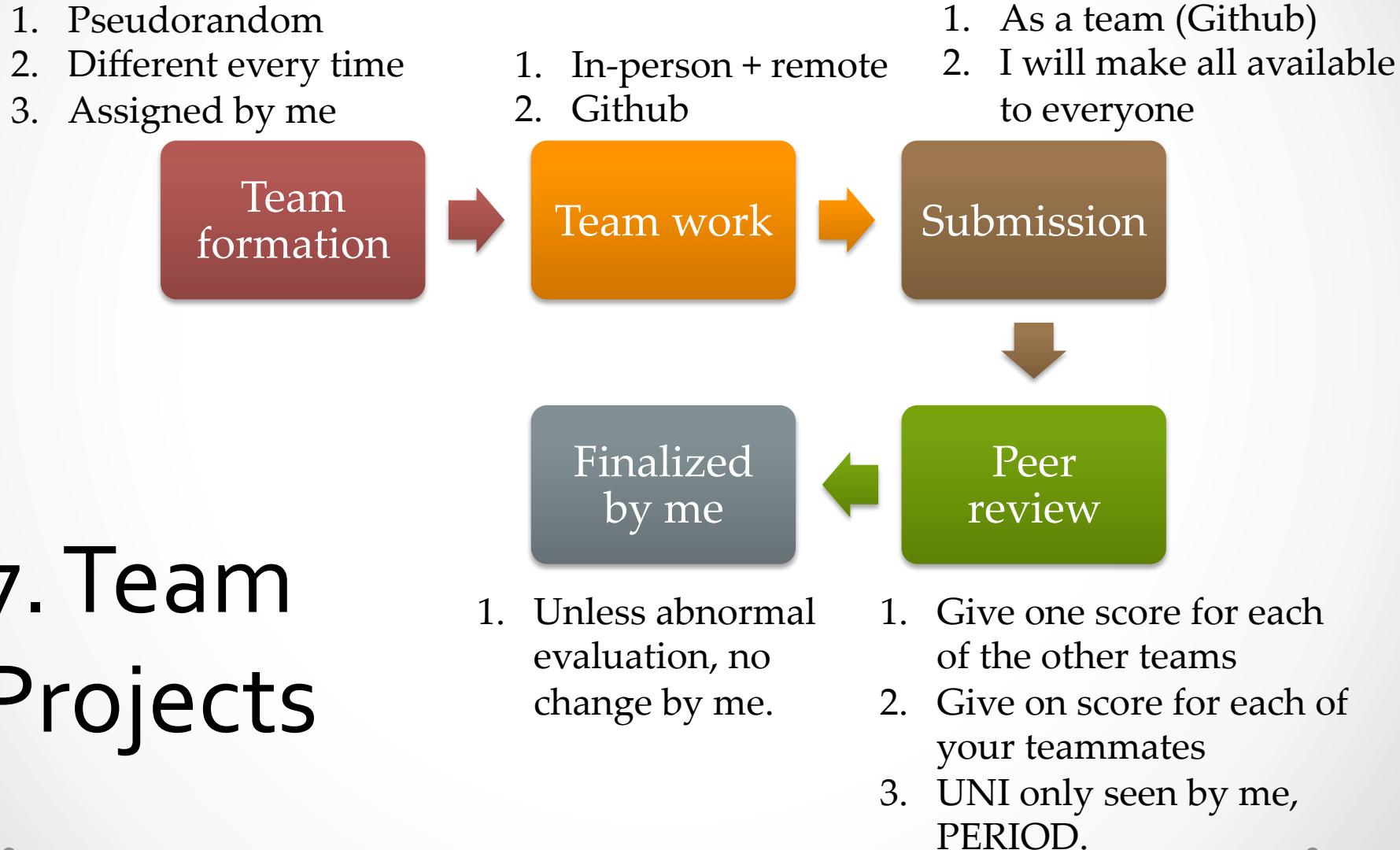
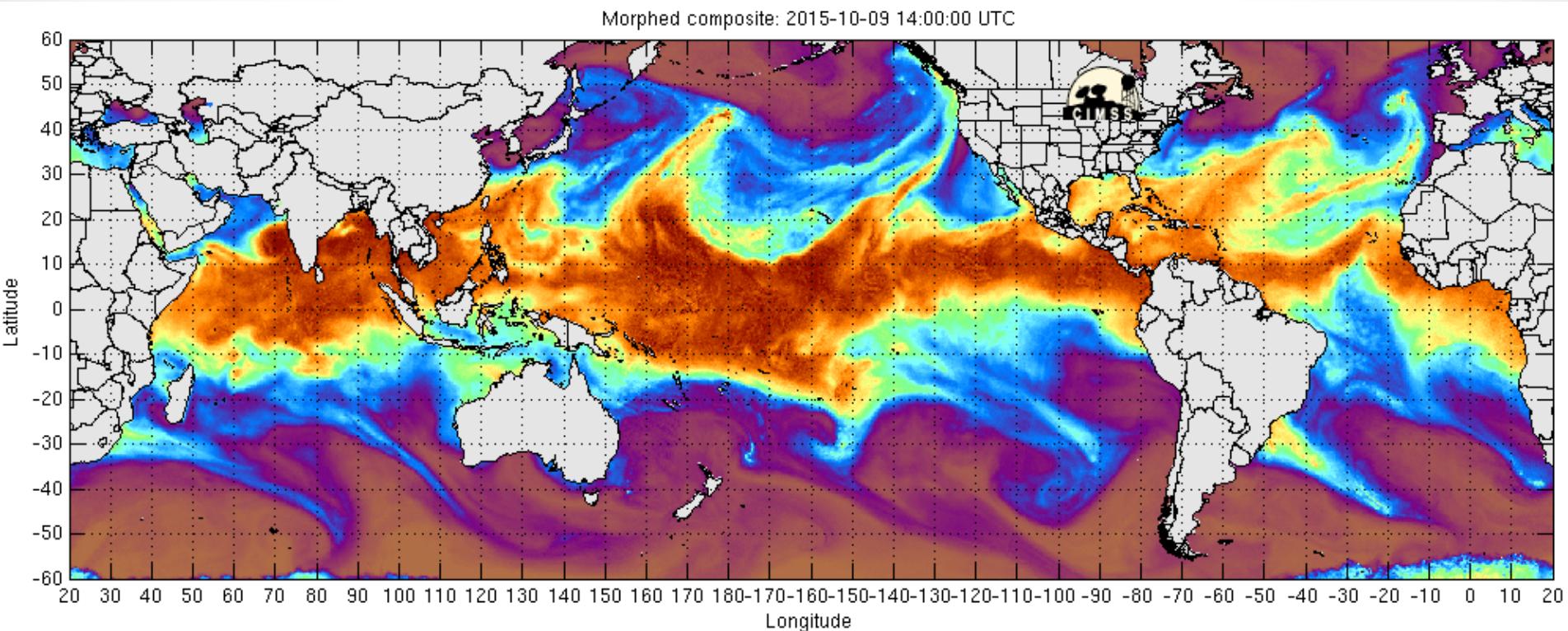


1. Survey (
goo.gl/forms/GpBjYuXuoy)
2. Office Hours @ 903 SSW
3. Email Subject: [4701 EDAV]
4. Waiting List
5. Programming
6. github.com/MRandomMax/EDAV

7. Team Projects

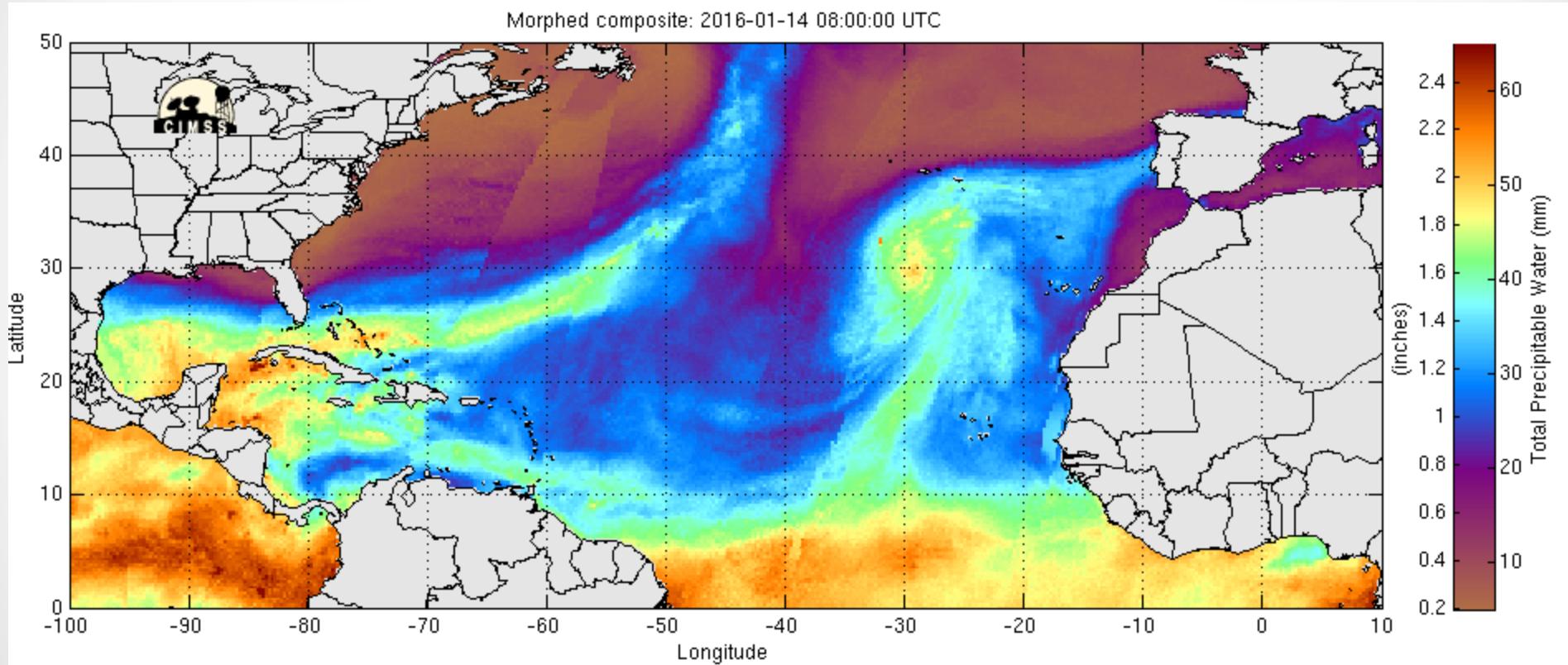


WHY IT RAINS

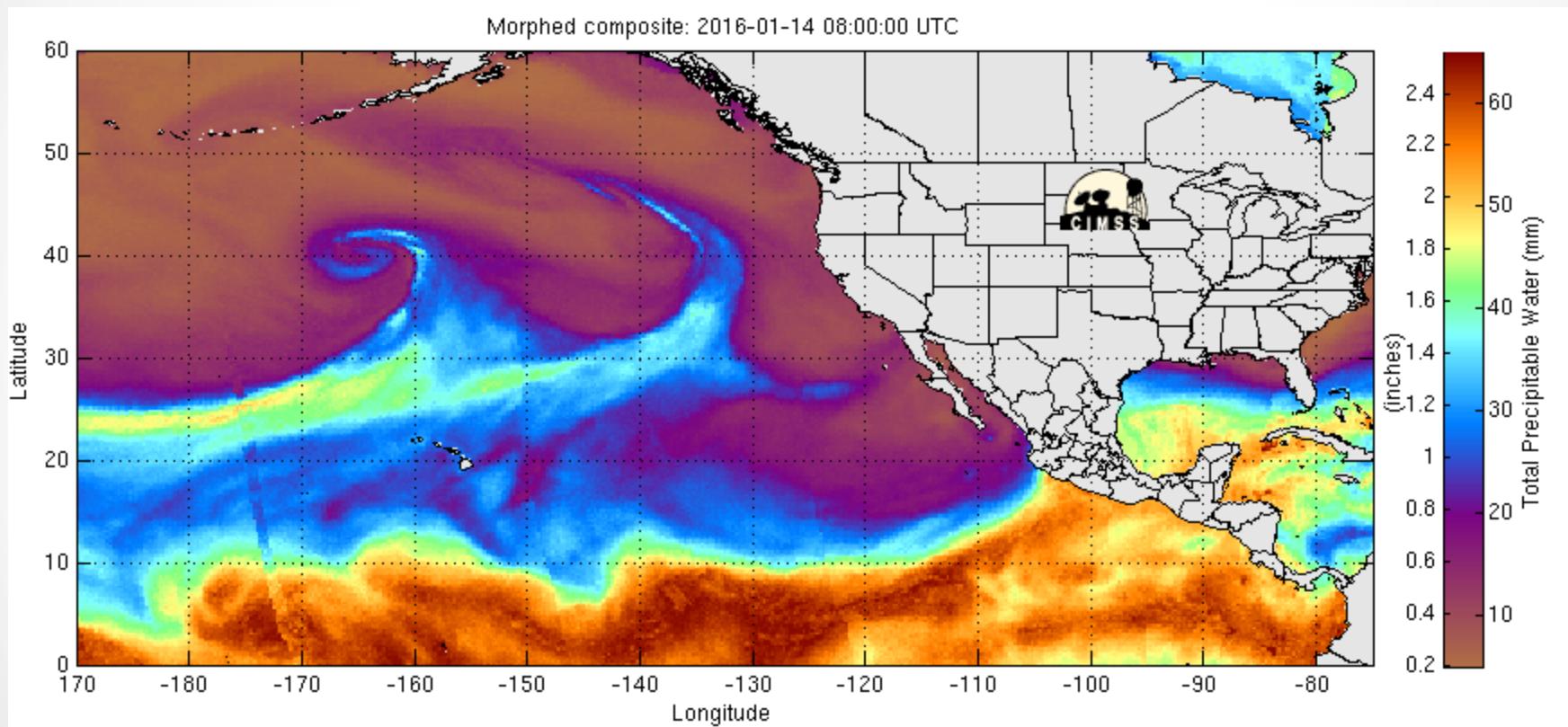


[NOAA/ESRL/PSD](#)
[CW3E SCRIPPS UCSD](#)

EAST COAST



WEST COAST

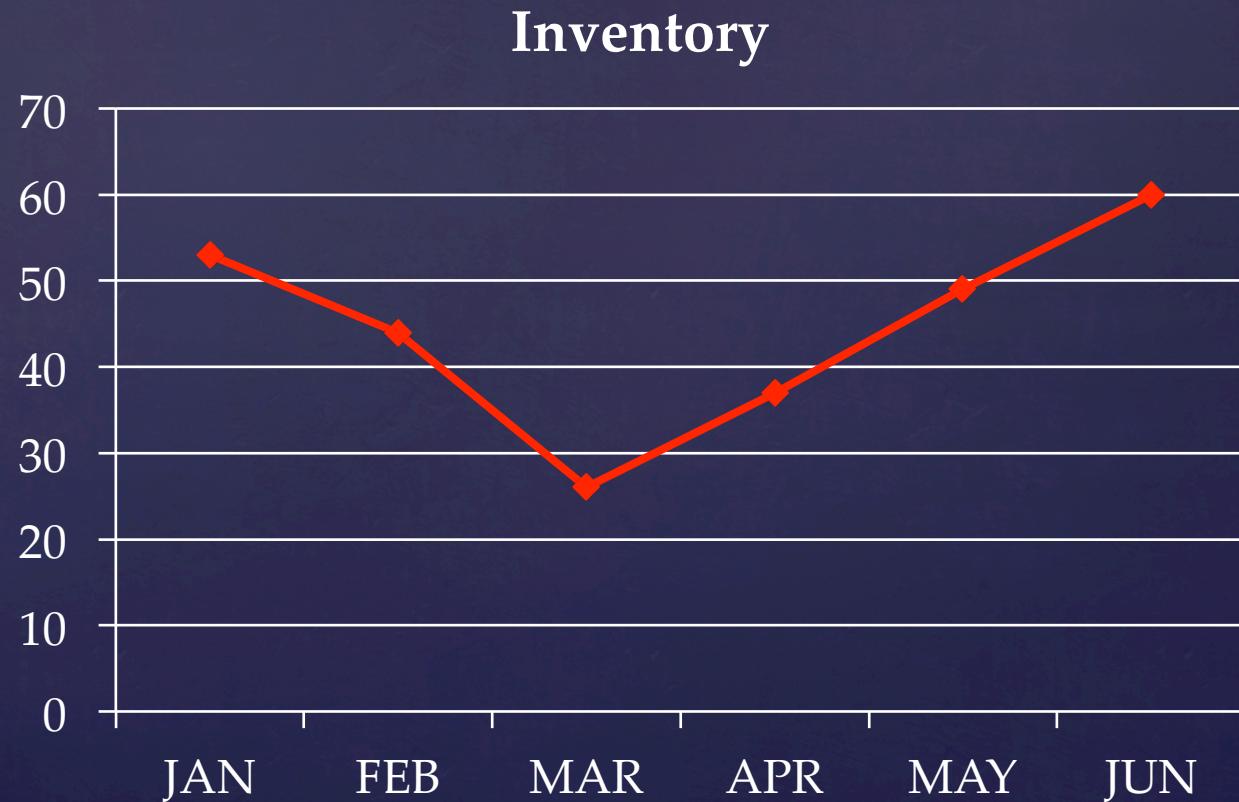


WHY DO WE NEED GRAPHICS?

{ Really necessary?

Which is better?

Month	JAN	FEB	MAR	APR	MAY	JUN
Inventory	53	44	26	37	49	60



WHY GRAPHS

“A picture is worth 1000 words”

- ¶ Discover or answer questions
- ¶ Make massive accessible & See data in context
- ¶ Pattern recognition, signal detection
- ¶ Support calculation, analysis and modeling
- ¶ Provide evidence or present argument
- ¶ Reasoning & Decision – making

and more...

THE ROLES OF GRAPHS

THINK LIKE A
DATA SCIENTIST

What it takes? {

GRAPHS ARE COMPARISON...

{ To find things unexpected

NEXT AMERICA

Percent of U.S. Population by Age Group, 1950-2060

Baby Boomers

MALE

FEMALE

1950

85+

75-79

50-54

25-29

0

4%

2%

0%

2%

4%

PEW RESEARCH CENTER

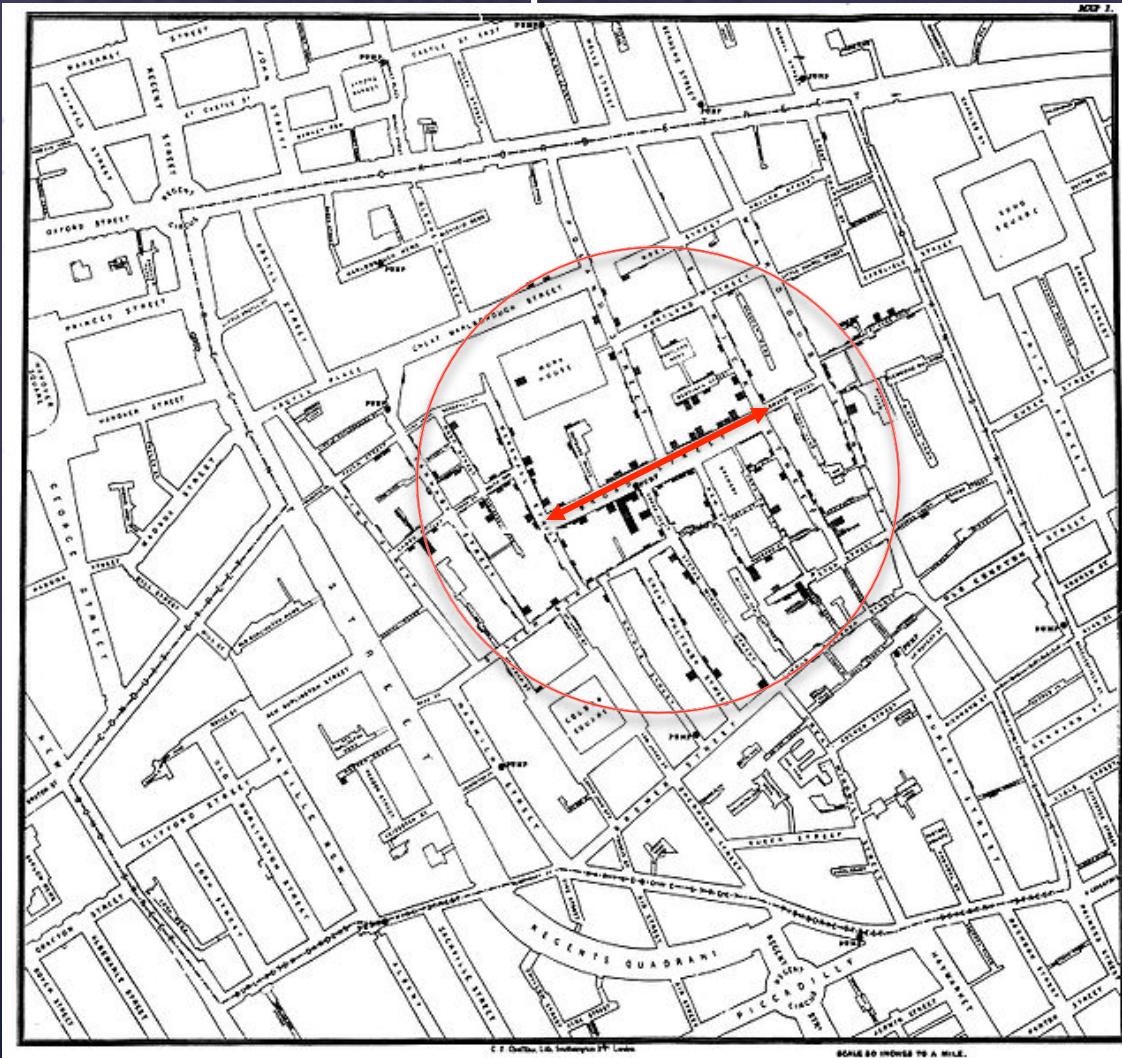
THE JOY OF STATS

BBC FOUR



GRAPHS ARE COMPARISONS

Timeless examples ...



John Snow's Dot Distribution Map of Broad Street Cholera Cases

source: [Wikimedia Commons](#)

LET'S REDRAW WITH R



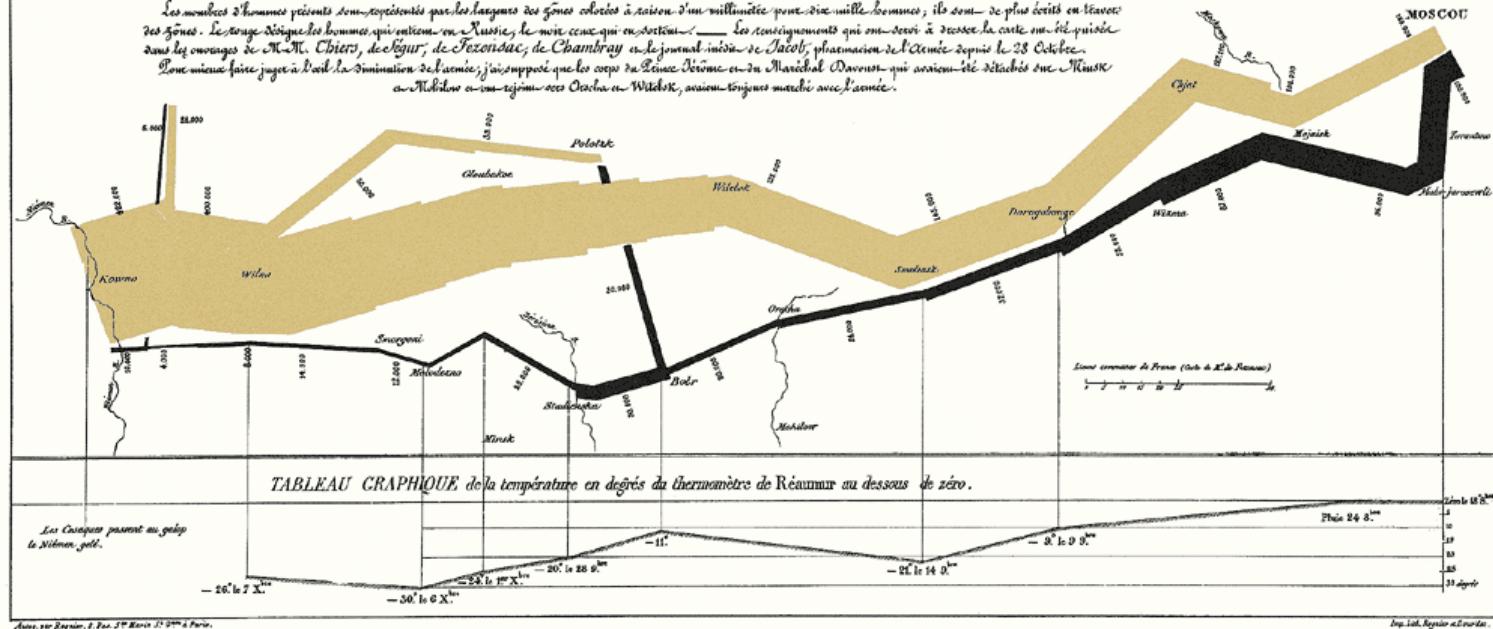
The Night Bivouac of Napoleon's Army during retreat from Russia in 1812. Oil on canvas. *Historical Museum, Moscow, Russia.*

Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.

Deçue par M. Minard, Inspecteur Général resté sous le Charrois au siège de Paris, le 20 Novembre 1869

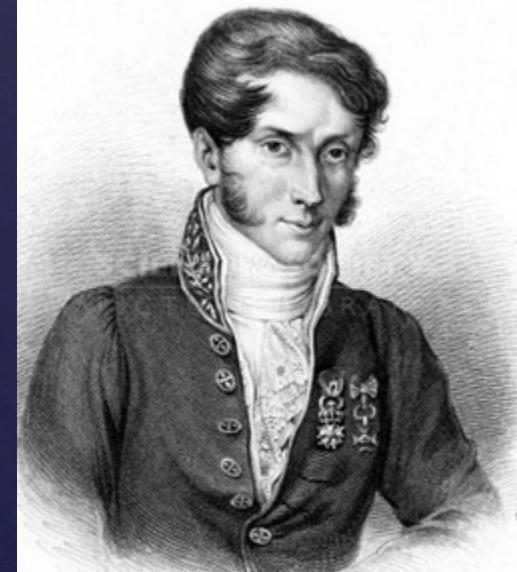
Les nombres d'hommes perdus sont représentés par les largures des zones colorées à raison d'un millimètre pour dix-mille hommes; ils sont de plus écrits en lettres des zones. Le rouge désigne les hommes qui restent en Russie, le noir ceux qui rentrent. — Les renseignements qui me serviront à dresser la carte me dépendent des ouvrages de M. M. Chabot, de Liger, de Tocroisac, de Chambray, du journal intitulé de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'échelle la diminution de l'armée, j'inscris sur les coqs la force établie en Russie, et du Maréchal Davout qui venait d'être détaché sur Moscou au début d'un régime avec Orléans au Witebsk, auquel tout juste marcha avec l'armée.

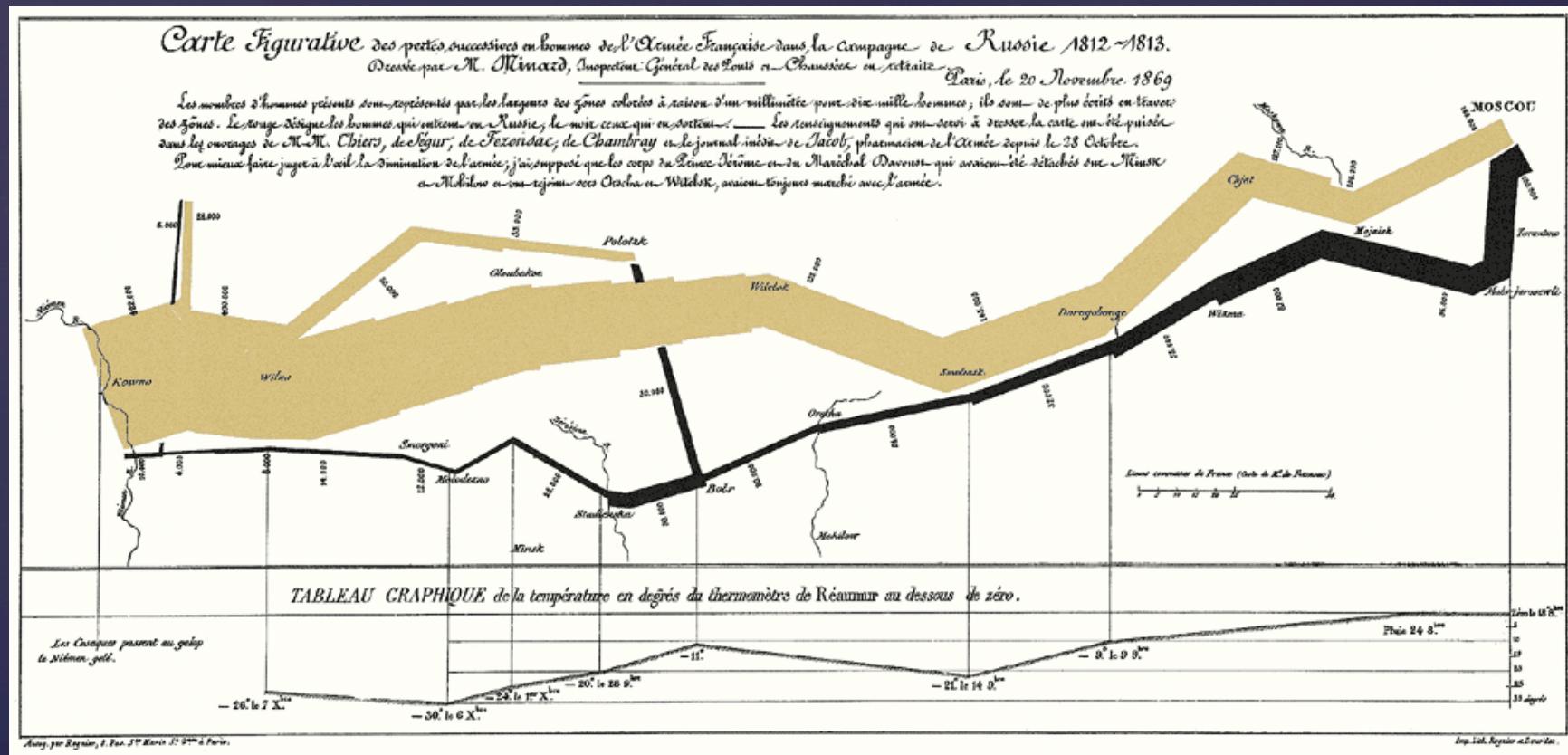


Dep. Lib. Republ. d'Etat.

Charles Joseph Minard



Charles Minard's Visualization of Napoleon's 1812 March

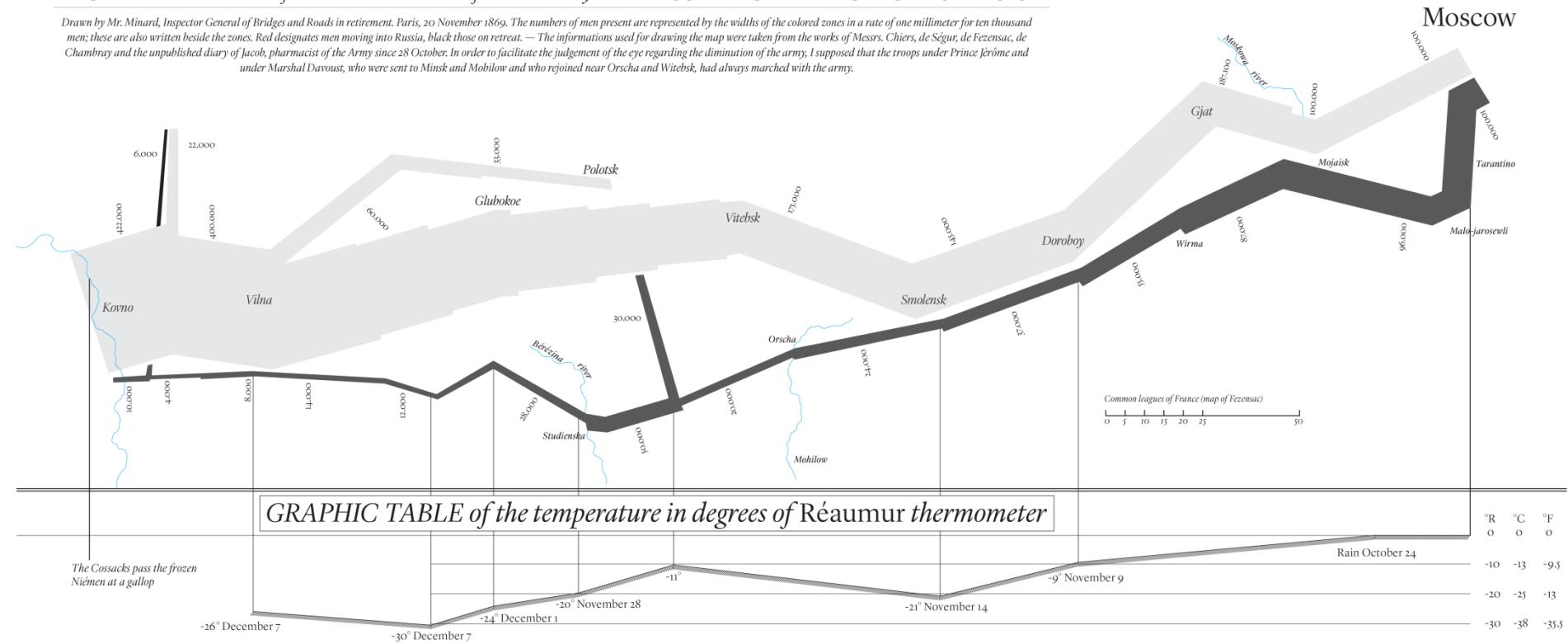


More can be found at: <http://www.edwardtufte.com/tufte/minard>

Modern redraw

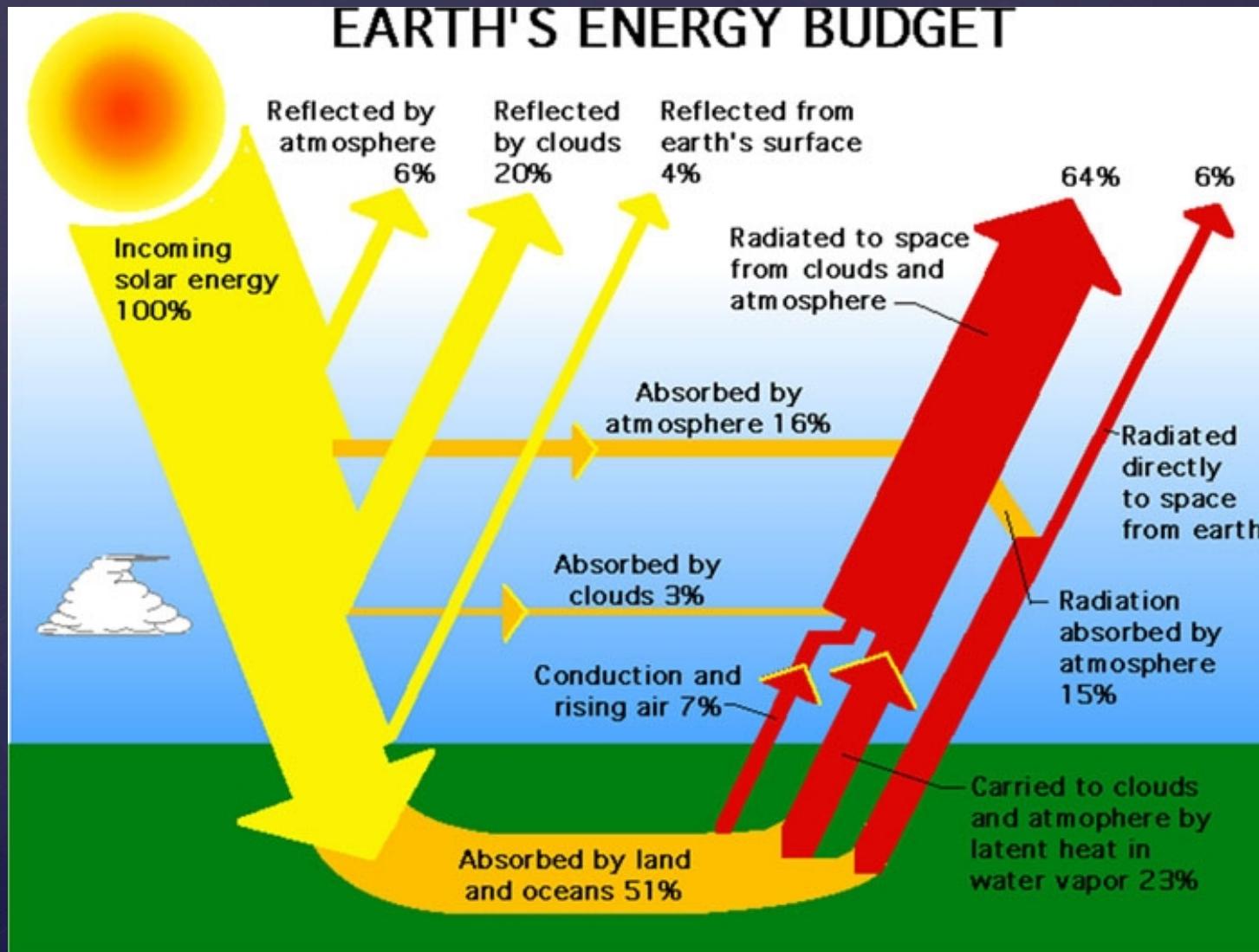
FIGURATIVE MAP of the successive losses in men of the French Army in the RUSSIAN CAMPAIGN OF 1812-1813

Drawn by Mr. Minard, Inspector General of Bridges and Roads in retirement. Paris, 20 November 1869. The numbers of men present are represented by the widths of the colored zones in a rate of one millimeter for ten thousand men; these are also written beside the zones. Red designates men moving into Russia, black those on retreat. — The informations used for drawing the map were taken from the works of Messrs. Chiers, de Ségar, de Fezensac, de Chambray and the unpublished diary of Jacob, pharmacist of the Army since 28 October. In order to facilitate the judgement of the eye regarding the diminution of the army, I supposed that the troops under Prince Jérôme and under Marshal Davout, who were sent to Minsk and Mobilow and who rejoined near Orscha and Witebsk, had always marched with the army.



“it may well be the best statistical graphic ever drawn”, Edward Tufte
 “Minard's map is a “gem” of information graphics, it is the World's Champion Graph”, Howard Wainer
 “His famous map was only one of 51 thematic maps he created during his lifetime, he was a true pioneer in many respects”, Arthur Robinson

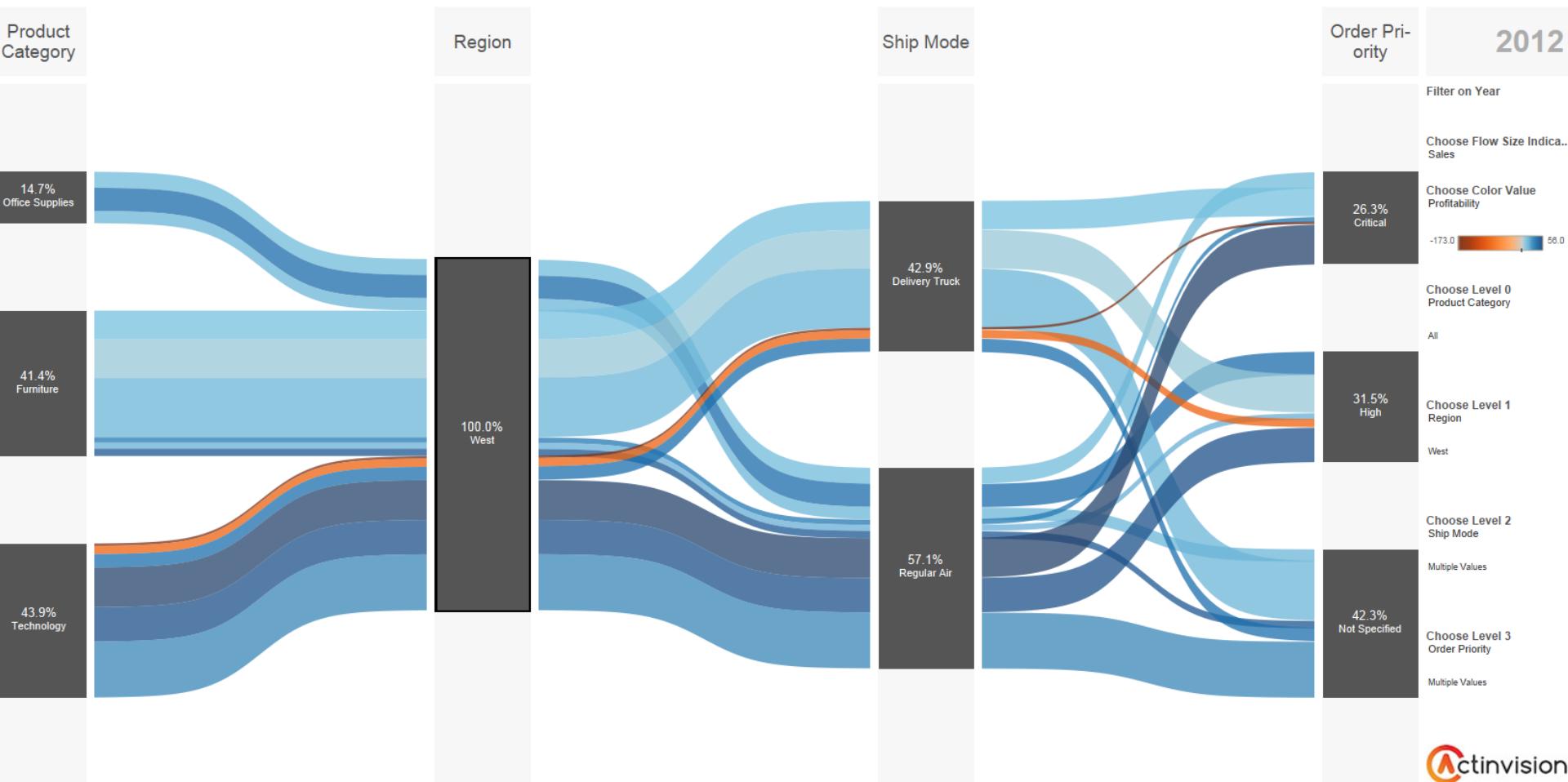
SANKEY DIAGRAM



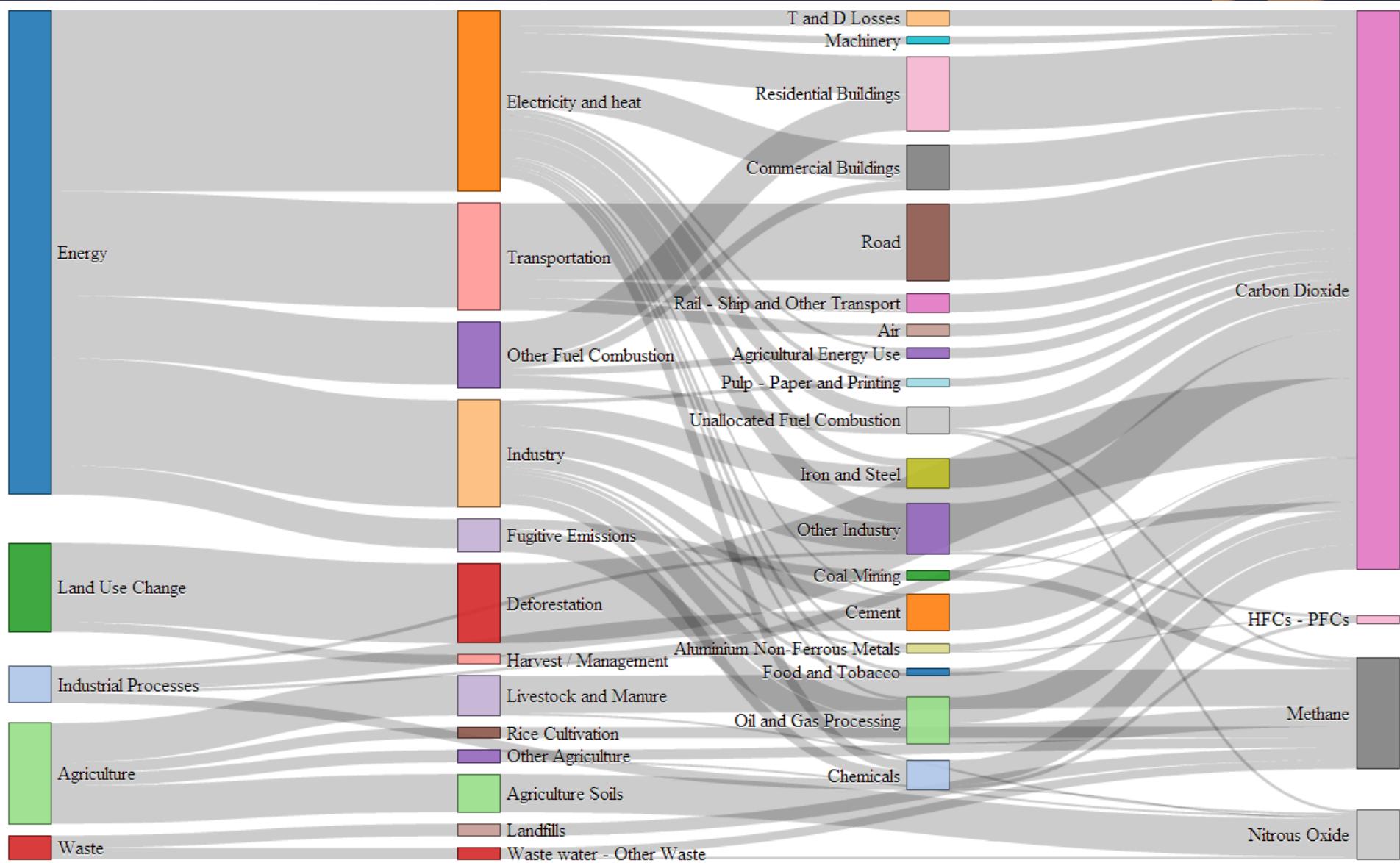
SANKEY DIAGRAM



Superstore Interactive Sankey



SANKEY DIAGRAM



AFTER CLASS

1. Complete the Survey:
2. Get a Github account – learn to fork the repo:

Github.com/MRandomMax/EDAV and check out
the codes I will upload.

3. Your first assignment is coming up next week