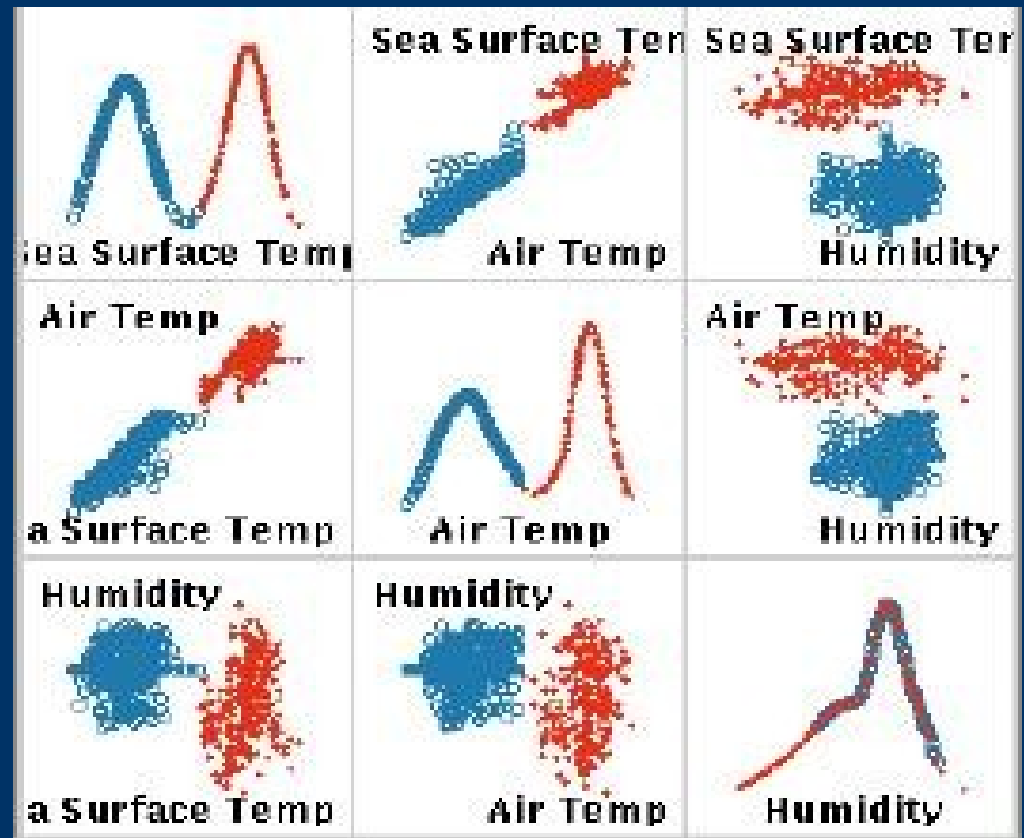# *Visualizing ND data*

- Screen is flat

- 3D projection limited to N=3

- Combining plots > cluttering
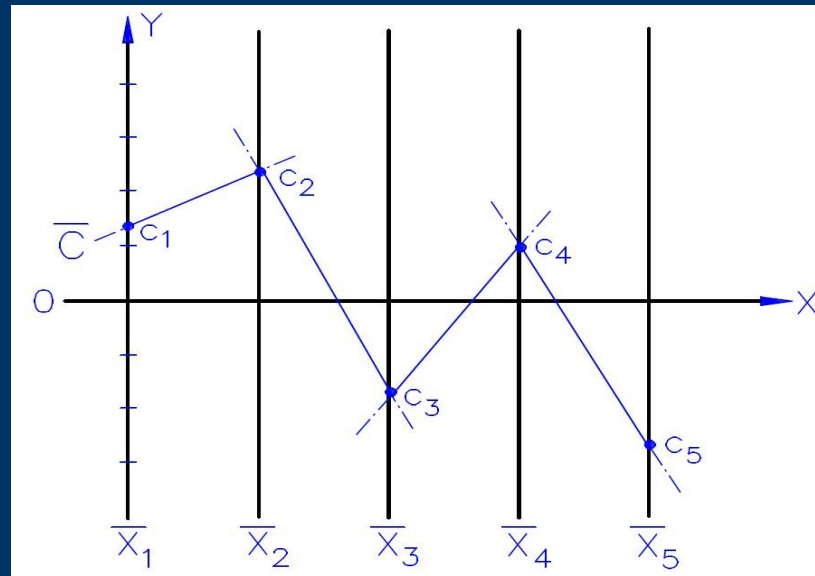
- Solutions?

Scatterplot matrix

- Scatterplot: Graph used in statistics to visually display and relate two numerical variables of a multidimensional data set by displaying the data as a collection of points, each having one coordinate on a horizontal and one on a vertical axis.
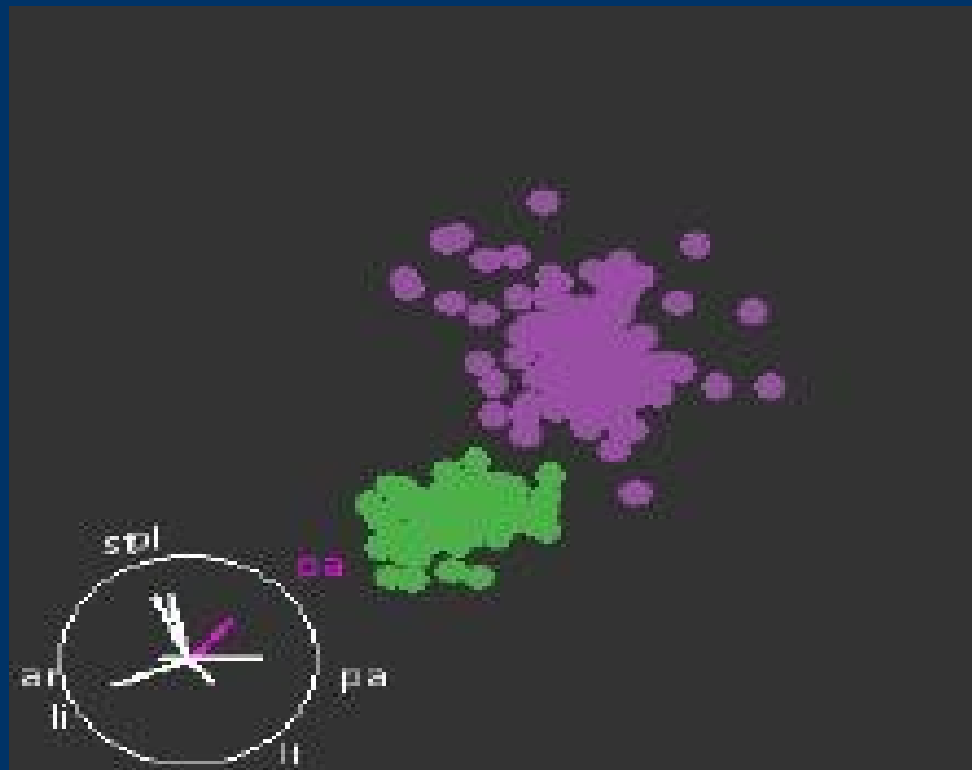- Scatterplot matrix?

Parallel coordinate plot

- To show a set of points in an n-dimensional space, a backdrop is drawn consisting of n parallel line segments. Then a given data point in n-dimensional space is represented as a polyline with vertices on the parallel line segments. The position of the vertex on the i-th segment corresponds to the i-th coordinate of the point.
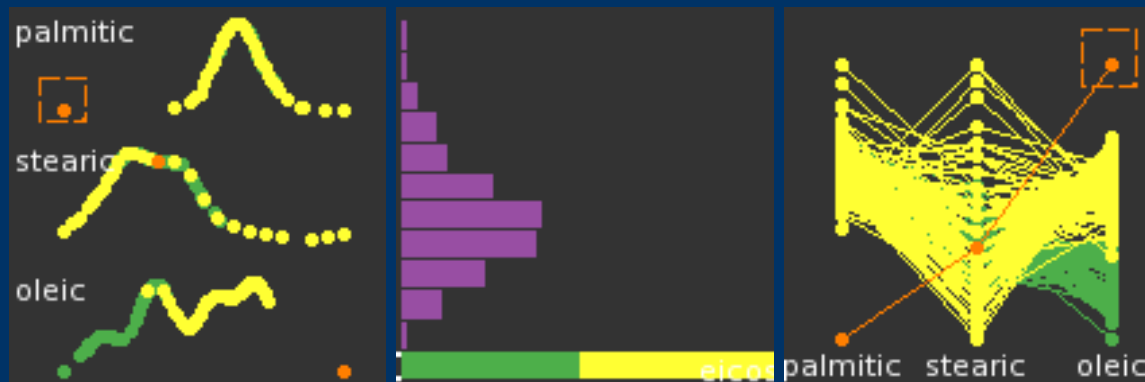
Tour

- Dynamic and interactive graphic
- N=1,2,3,4,5,...
- Used to find clustering in data
- Numerous projections ND -> 2D
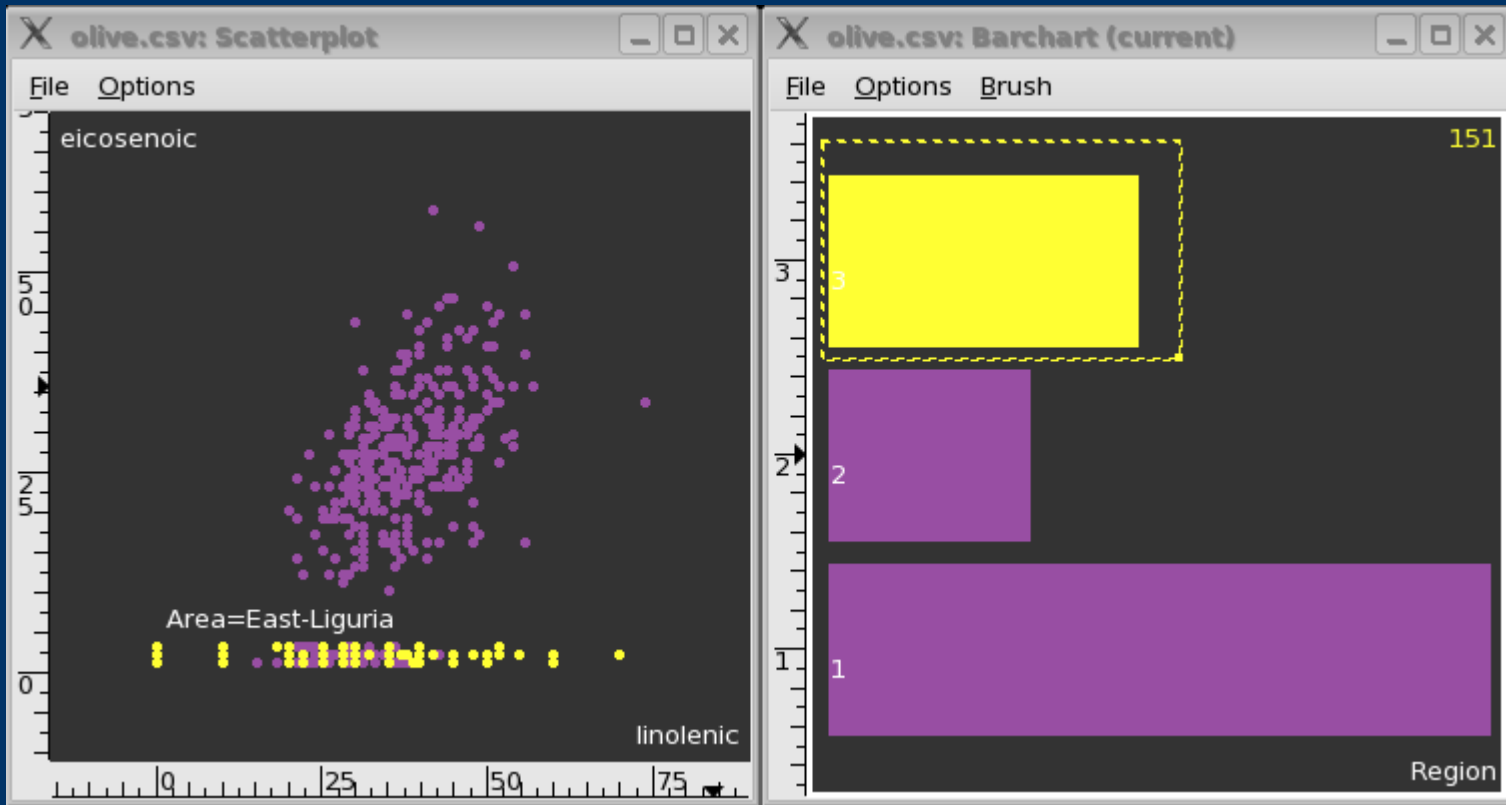 - Purpose: guide user to find interesting projections (clustering).

GGobi

- Visualization program for exploring high-dimensional data.
  - Tours
  - Scatterplot
  - Barchart
  - parallel coordinates plots
  - Plots are interactive and linked with brushing and identification.

How does it work?

- Start Ggobi

- Scatterplot -> cycle / show matrix
  - Leave out uninteresting variables

- Color visible clusters
  - Identify clusters

- Open new display (scatterplot / pcp / tour / rotation)
  - Note the linked colors!

- Search for new clustering/patterns
  - Or let the Tour do it for you

- Loop over previous 4 steps

Example 1

Example 2