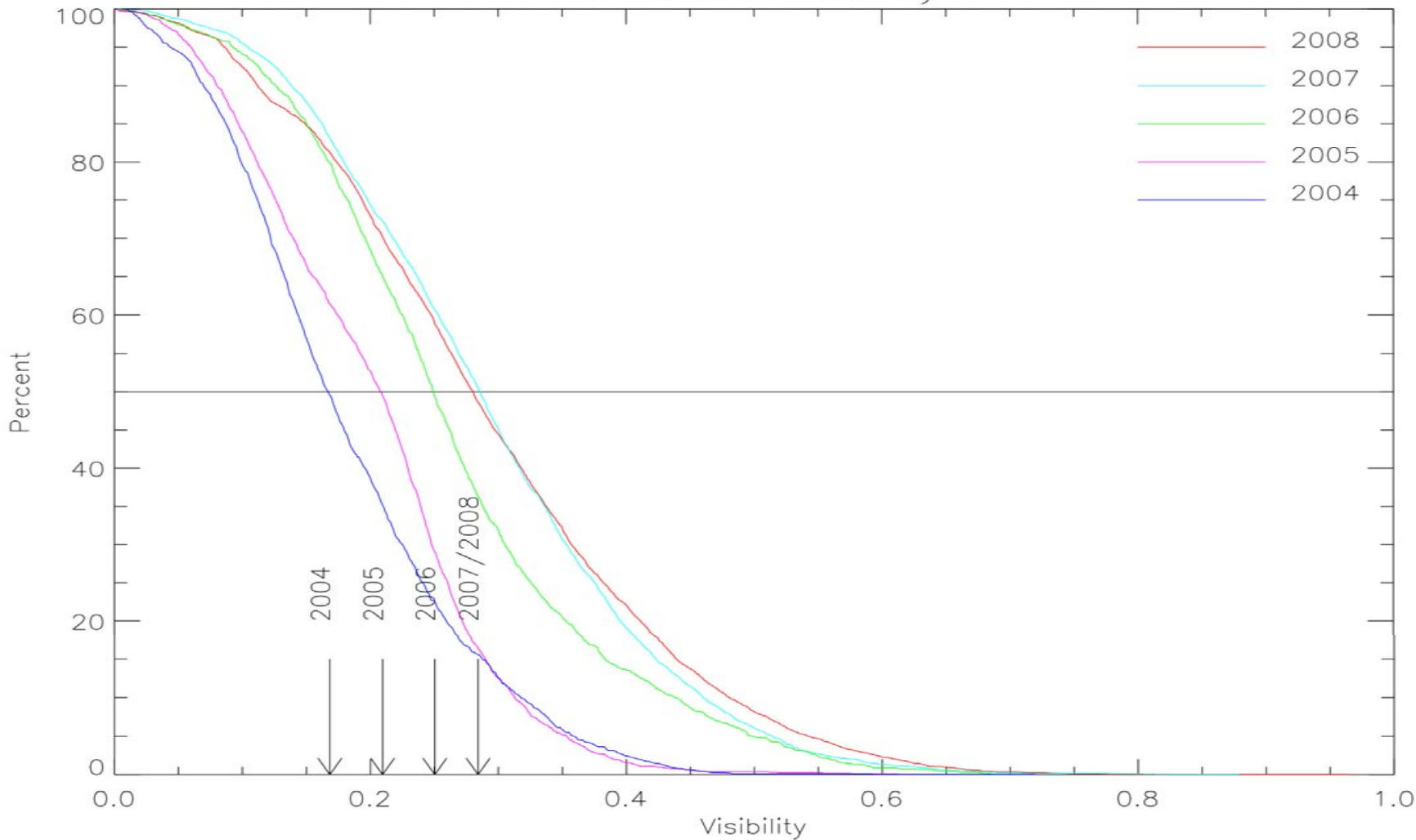
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# Raw Visibility

Cumulative Probability



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# The Bottom Line

- K Band throughput is 7.6% (88% reflectivity)
- As expected the silver coatings did not affect the K band throughput. Other's must speak for visible bands.
- SNR, Raw visibility and Magnitude limits went up in 2005, 2006 and 2007. In 2008 they remained the same, or worse, than 2007.
- We expect improvements to the NIRO optics, Irises, scope alignment and readout modes to yield another magnitude of sensitivity. Beyond that we need AO.