

3. Graphs & Plots

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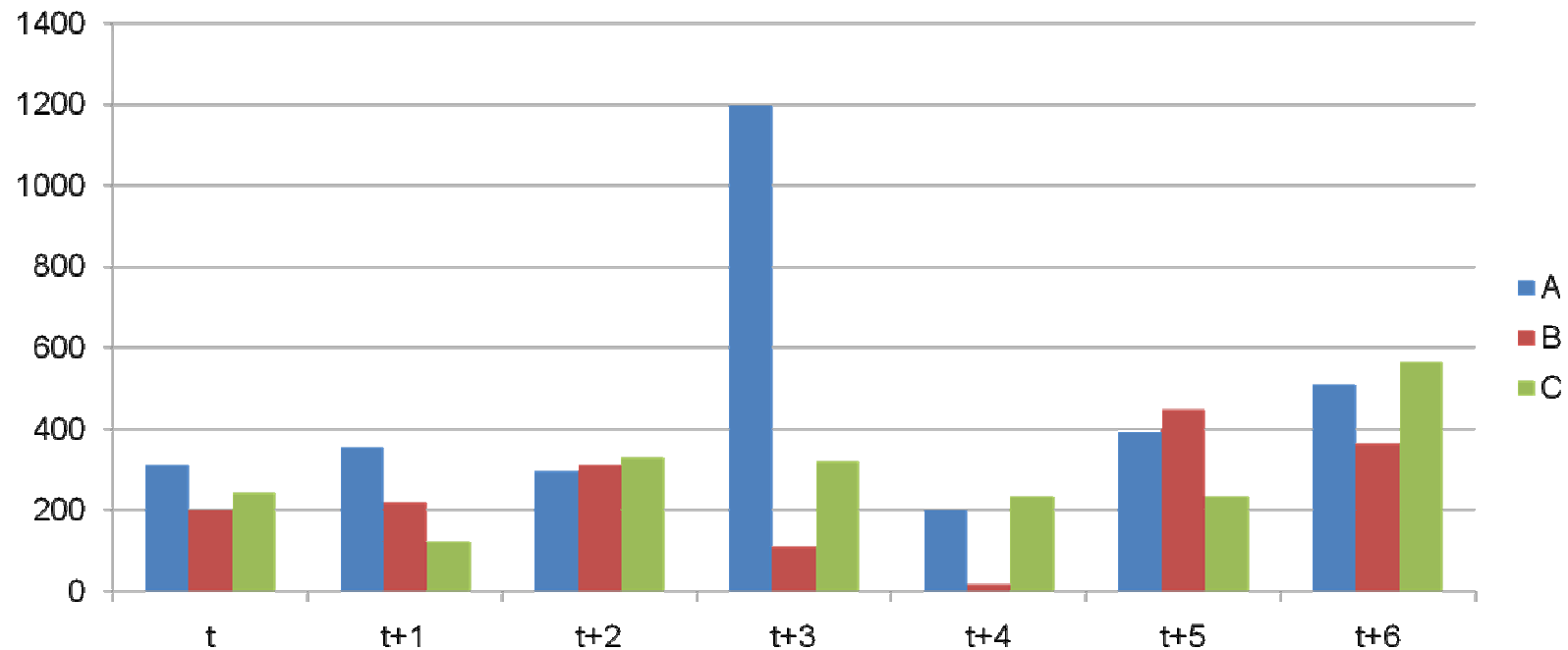
Graphs

- Why use graphs?
 - Help to decipher hidden elements of data
 - Communicate better to stakeholders
 - Improves the quality of report
- But which graph to use when?

Bar diagrams

Time	locations		
	A	B	C
t	313	202	245
t+1	356	220	123
t+2	298	312	332
t+3	1200	111	321
t+4	200	20	234
t+5	398	450	234
t+6	512	367	567

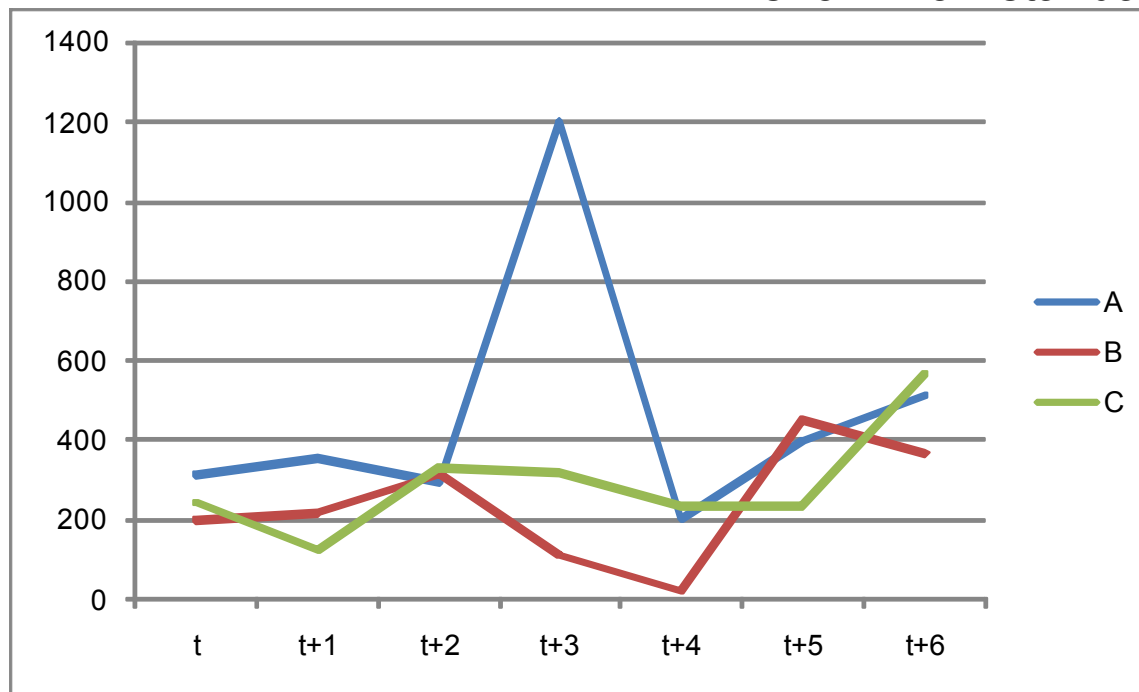
- Case of
- Multiple Monitoring Locations
- Multiple Parameters
- Different time stamps



Line diagrams

Time	locations		
	A	B	C
t	313	202	245
t+1	356	220	123
t+2	298	312	332
t+3	1200	111	321
t+4	200	20	234
t+5	398	450	234
t+6	512	367	567

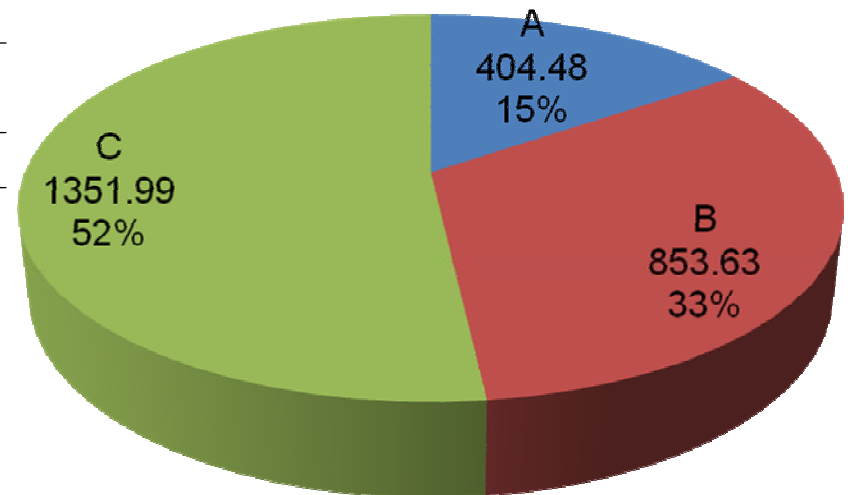
- Show temporal variation
- Multiple locations
- Multiple parameters
- More effective interpretation if lines are shown for “standard”, SE, mean +/- 4 SD



Pie charts

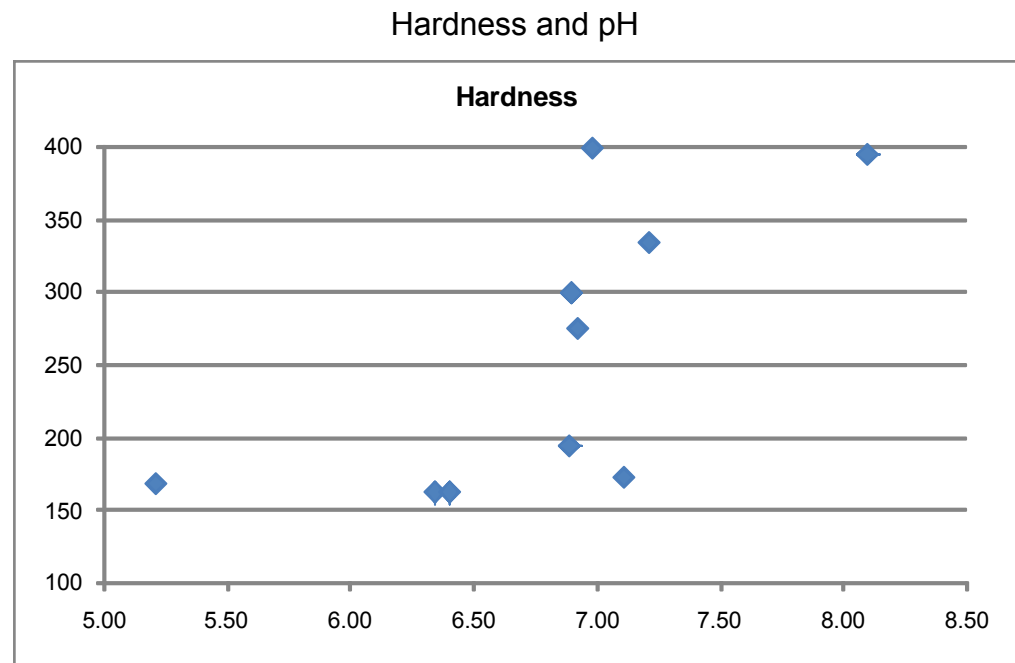
- A versatile plot for showing **relative** contributions (e.g. Ion distribution)
- Data should have some linkages so that $\Sigma(\text{all data points}) = 100\%$ or 1
- Sliced pie charts to “stand out” a parameter

Source	Average TDS (mg/L)	Flow (L/s)	Total TDS Loading Kg/day
A	468.1	10	404.48
B	494.0	20	853.63
C	521.6	30	1351.99



X-Y Scatter plots

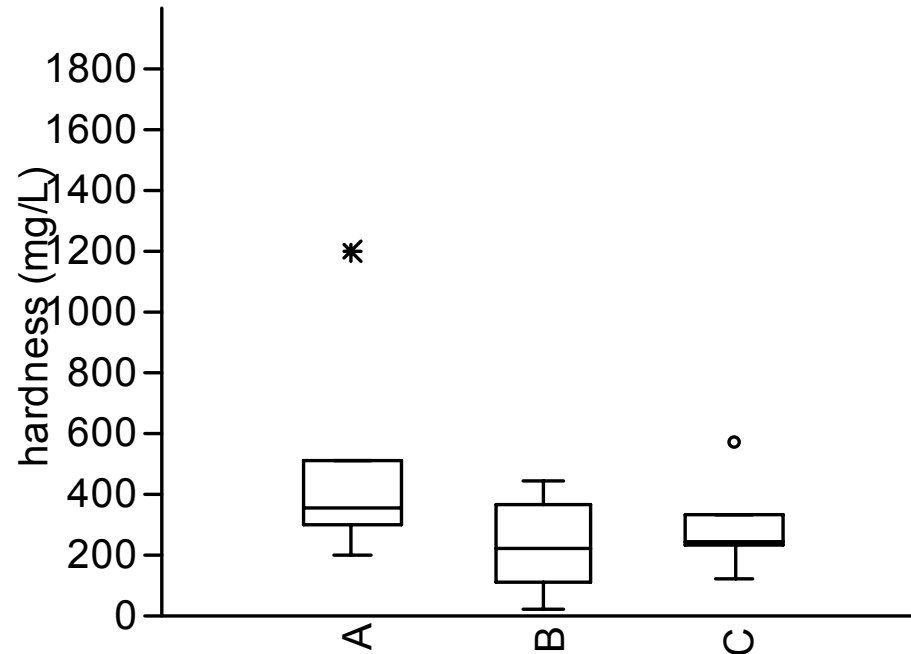
time	pH	Hardness
t	6.92	275.2
t+1	6.89	194.6
t+2	5.21	168.2
t+3	6.34	162.1
t+4	6.40	162
t+5	7.11	172.4
t+6	6.90	298.8
t+7	7.21	334
t+8	6.98	398.3
t+9	8.10	394.8



- **Scatter plot** show relationship between two sets of data
- **Dependant** variable (y) is expressed in terms of the **independent** variable (x)
- Provide insight for regression analysis

Box and Whisker plots

Time	locations		
	A	B	C
t	313	202	245
t+1	356	220	123
t+2	298	312	332
t+3	1200	111	321
t+4	200	20	234
t+5	398	450	234
t+6	512	367	567



a convenient way of graphically depicting groups of numerical data through their five-number summaries: the smallest observation (sample minimum), lower quartile(Q1), median (Q2), upper quartile (Q3), and largest observation (sample maximum). A box plot may also indicate which observations, if any, might be considered outliers.