



Plots

“workout”



Carsten Kutzner, January 2014

Show the data,

tell the truth,

help the viewer think about the information rather than the design,

encourage the eye to compare the data,

make large data sets coherent.

Tufte, E. The Visual Display of Quantitative Information. Graphics Press, Cheshire, CT (1983)

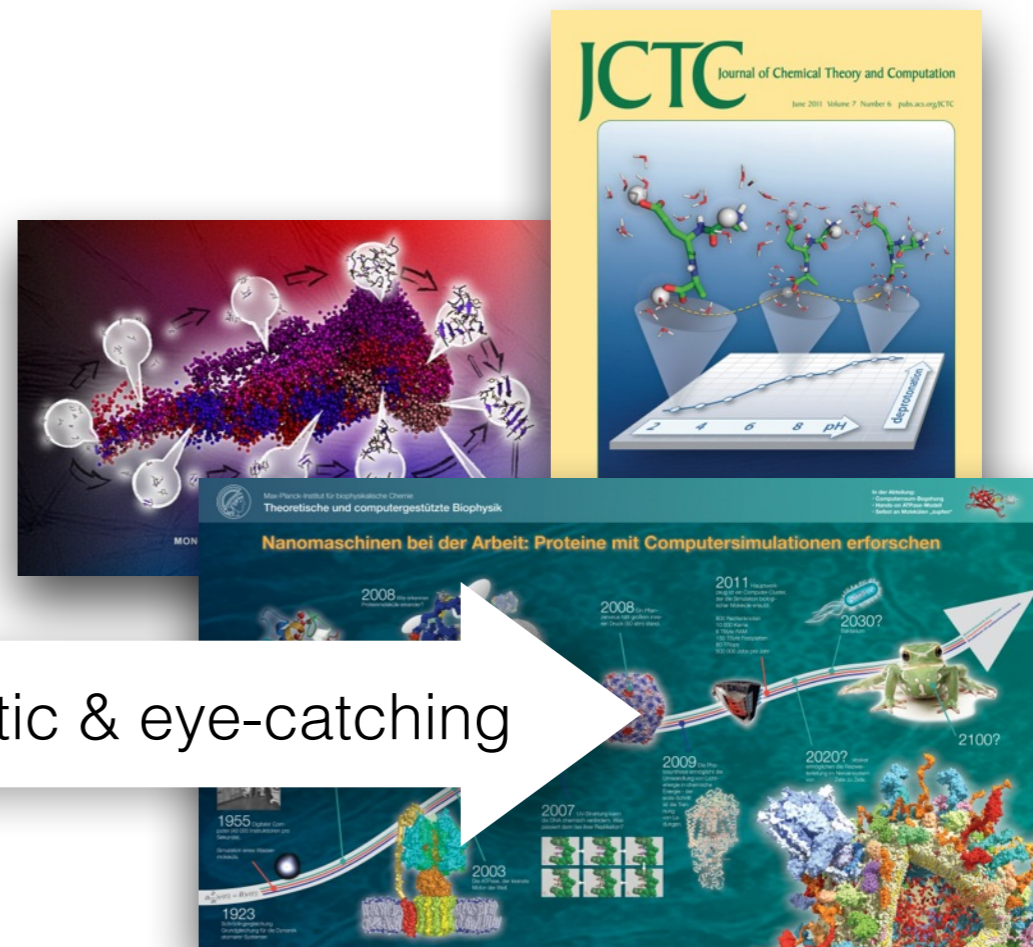
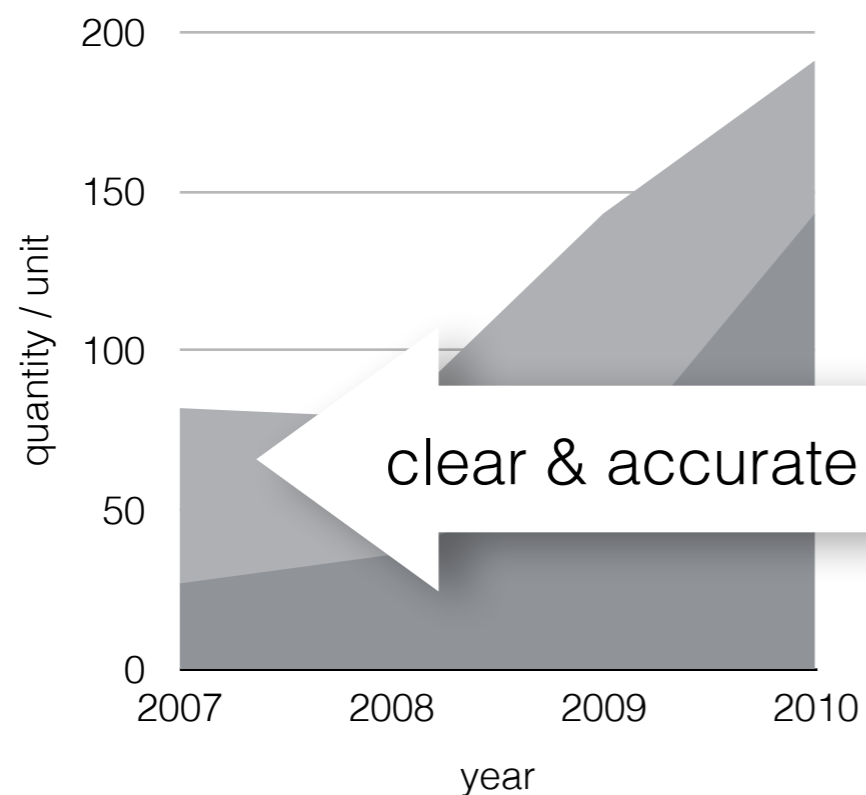
This tech-tea is ...

... **about** presenting data in the scientific context, i.e. for

- papers,
- posters, and
- talks

... **not about** making

- cover figures, and
- graphical abstracts



artistic & eye-catching

The short story:
2 principles.

#1: Use a visual language.

Visual language

is a graphic hierarchy that helps to identify

what is **important,**

and what **belongs together:**

same / similar

color **line style**
font **size**

It encodes information in non-text elements.

Use whenever possible.

The short story:
2 principles.

#2: Omit chart junk.

Tufte, E:
The Visual Display
of Quantitative Information,
Graphics Press,
Cheshire, CT (1983)

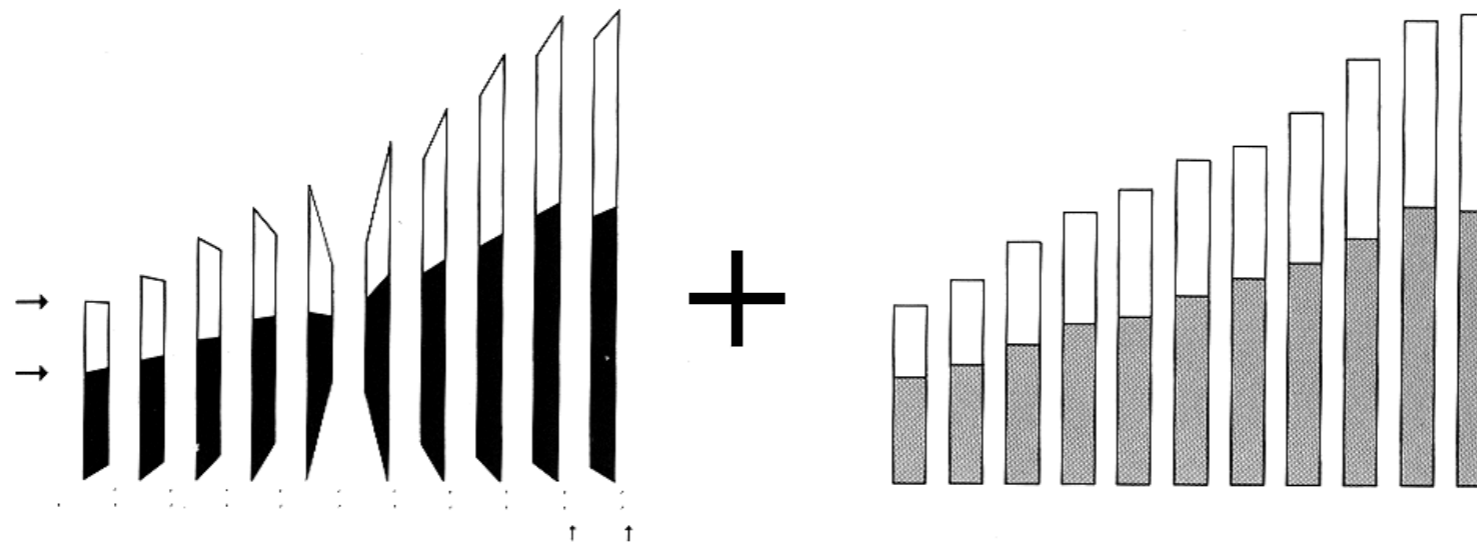
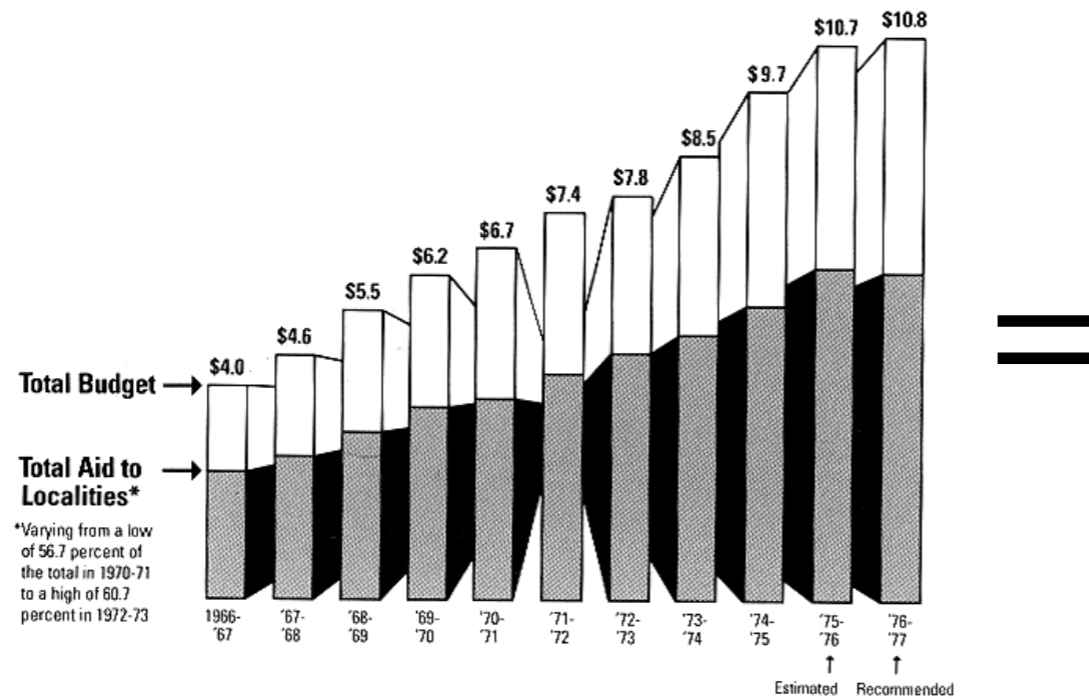


Chart junk

all "ink" not carrying information

Chart junk

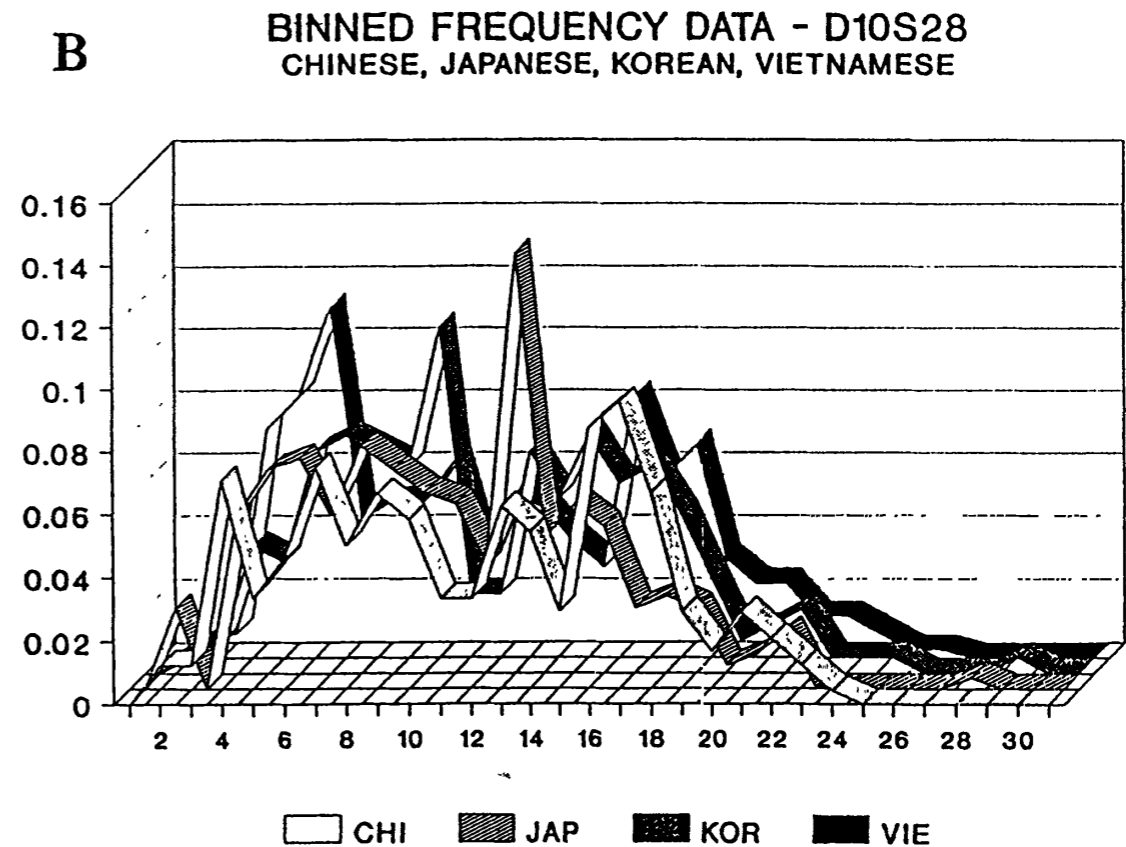
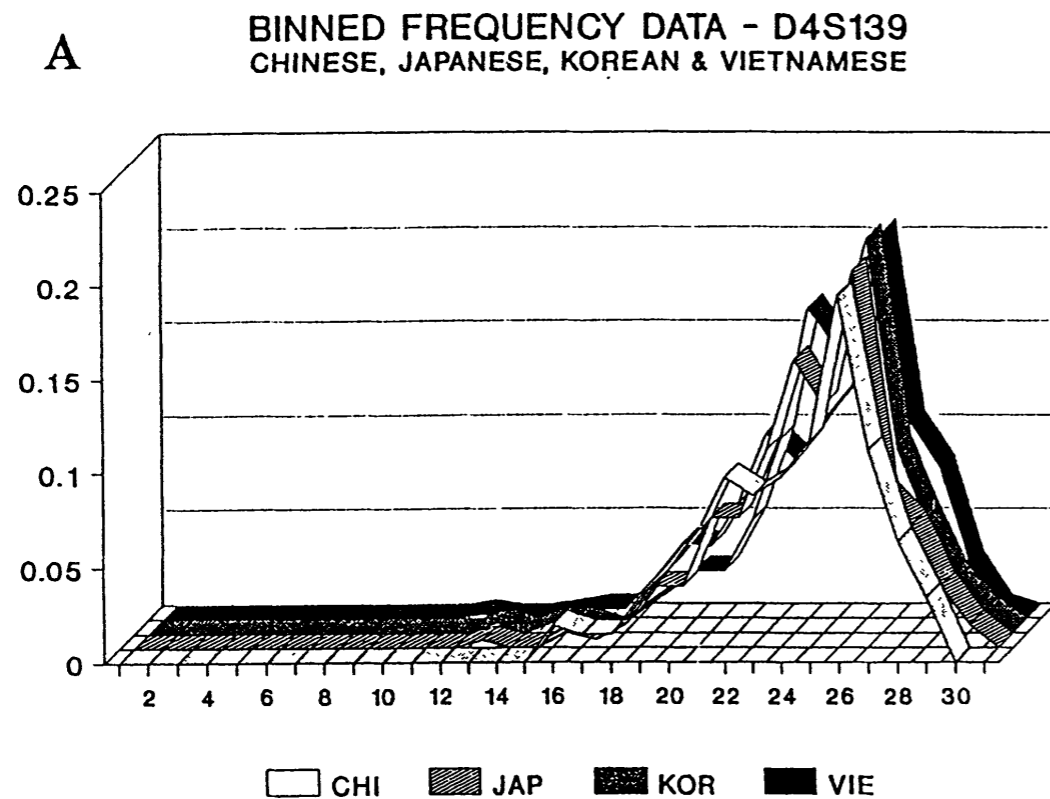
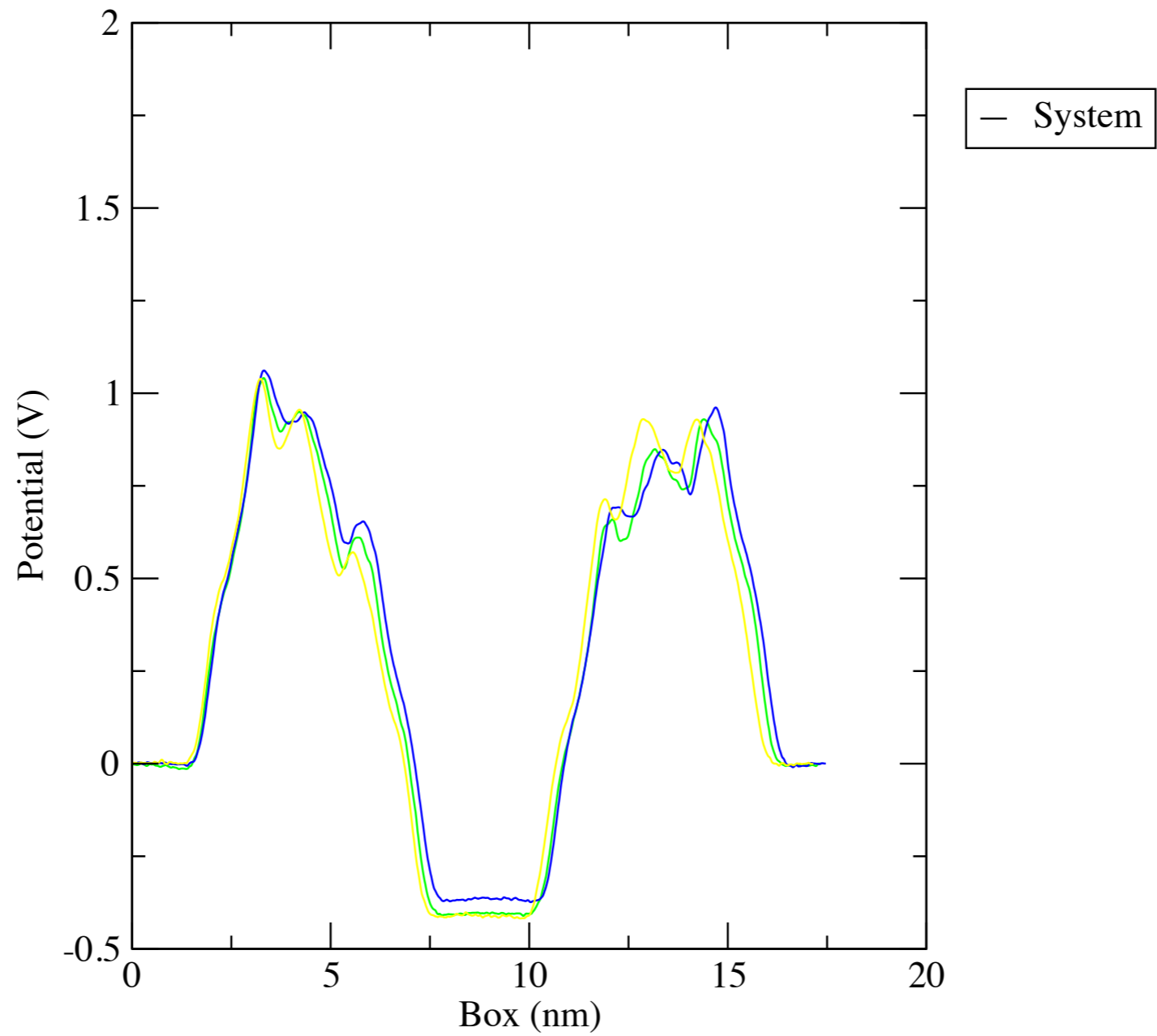


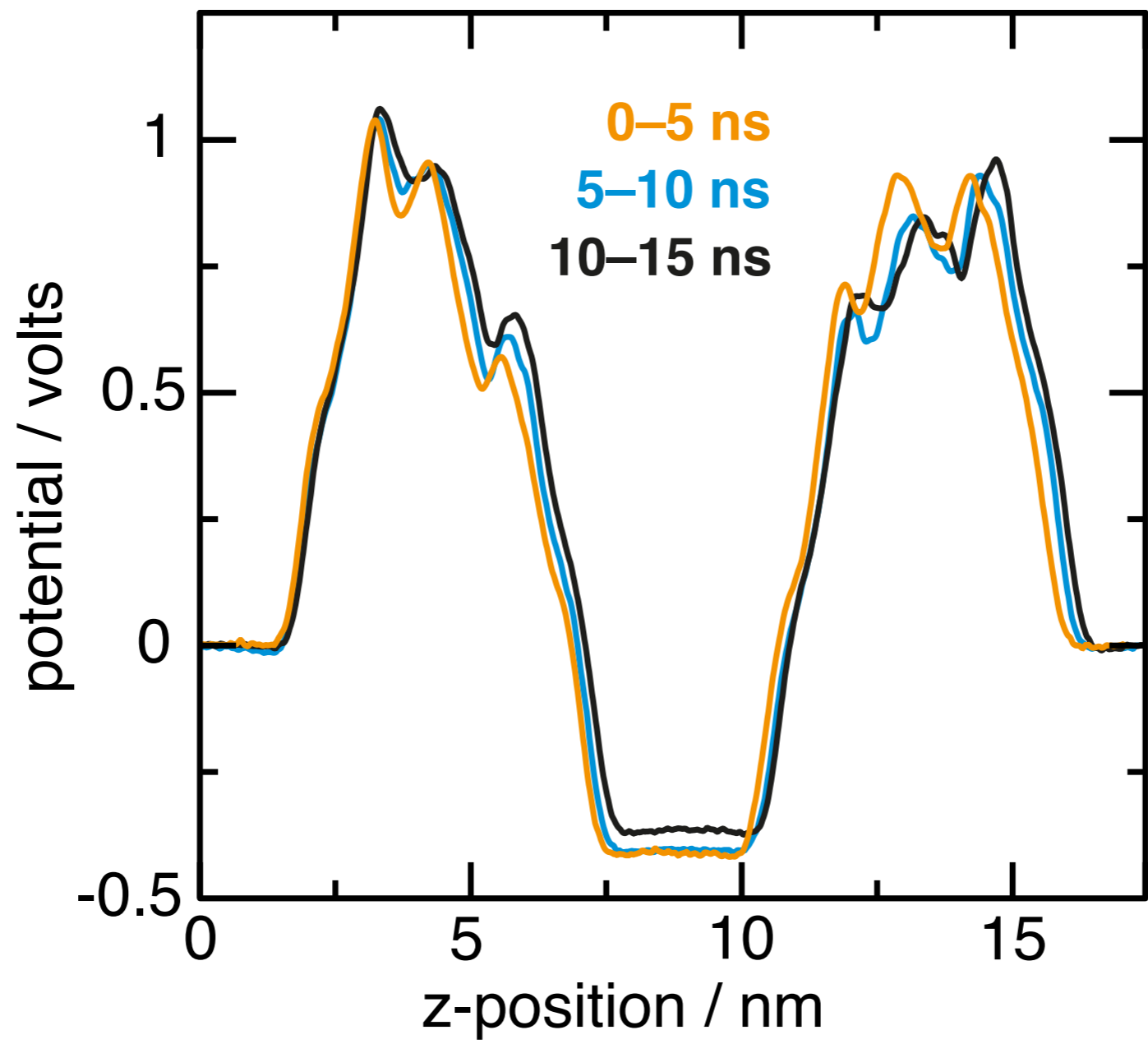
FIG. 4. *Fixed bin distribution (histogram) for two loci and four Asian subpopulations (used with permission from John Hartmann): the boundaries of the 30 bins (vertical axis) are determined by the FBI; these bins are not of equal length. Sample sizes (numbers of individuals) for Chinese, Japanese, Korean and Vietnamese are 103, 125, 93 and 215 for D4S139 and 120, 137, 100 and 193 for D10S28. The horizontal axis is the bin number; bins are not of equal length.*

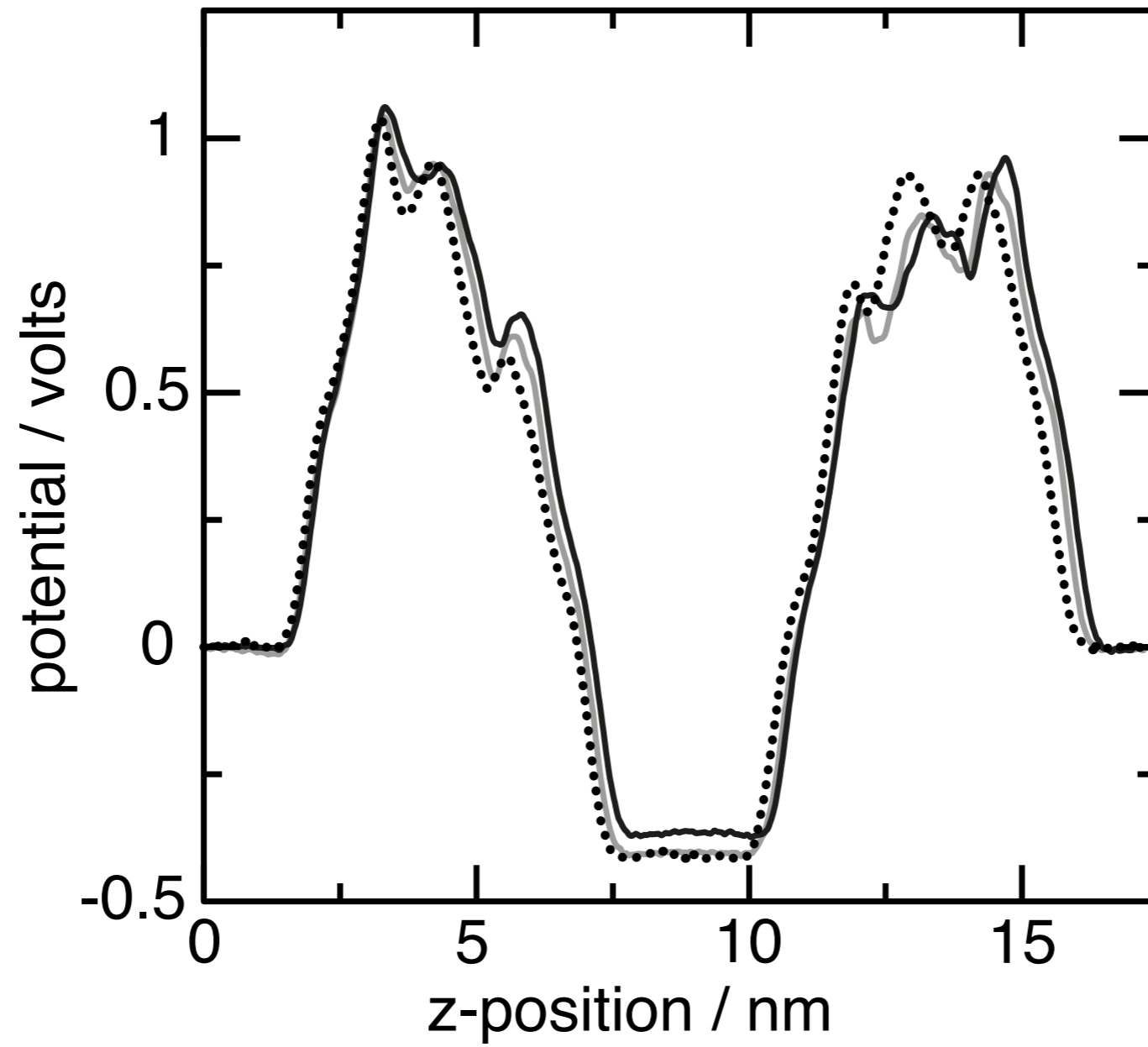
Examples

xmgrace -nxy potential.xvg

Electrostatic Potential

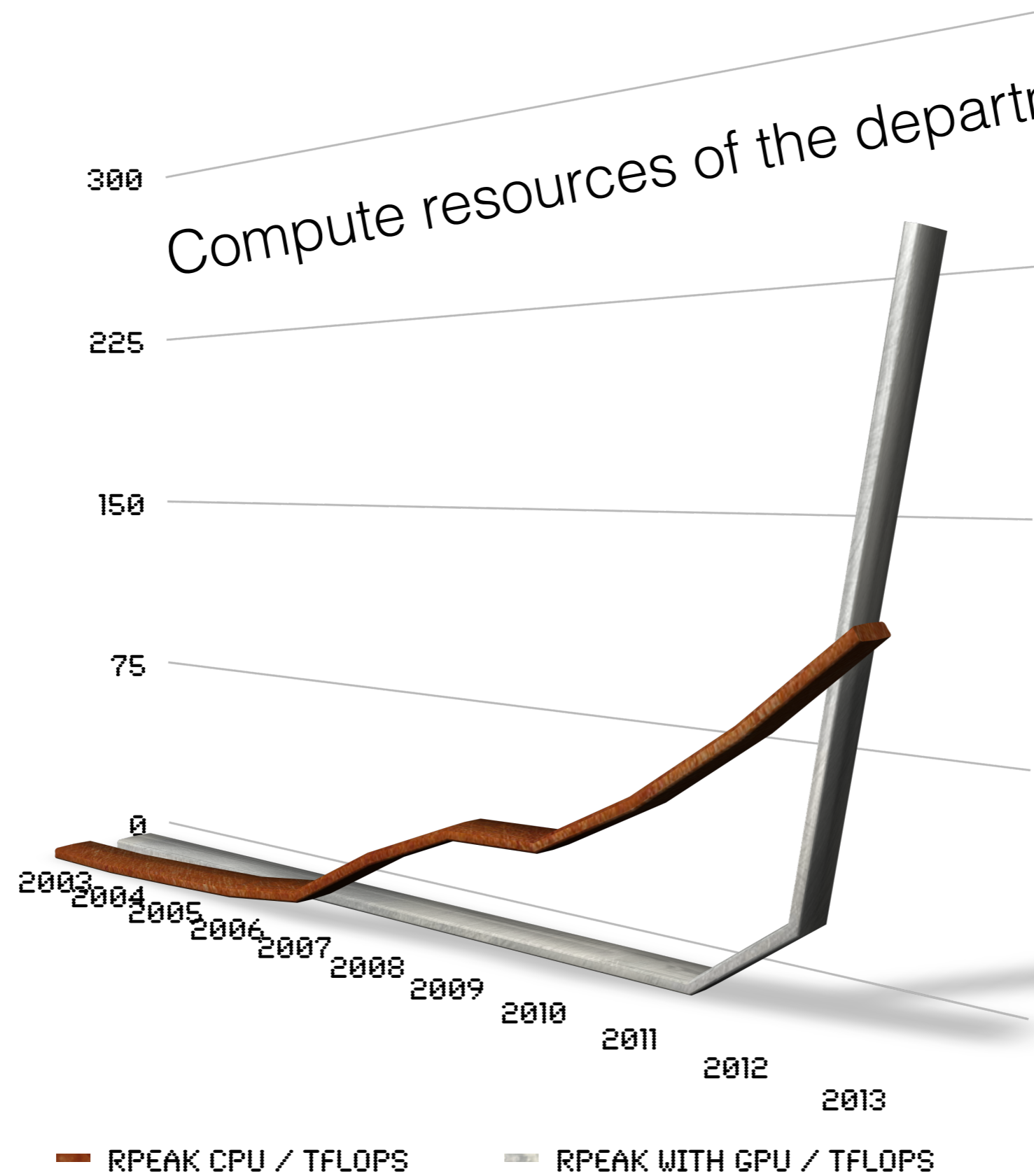






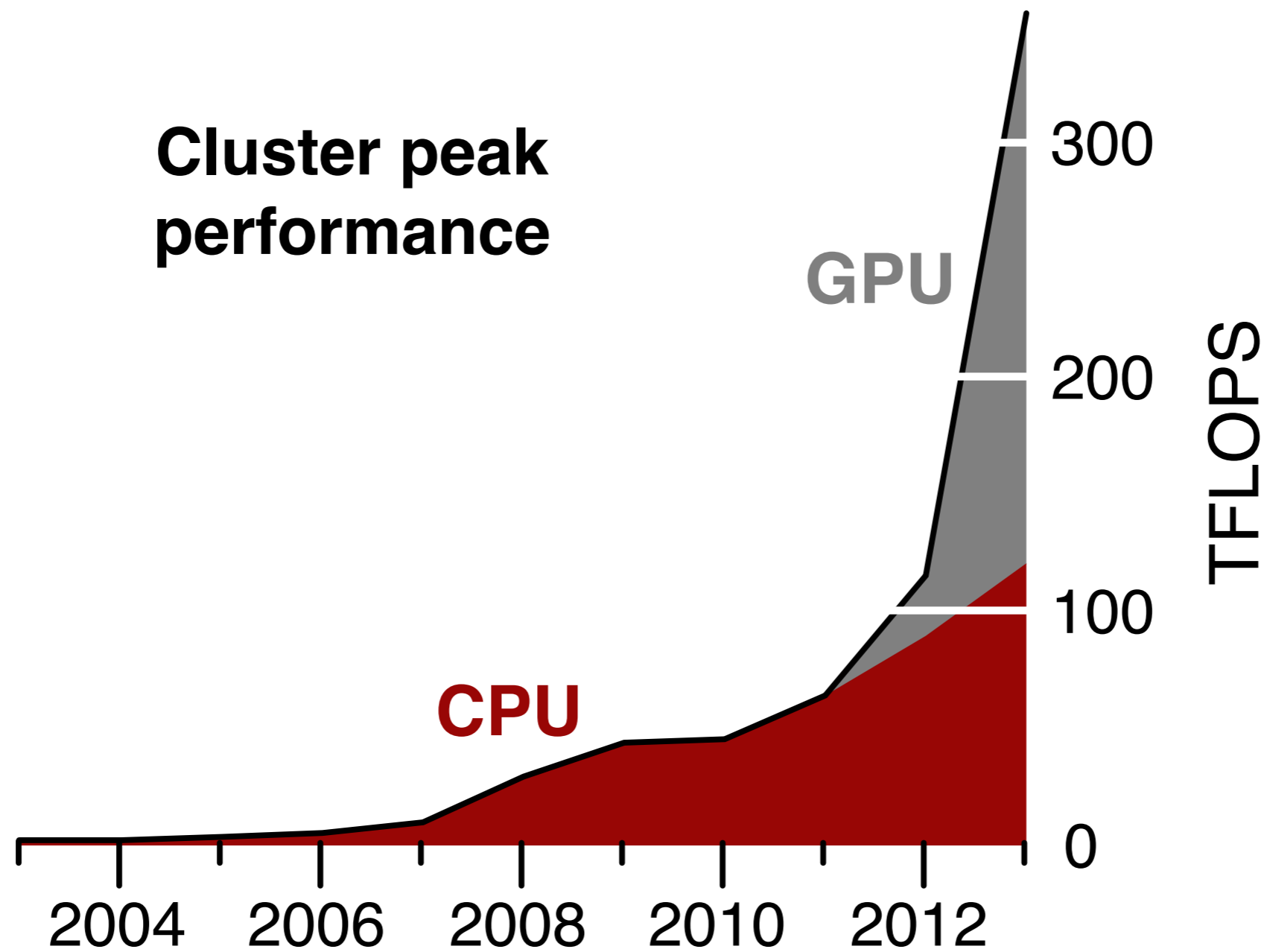
Time intervals 0–5 ns (dotted), 5–10 ns (grey), and 10–15 ns (black).

Compute resources of the department

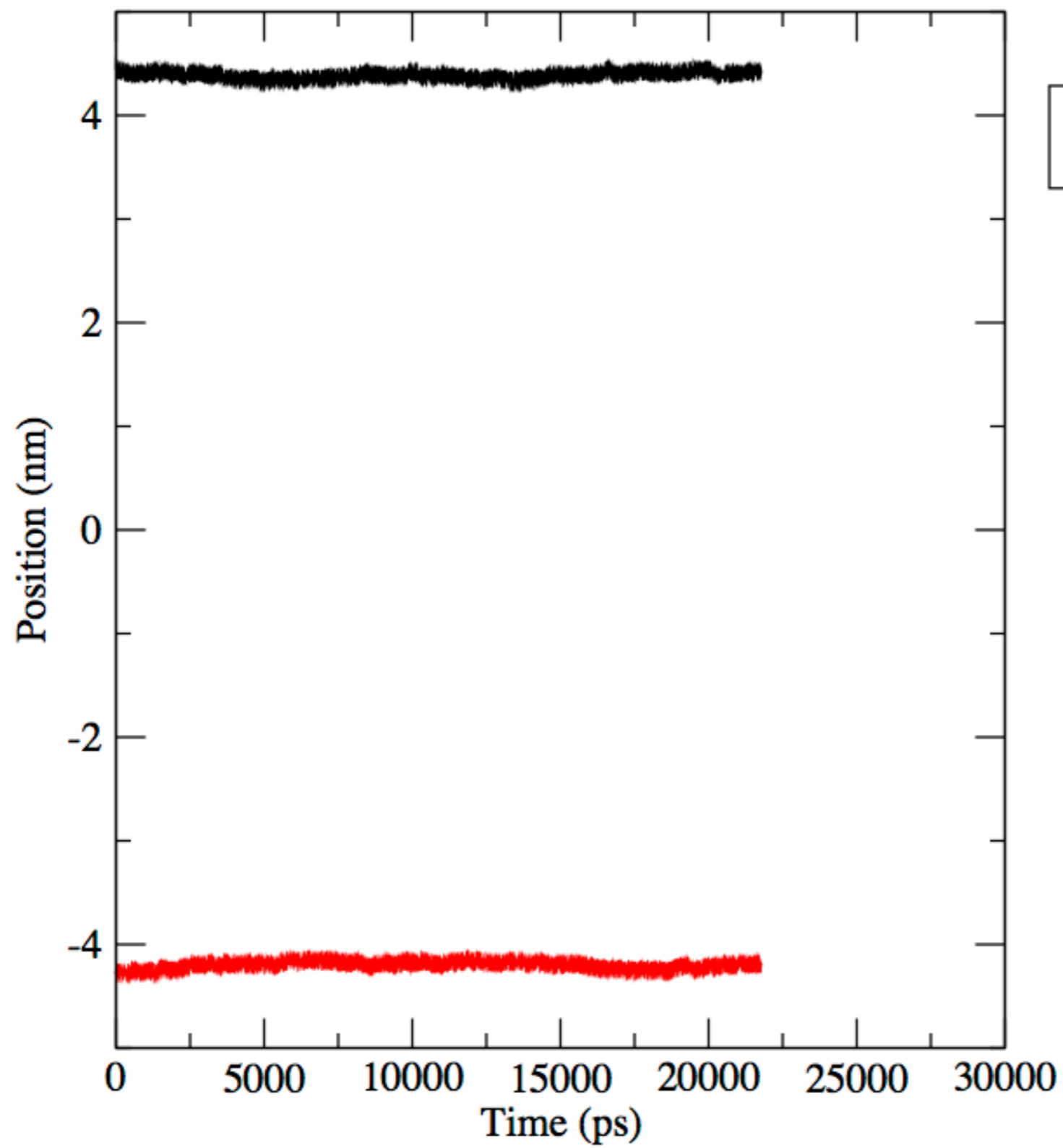


— RPEAK CPU / TFLOPS — RPEAK WITH GPU / TFLOPS

Help the viewer think about the information rather than the design

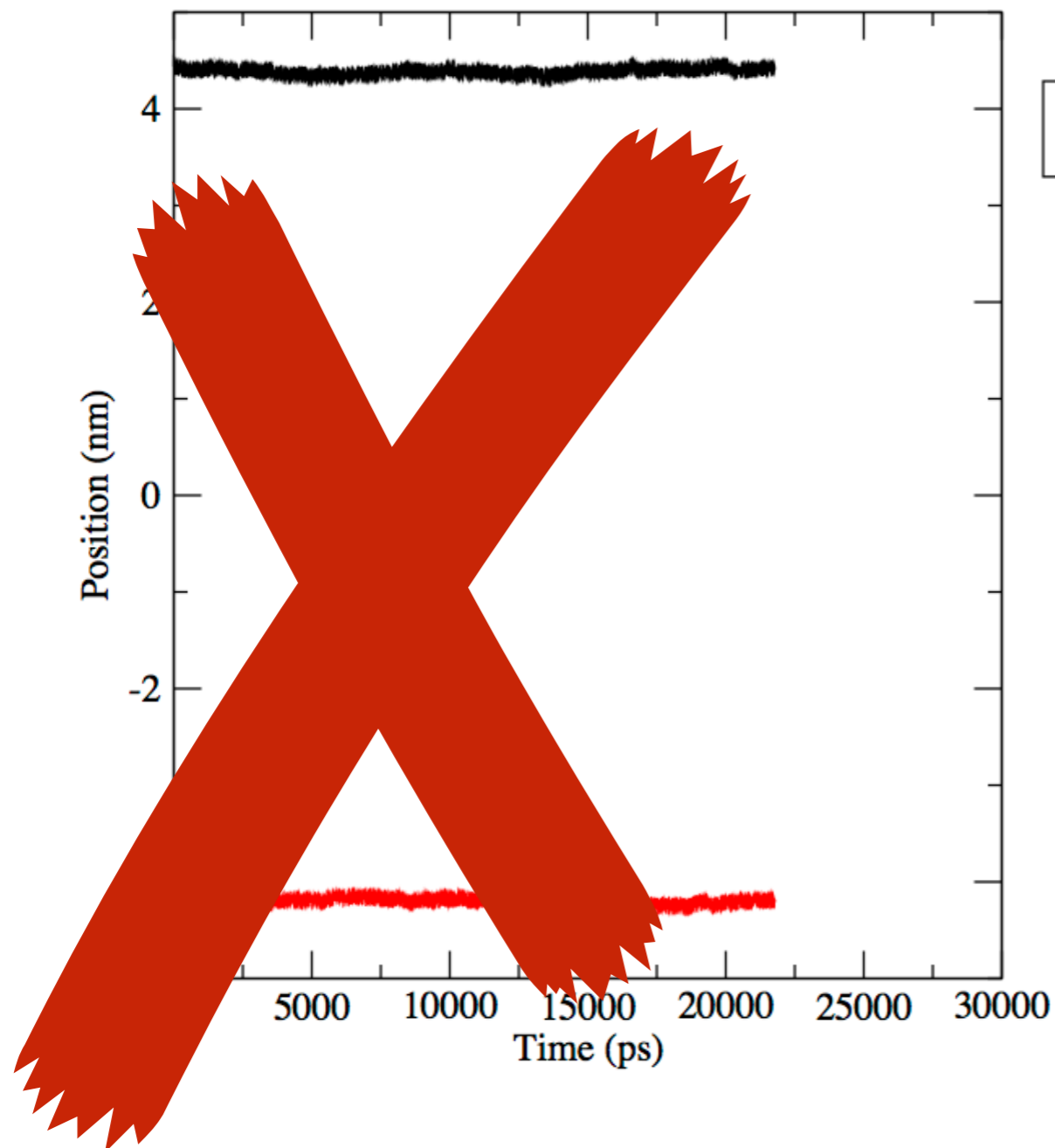


Pull COM

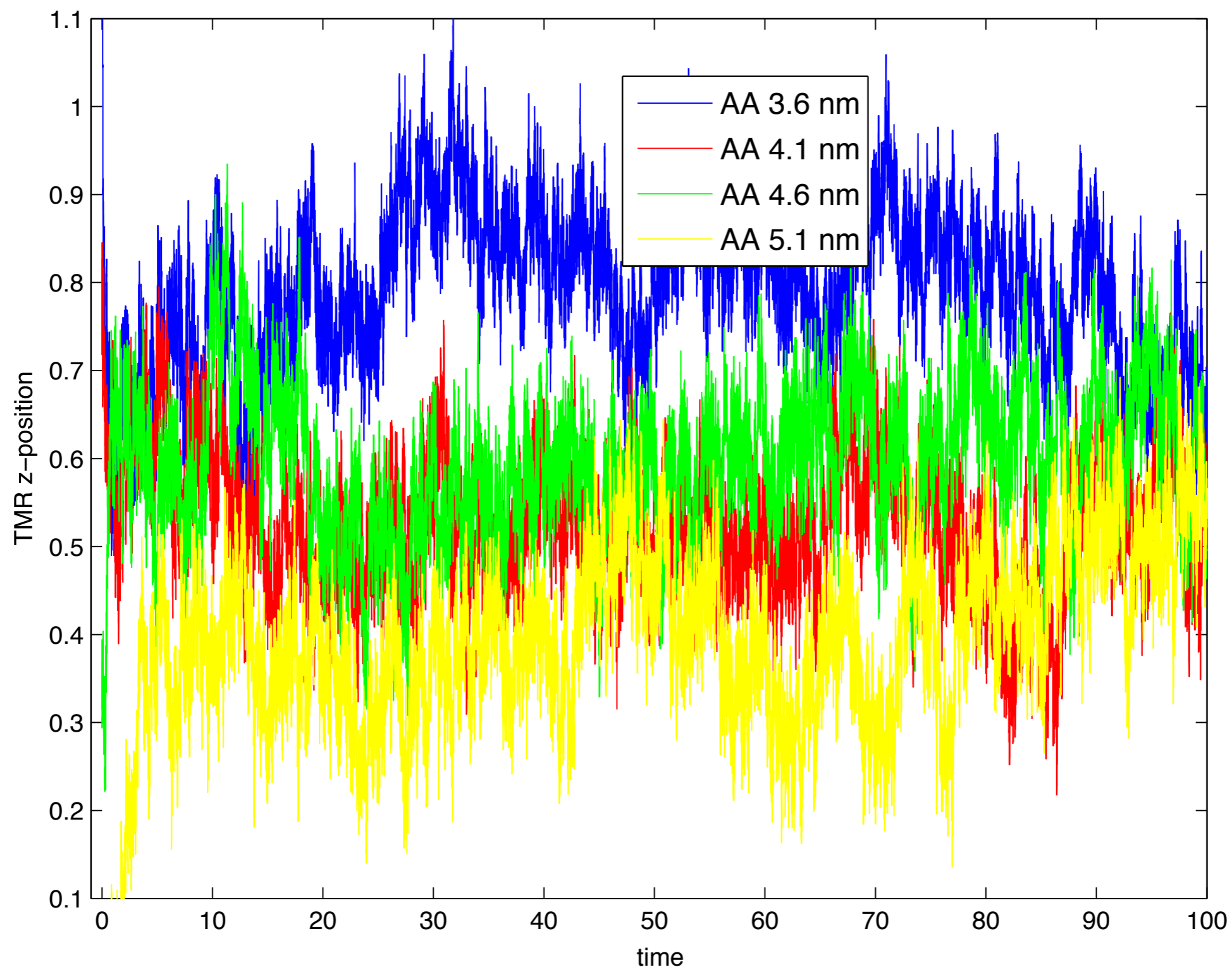


Omit unnecessary graphs

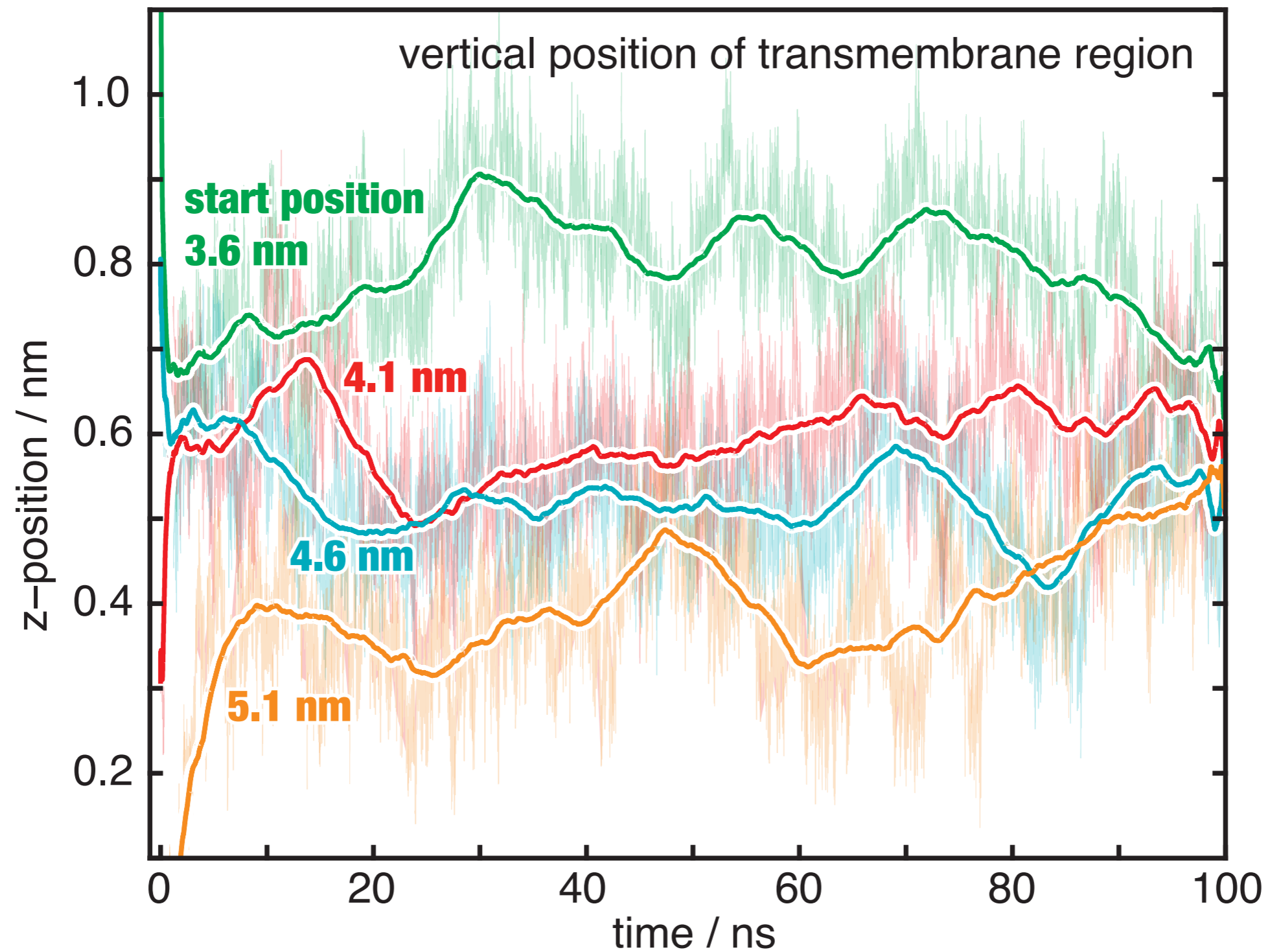
Pull COM

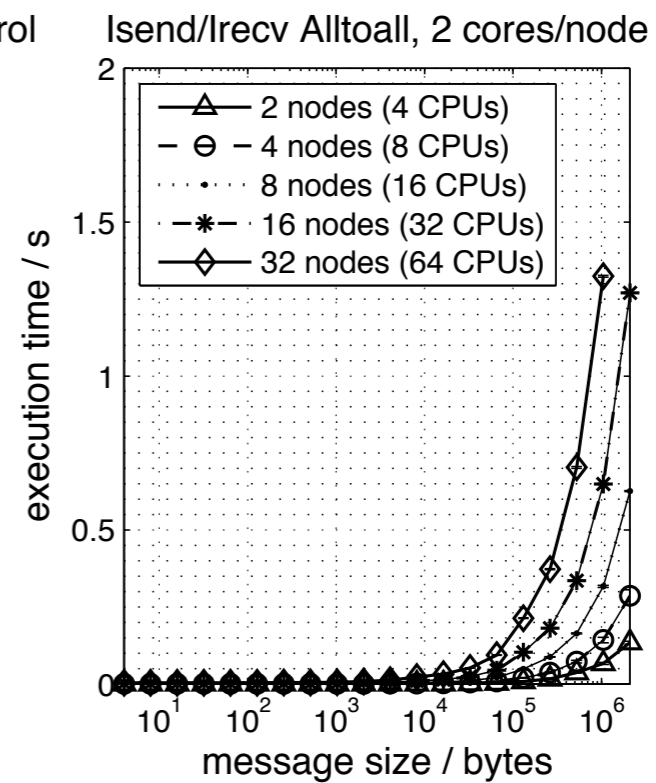
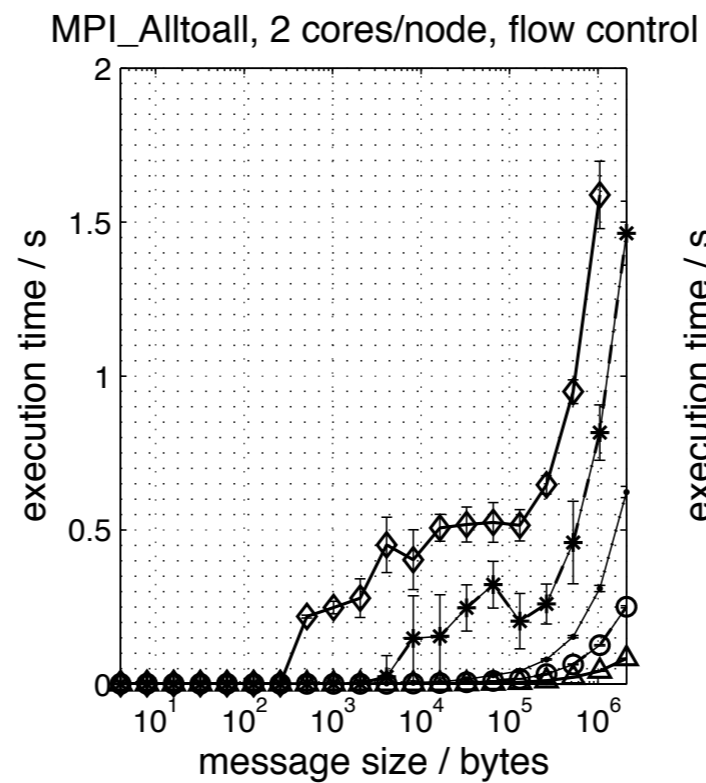
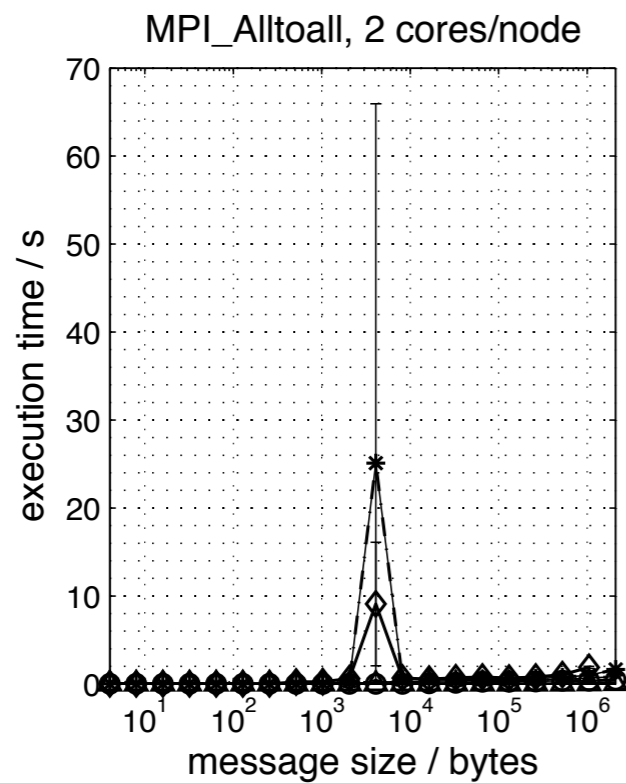
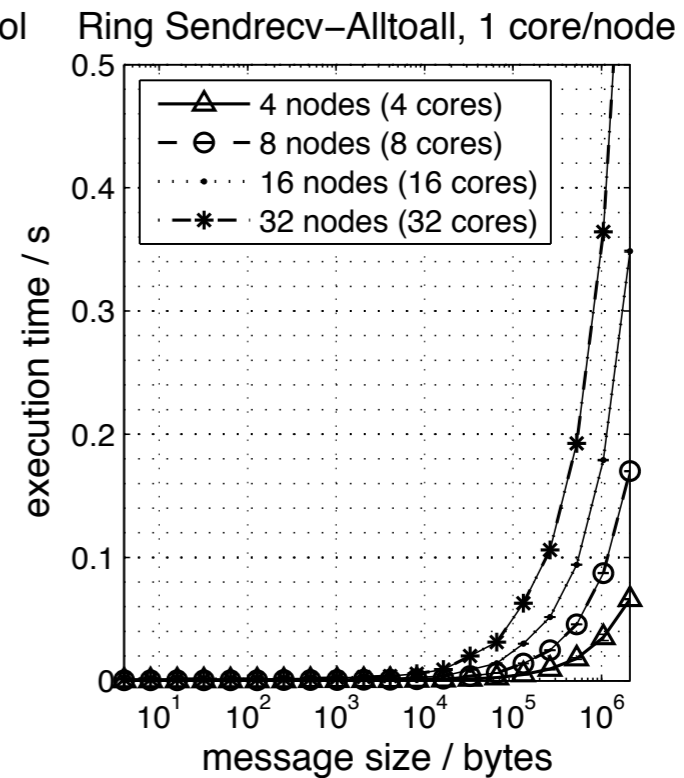
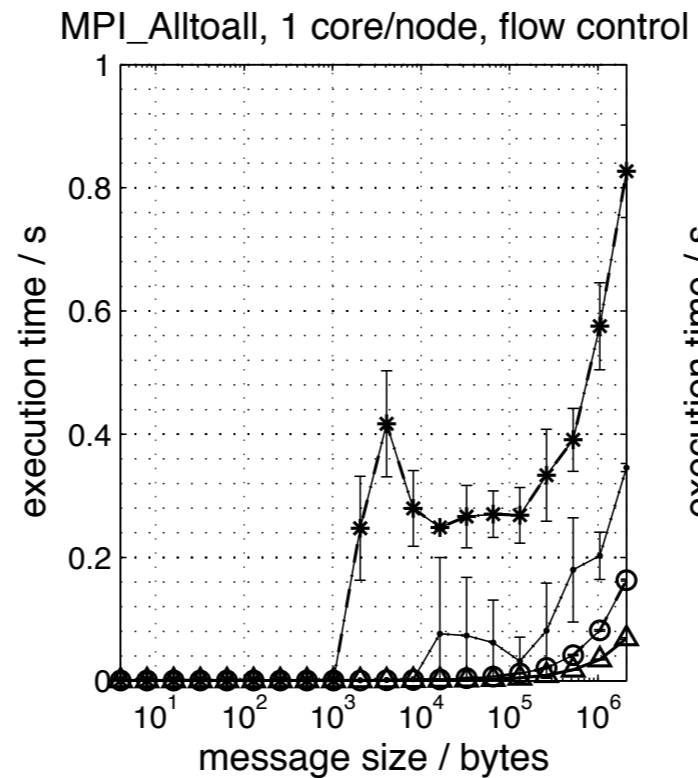
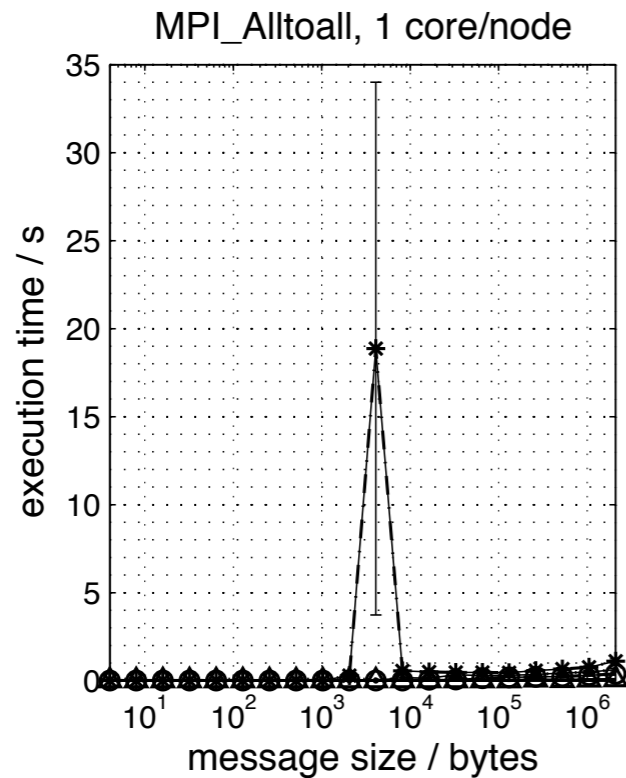


The centers of mass for both pull groups stay within ± 0.2 nm of their equilibrium positions during the whole simulation.

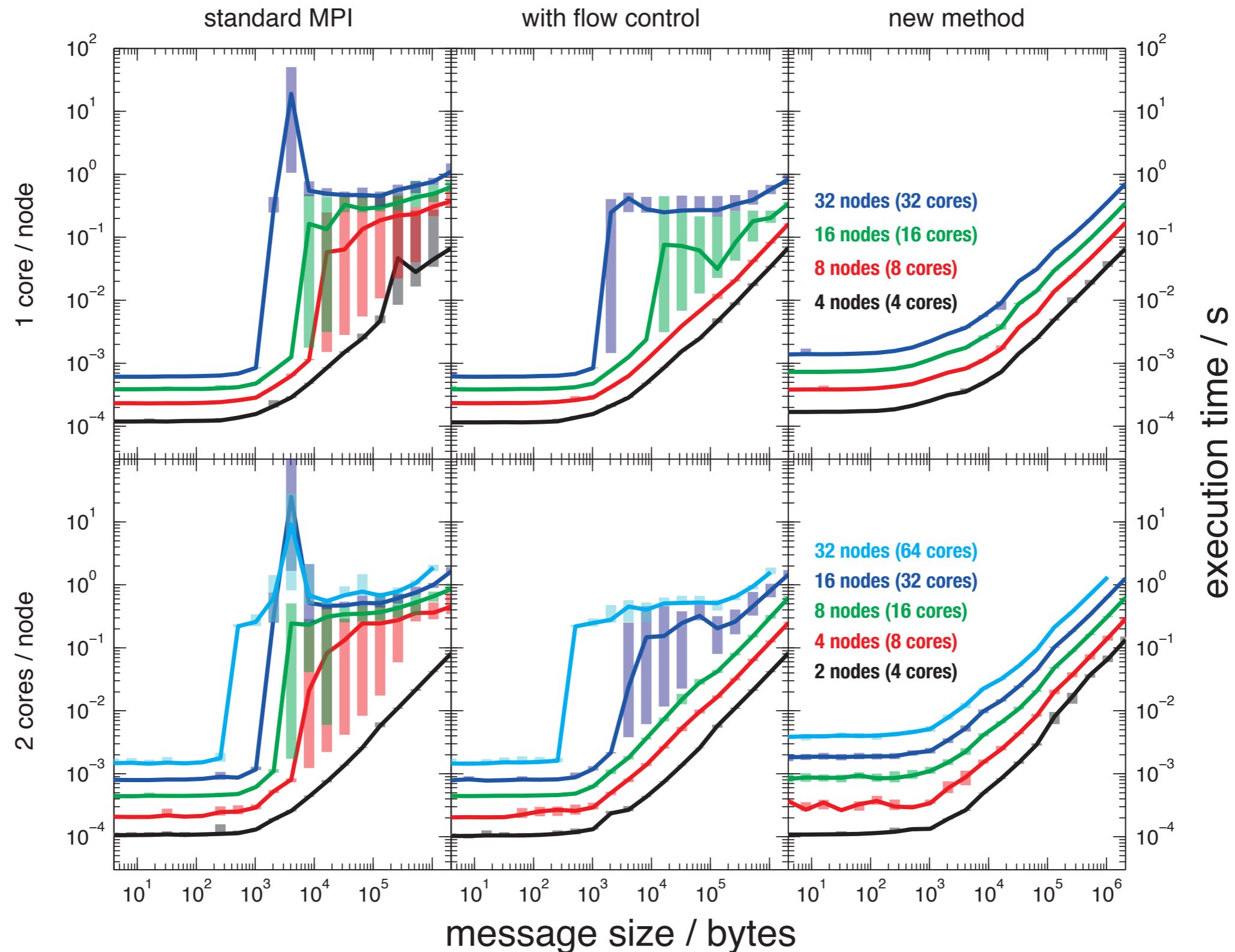


Condense large data sets





Encourage the eye to compare the data



Tables

Tab. 1.1: Coffee consumption per person and year.

Country	2007	2006	2005
Finland	12 kg	11.8 kg	12.6 kg
Norway	9.9 kg	9.6 kg	9.6 kg
Denmark	8.7 kg	9 kg	8.8 kg
Netherlands	8.4 kg	6.7 kg	7.1 kg
Sweden	8.2 kg	7.8 kg	7.8 kg
Switzerland	7.9 kg	8.2 kg	8.7 kg
Belgium/Lux.	6.8 kg	6.6 kg	6.9 kg
Canada	6.5 kg	5.7 kg	5.2 kg
<u>Germany</u>	6.4 kg	5.5 kg	6.1 kg
Austria	6.1 kg	4.2 kg	5.6 kg

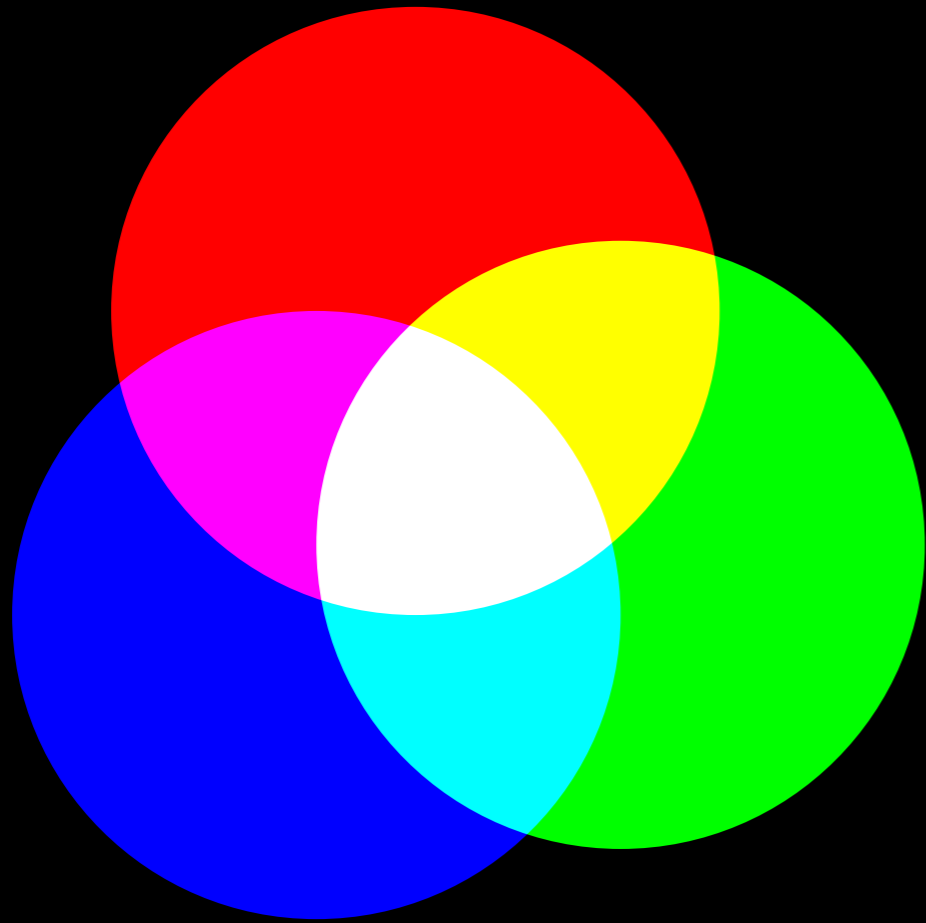
Put units in top row, omit unnecessary lines

Tab. 1.2: Yearly coffee consumption per person.

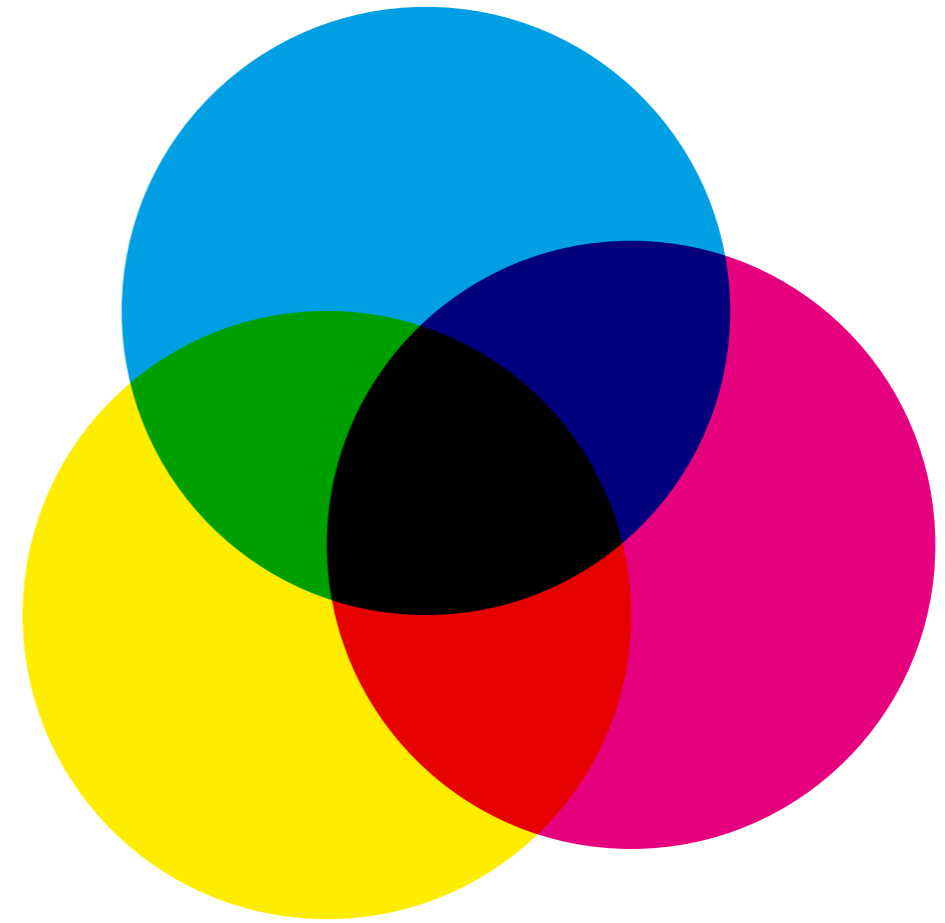
Country	2007 kg	2006 kg	2005 kg
Finland	12.0	11.8	12.6
Norway	9.9	9.6	9.6
Denmark	8.7	9.0	8.8
Netherlands	8.4	6.7	7.1
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Belgium/Lux.	6.8	6.6	6.9
Canada	6.5	5.7	5.2
Germany	6.4	5.5	6.1
Austria	6.1	4.2	5.6

Color

RGB or CMYK?

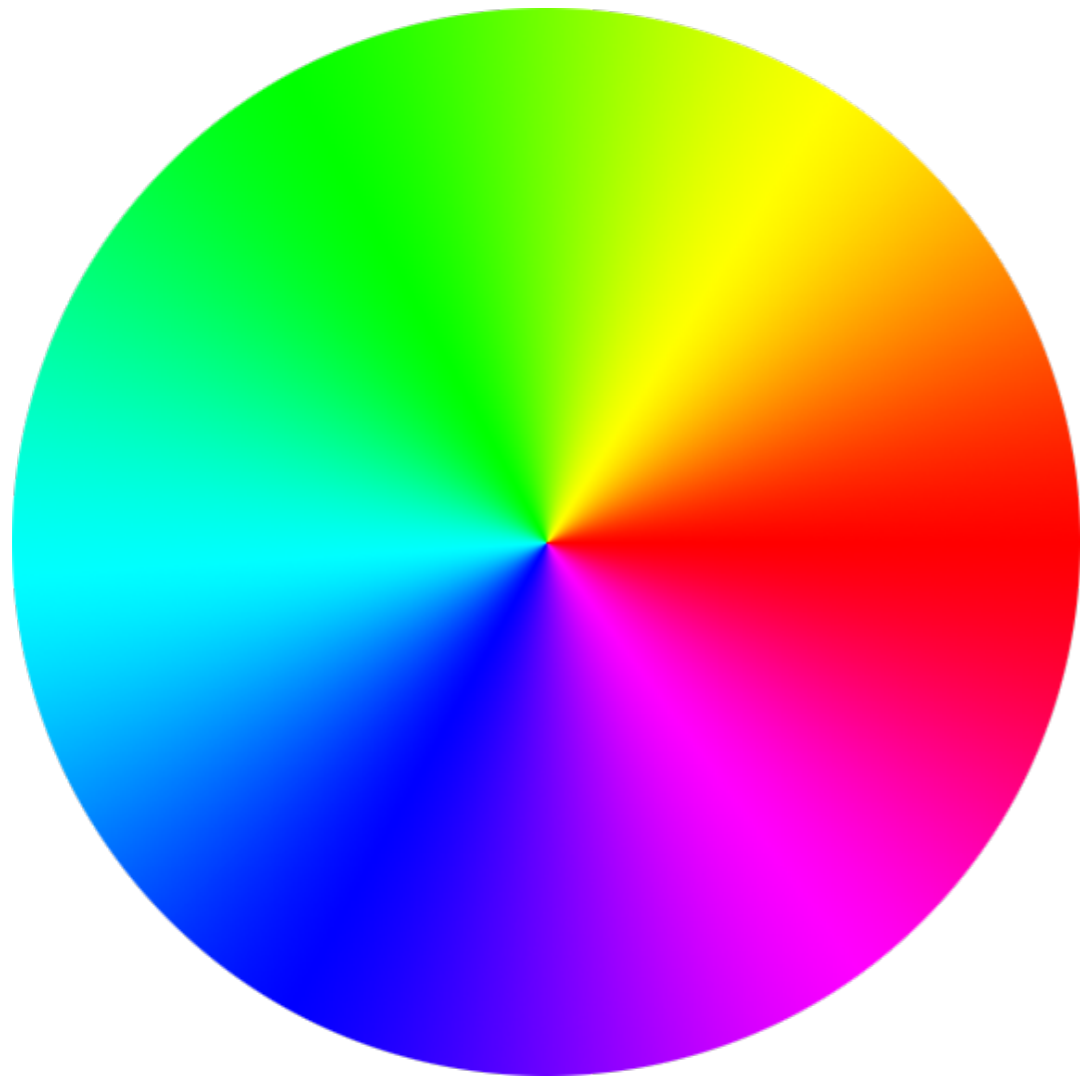


basic colors on a monitor

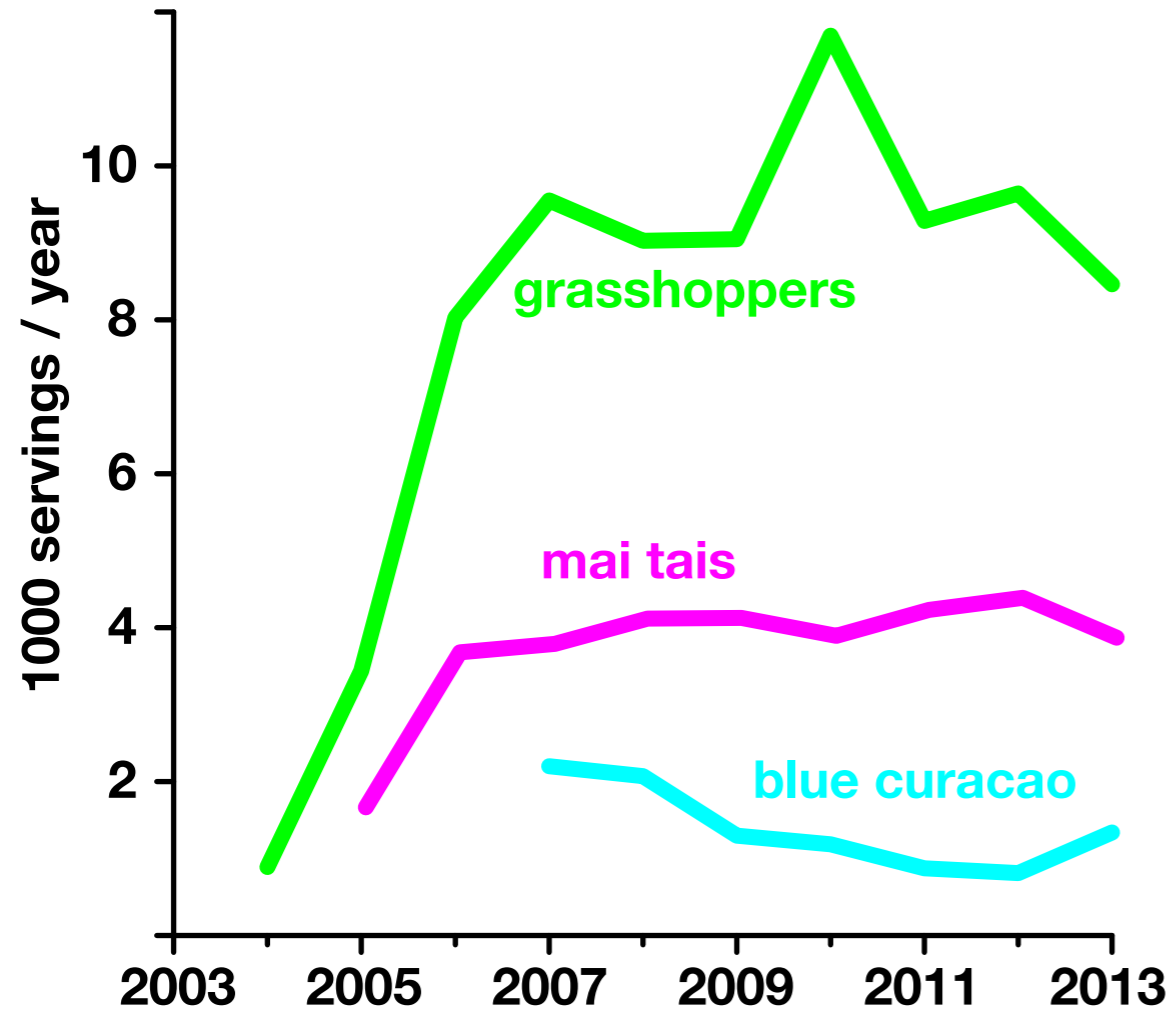


basic colors in print

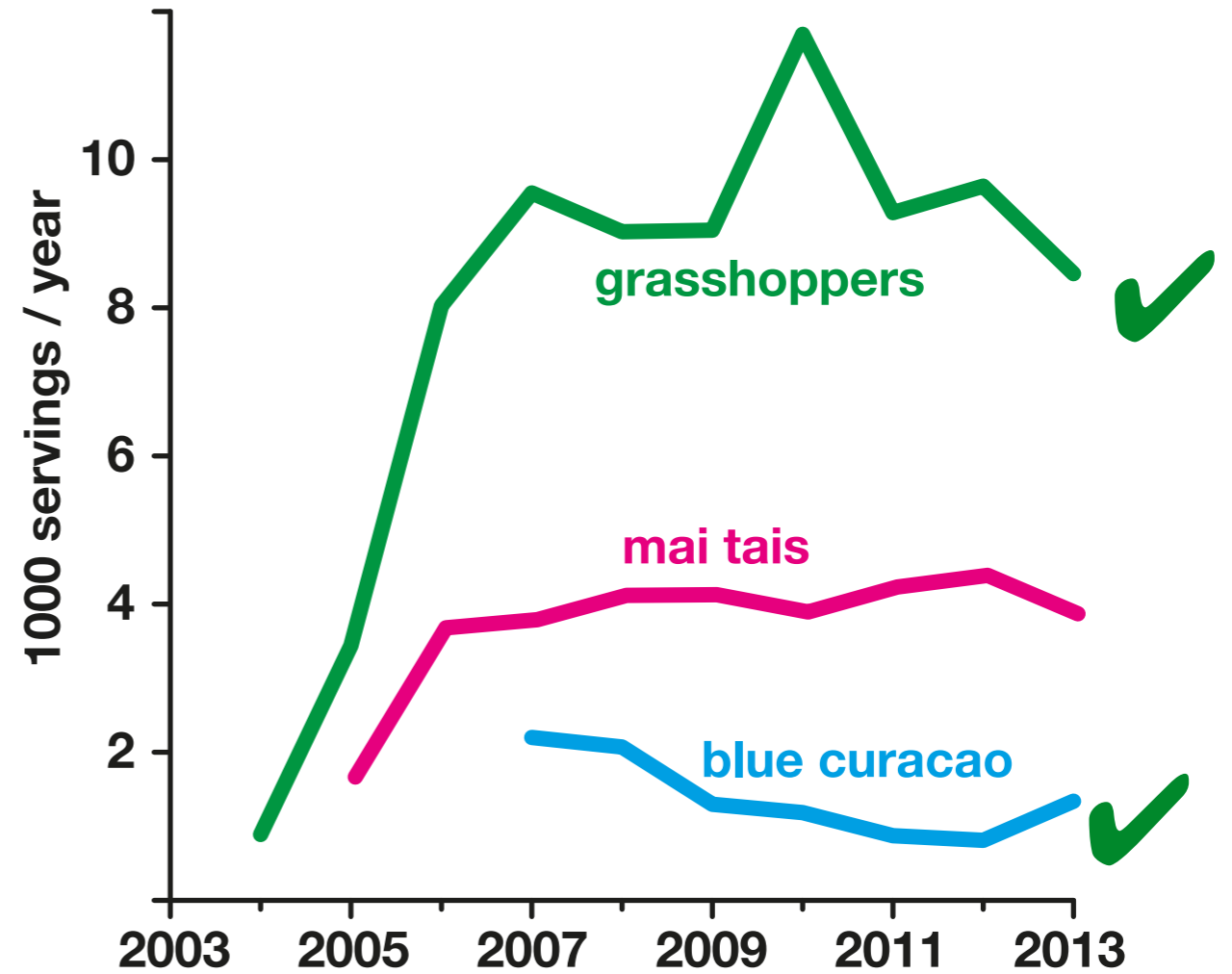
RGB or CMYK?



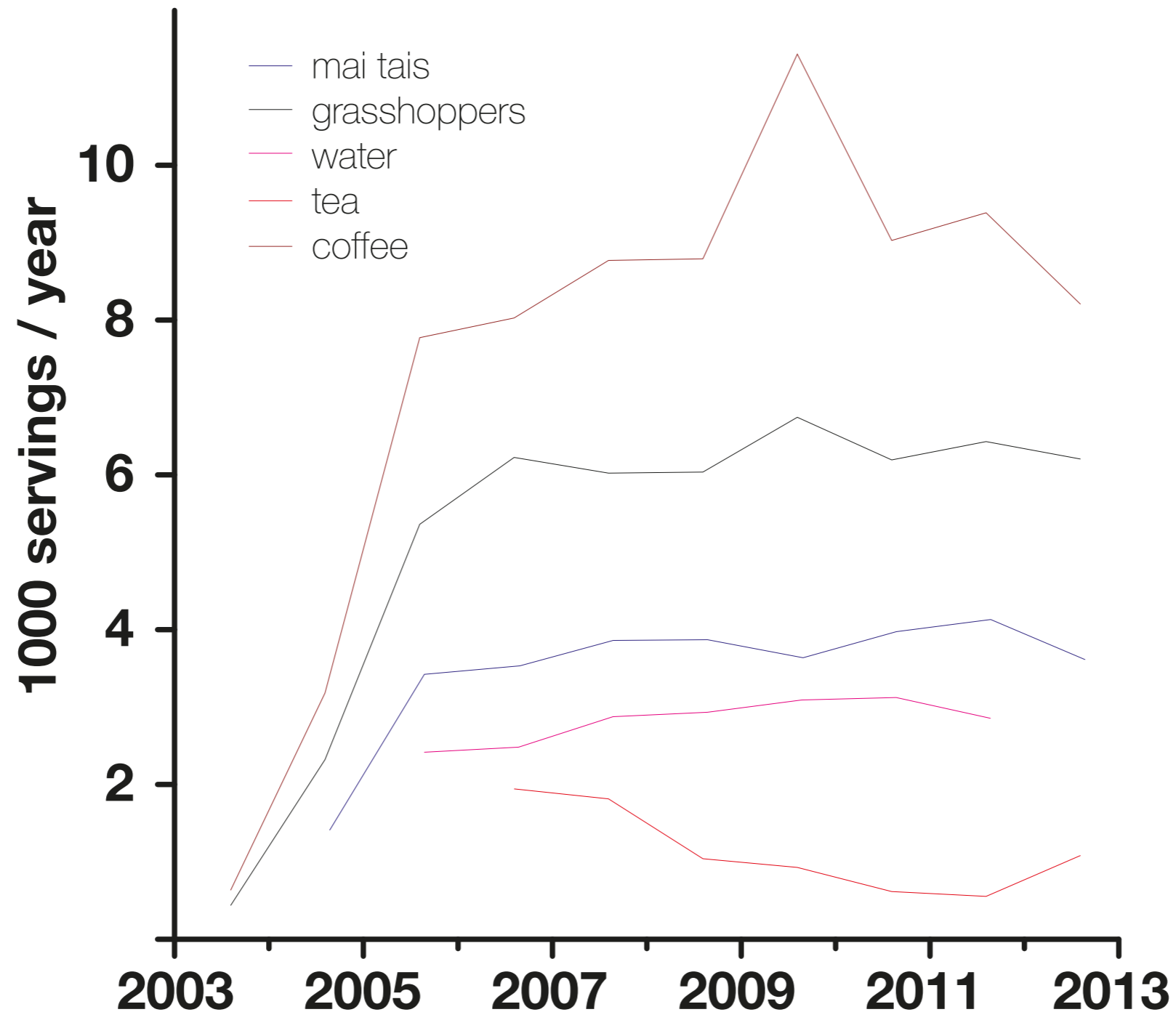
RGB or CMYK?



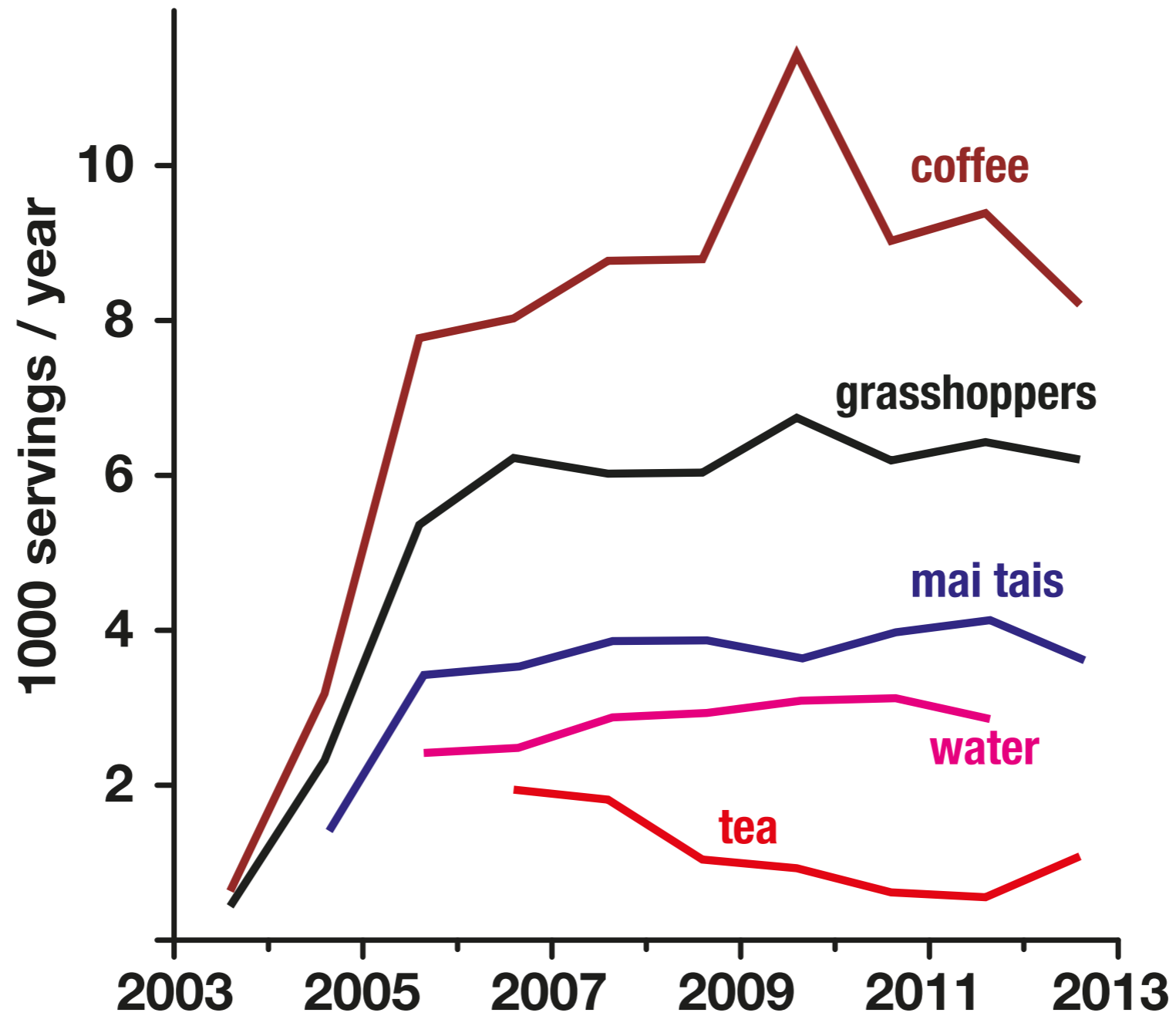
- 0R 255G 0B
- 255R 0G 255B
- 0R 255G 255B



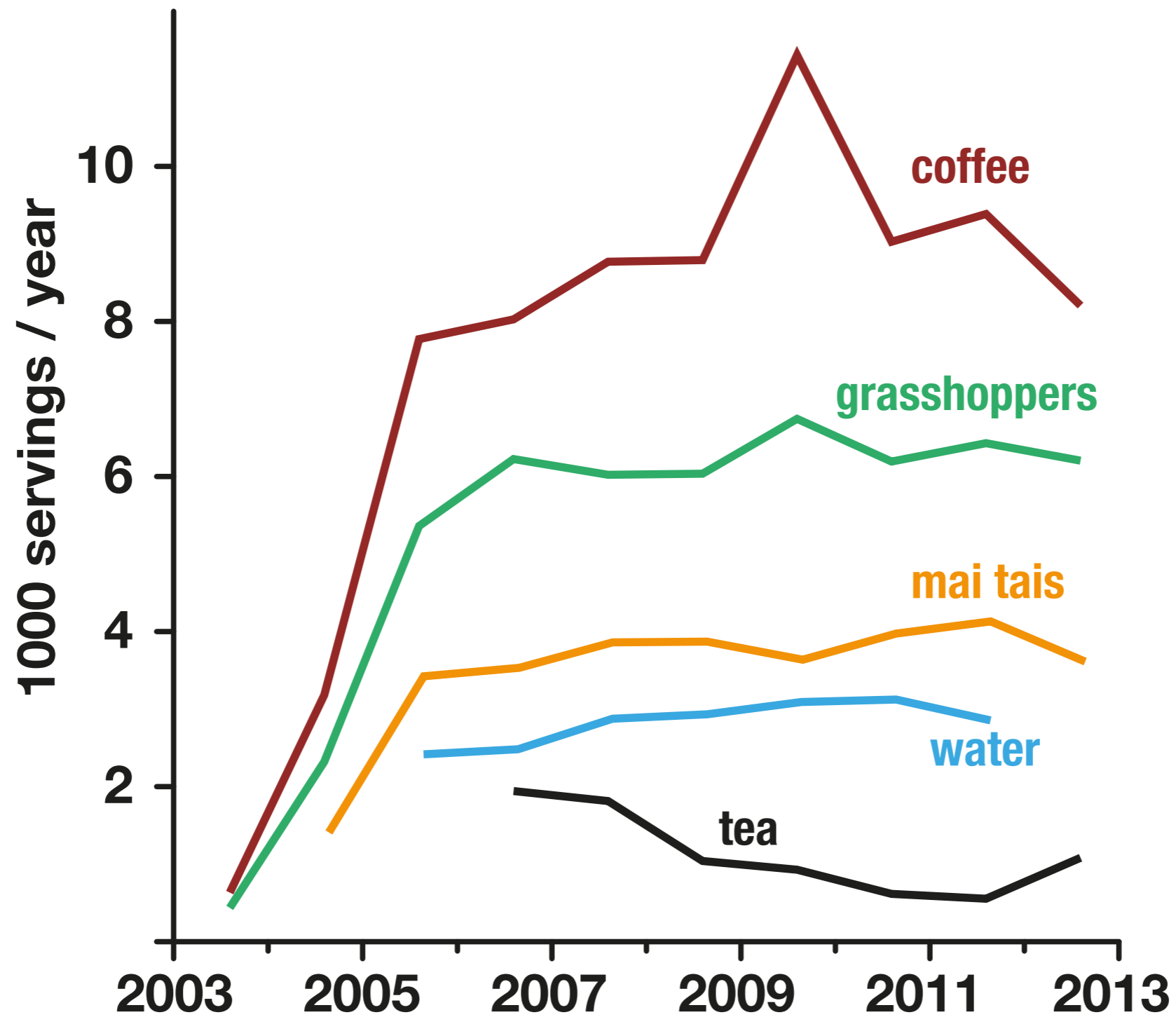
- 100C 0M 100Y 0K
- 0C 100M 0Y 0K
- 100C 0M 0Y 0K



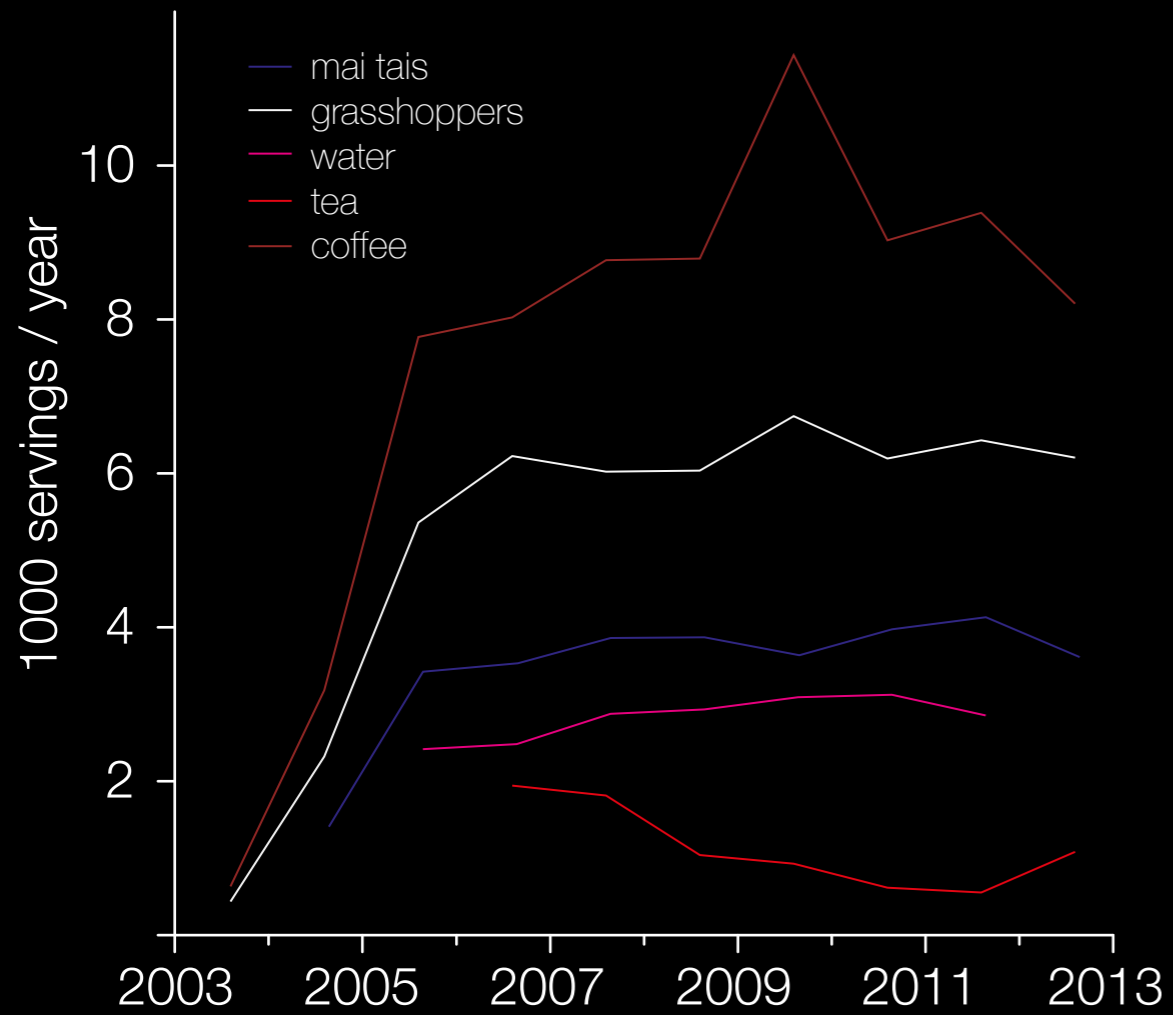
Make lines thick & text bold if colored



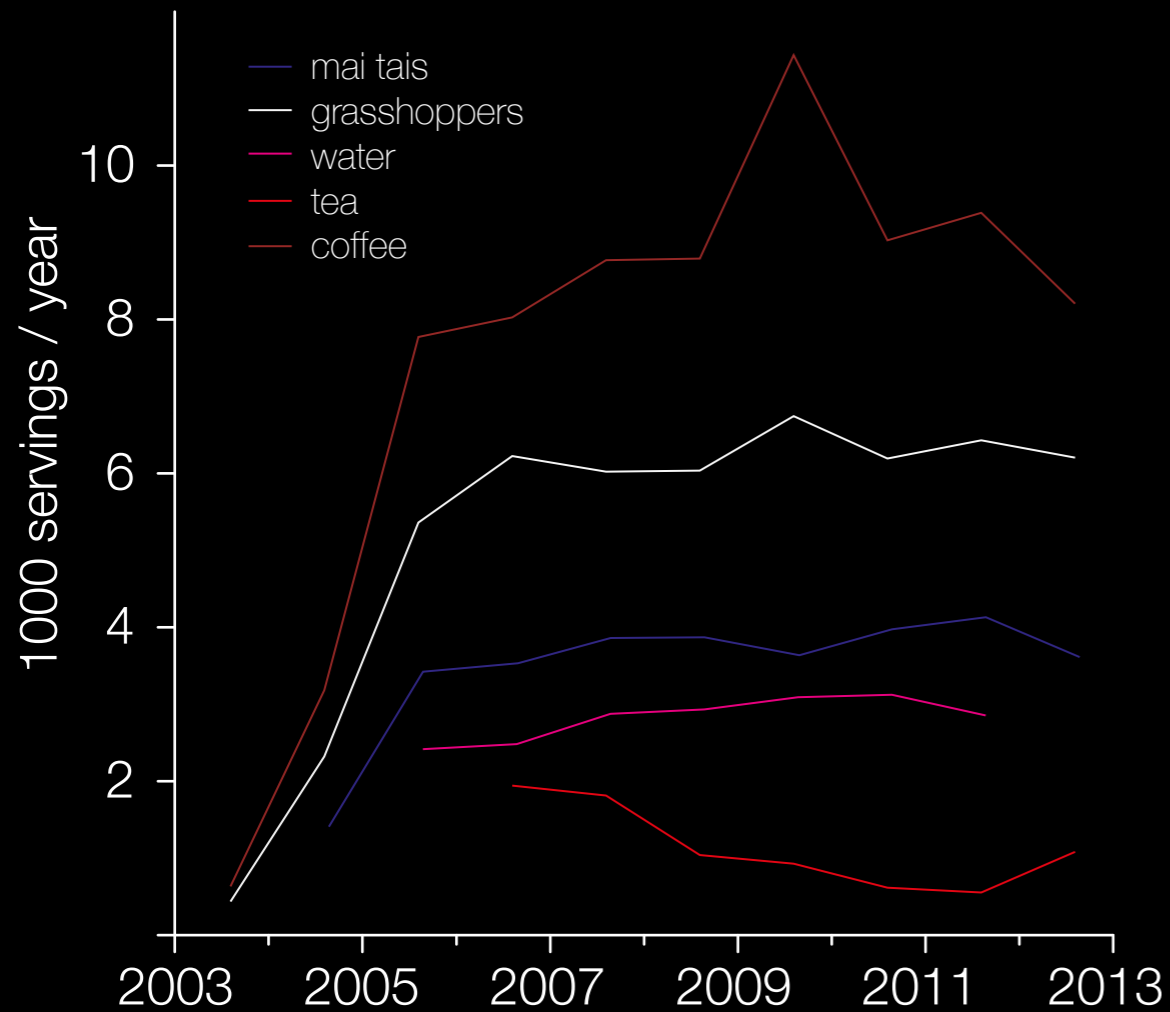
Why not make a choice that is easy to remember?



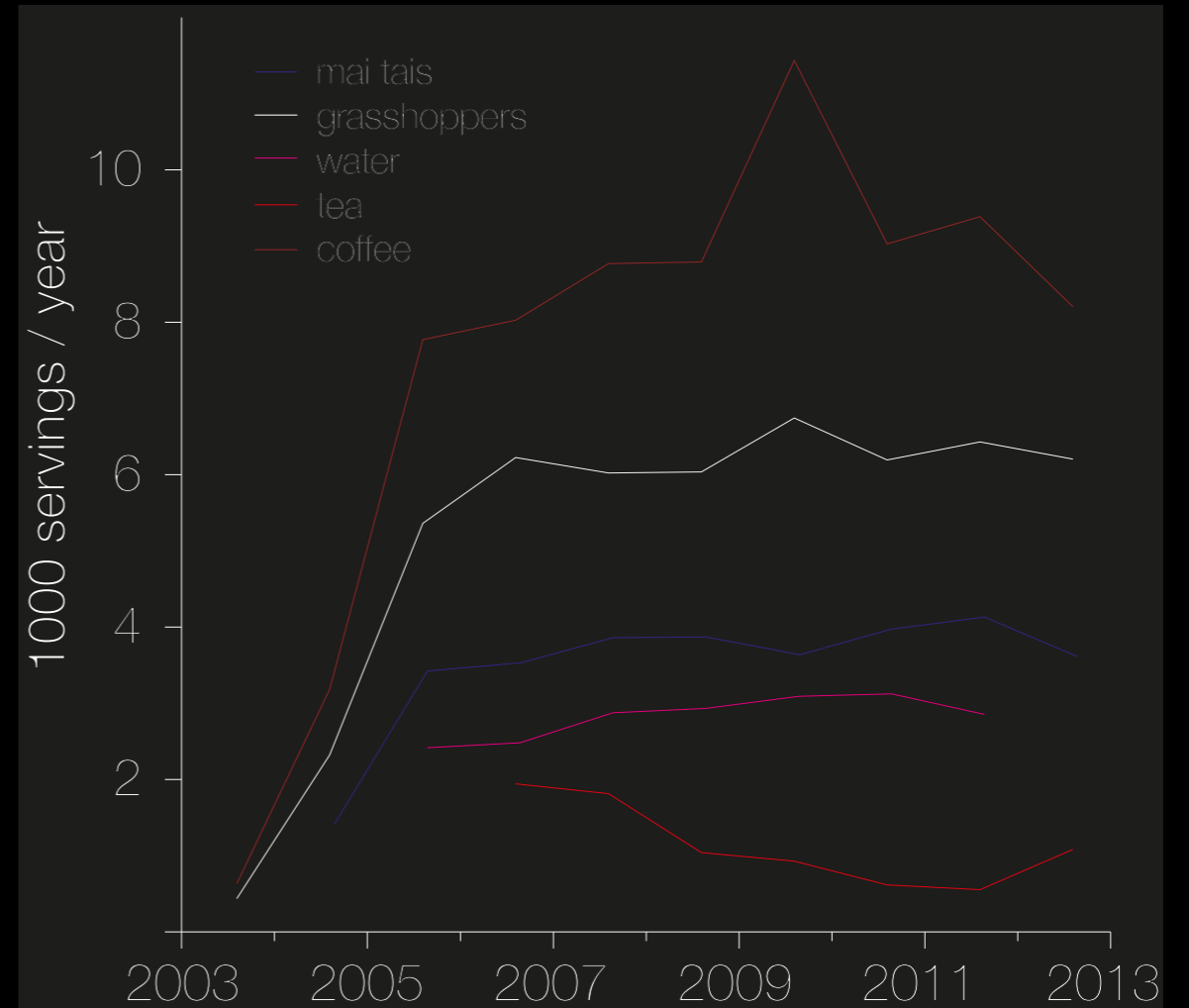
Black or dark backgrounds



Black or dark backgrounds

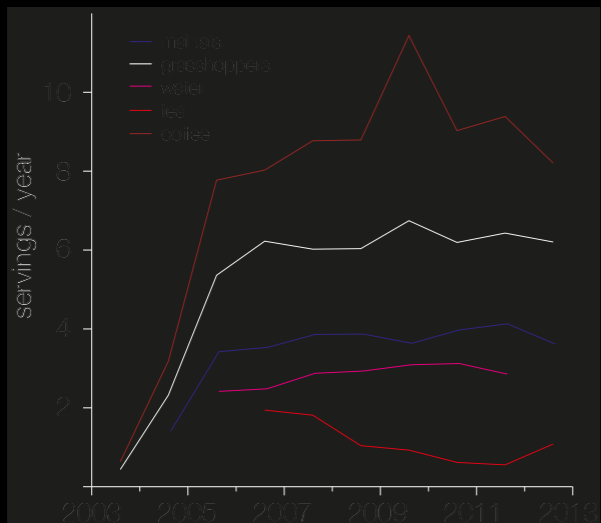
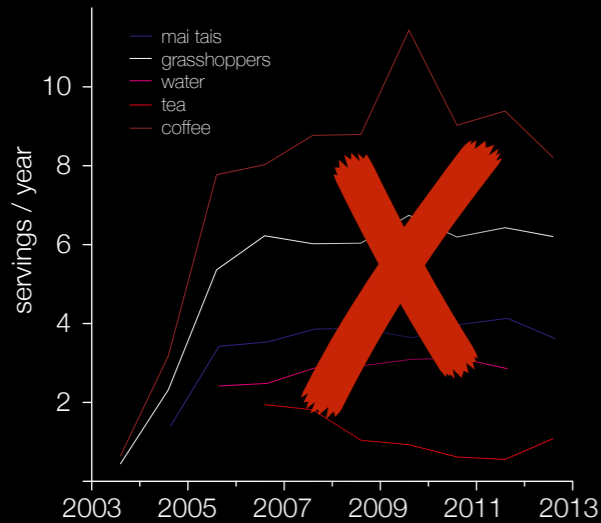


monitor

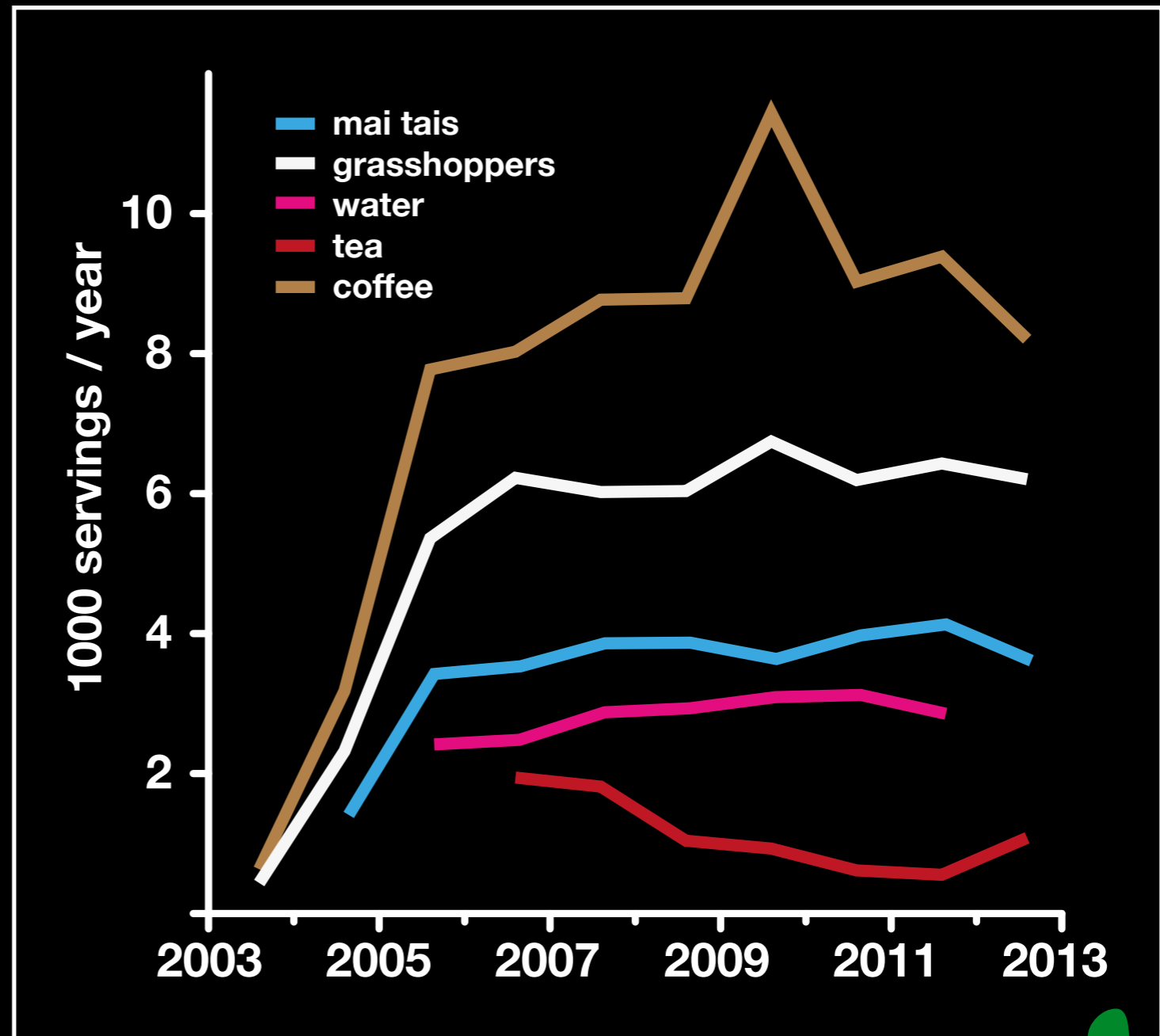


in print :(

Make lines thick & text bold if reversed



in print :(



Summary

How to graph badly

font size too small,
even smaller than the
smallest text in paper

CHART - JUNK

Not using ~~scripts~~...

Not using ~~scripts~~
and therefore ~~having to~~
do the whole ~~thing~~ again...

Not using scripts
and therefore having to
do the whole thing again
over and over.

lines too thin

NO ERROR BARS,
ALTHOUGH NEEDED

missing or unclear labels
on axes or data

no contrast

thin, reversed
text on light
colors

3D PRESENTATION OF 2D DATA

font *illegible*

waste of space

thin text on black

missing units