


Air quality sampling

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Air quality measurement

Relevance of sampling

- The principal requirement of a sampling system is to obtain a sample that is representative of the atmosphere at a particular place and time
- The uncertainty associated with the sampling and sample preparation can be higher than that for the analytical determination

Objectives of sampling

- To estimate the effects on the population and the environment
- Inform the public about air quality
- Provide information on sources and risks of pollution
- Carry out long-term assessments trends
- Check the impact of control measures on air quality
- To study the chemical reactions of pollutants in the air
- Calibrate and evaluate models of dispersion of pollutants in the atmosphere

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Air quality measurement

Measurements of air quality generally fall into three classes:

- Measurements of Emissions - also called source sampling - when a particular emission source is measured, generally by on the spot tests
- Meteorological Measurement - Measures meteorological factors that show how pollutants are transferred from source to recipient
- Ambient Air Quality - Measures the quality of all the air in a particular place. Almost all the evidence of health effects is based on these measurements

Also now have:

- Industrial Hygiene sampling - for testing the air quality inside of factories and places of work
- Residential Indoor sampling - to evaluate the quality of air in living spaces

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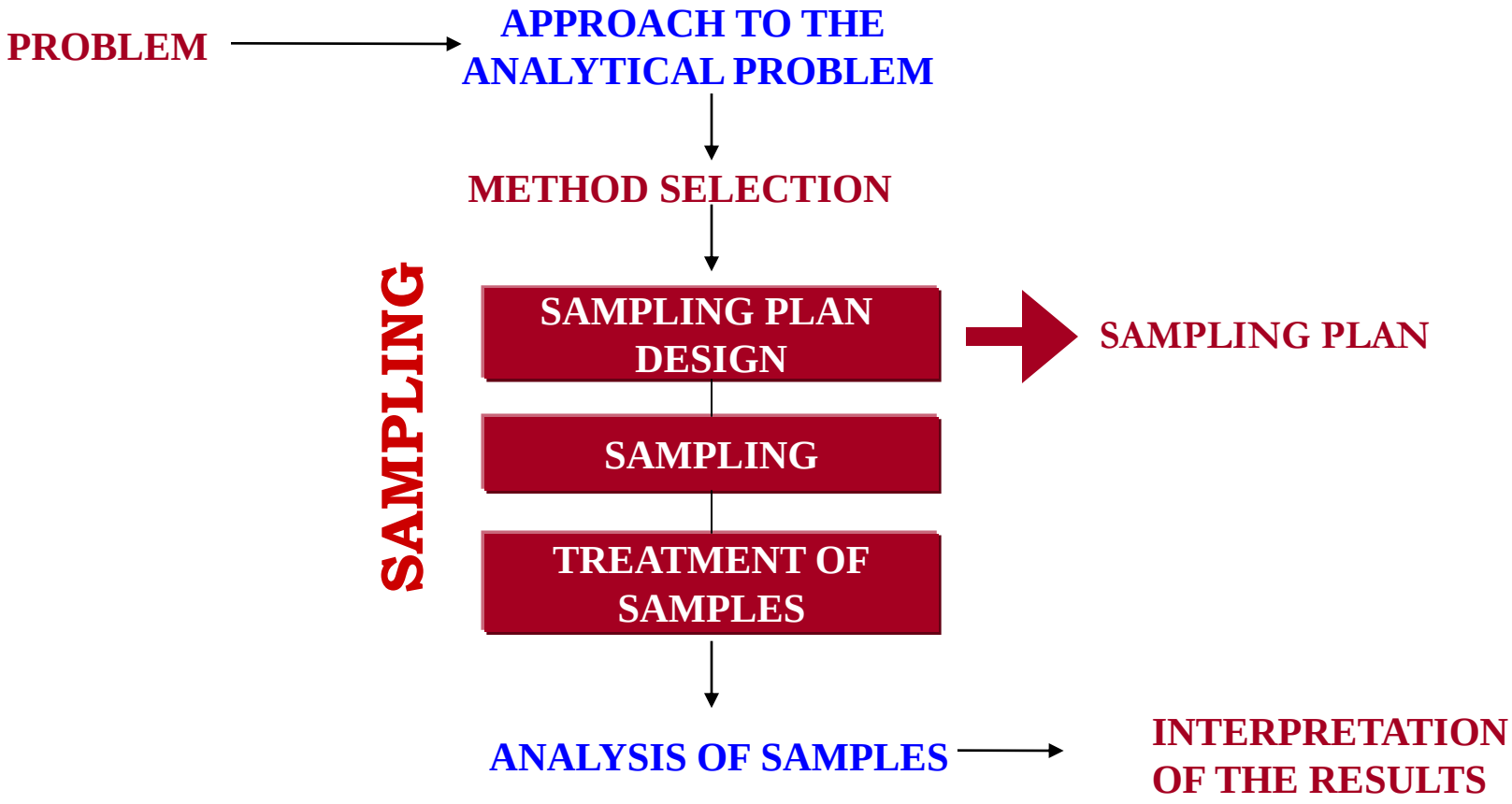
Sampling design



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Sampling plan

- Objective to be reached
- Duration of the sampling campaign
- Statistical plan
- Location of sampling points
- Factors that affect the sampling
- Quality Assurance (QA)
- Transport and storage

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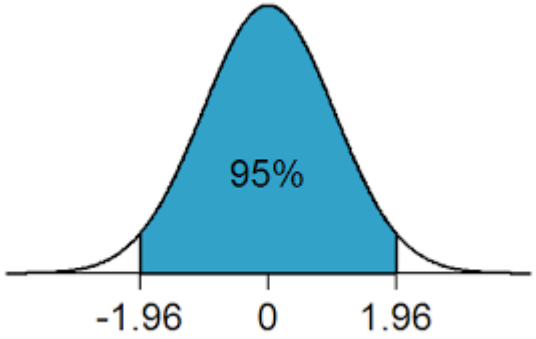
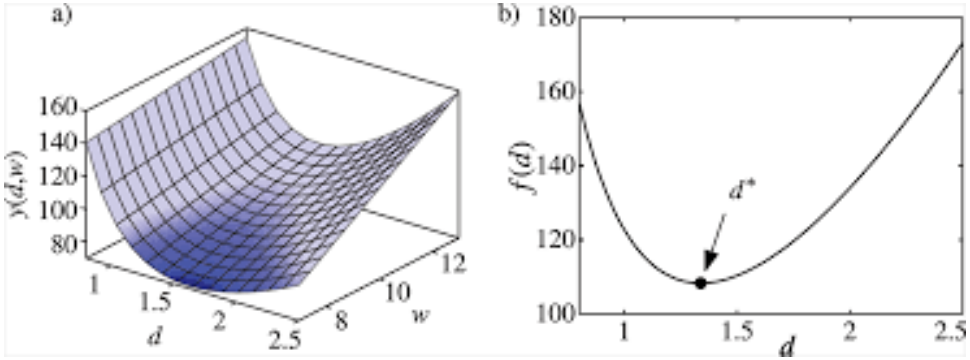
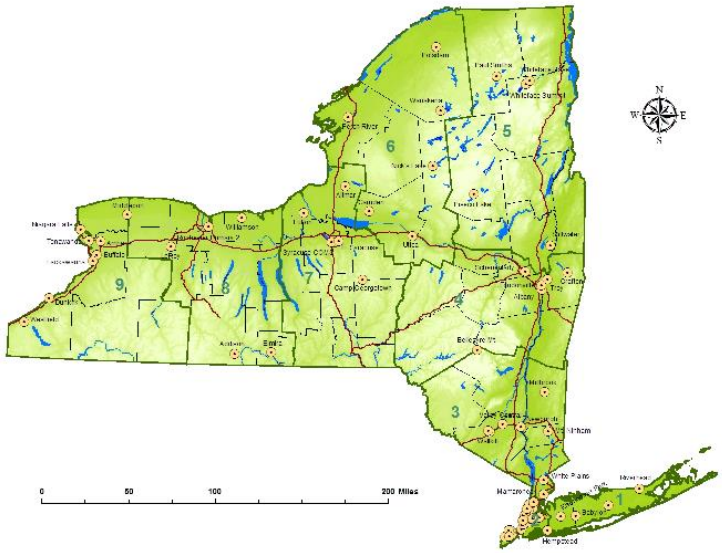
Statistical plan

- Number of required sampling points
- Sample amount
- Minimum number of samples
- Sampling frequency
- Number of analysis
- Sampling uncertainty
- Level of confidence







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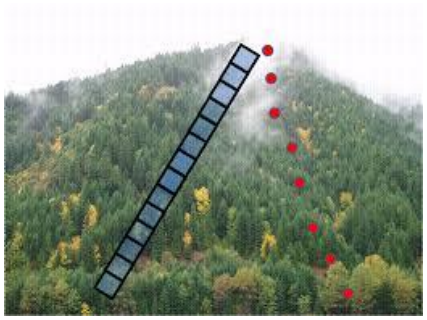
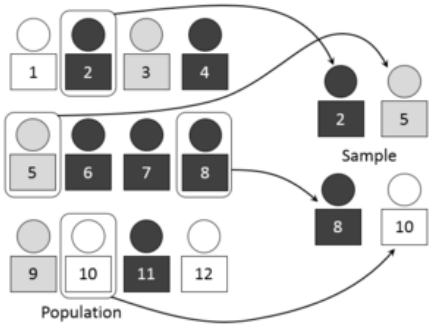
Location of sampling points

- According to the objectives: air quality, stationary or mobile source, public health ...
- Representative site
- Consider all factors affecting the sampling
- Simple random sampling
  - ✓ Homogeneous area of study
- Stratified sampling
  - ✓ Delimitation of different subareas
- Systematic sampling (random, regular, alternating and gradient)
  - ✓ Interrelation between the spatial location and the concentration of a target substance





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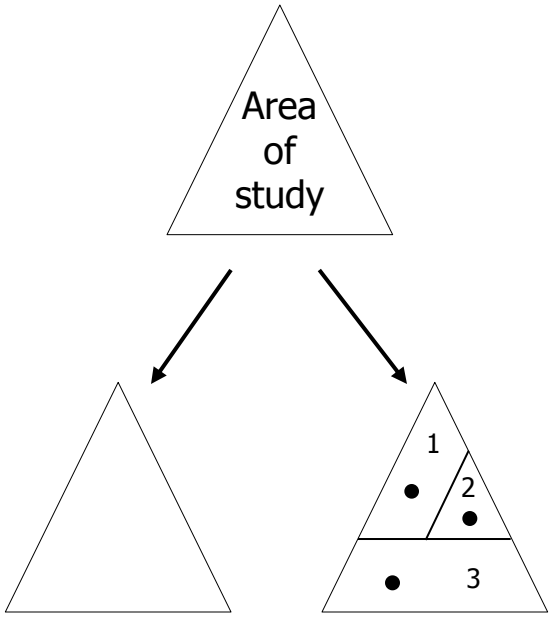
Location of sampling points

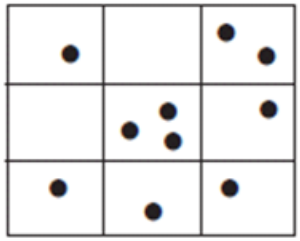
Distribution within the study area



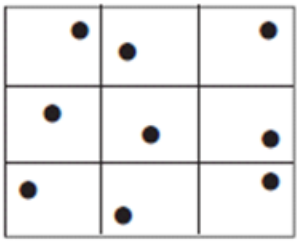
Simple

Stratified

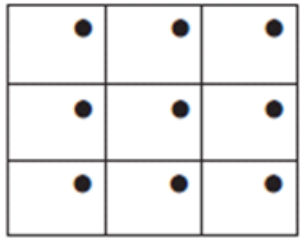
Distribution within the different areas



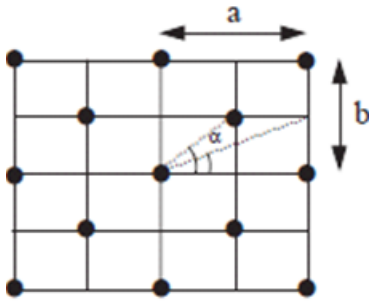
Random



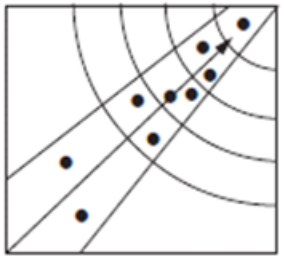
Random systematic



Systematic or regular



Alternating (systematic)



Gradient (systematic)

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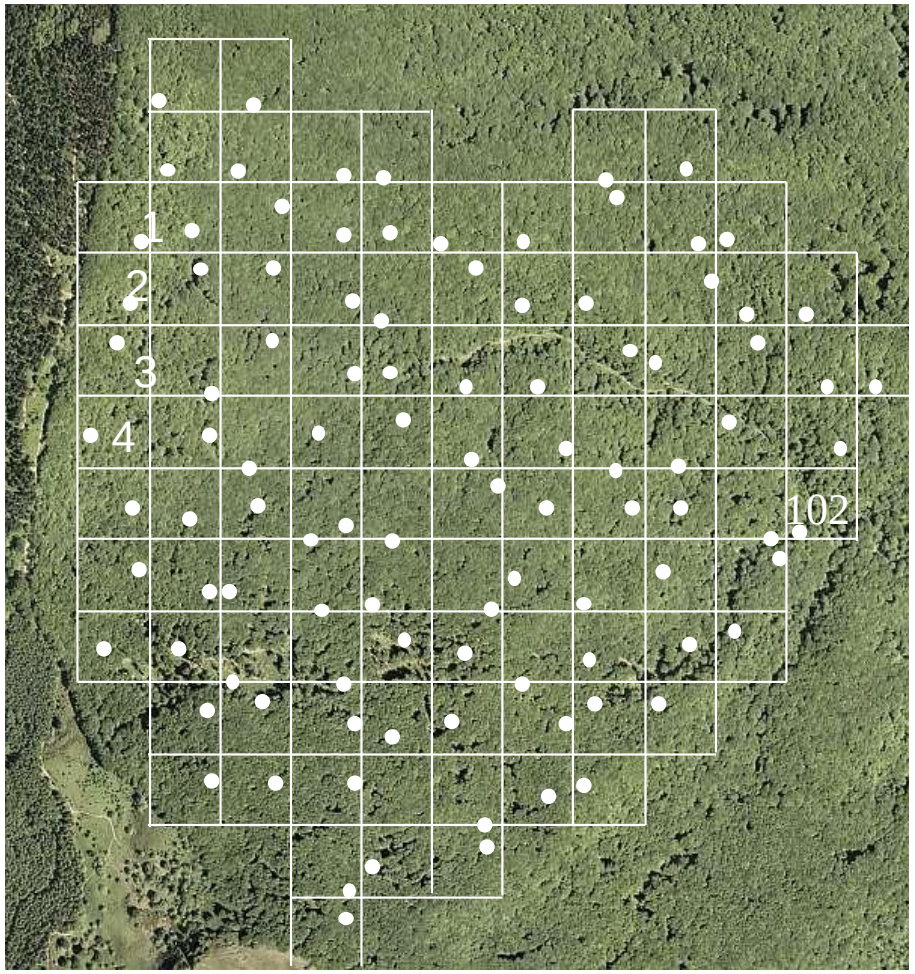
Location of sampling points



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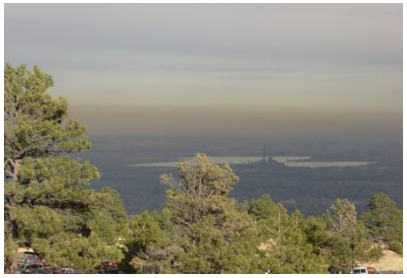
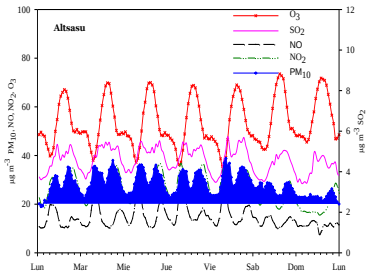
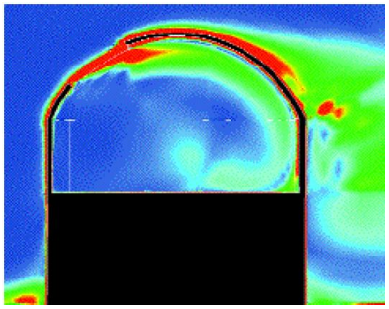
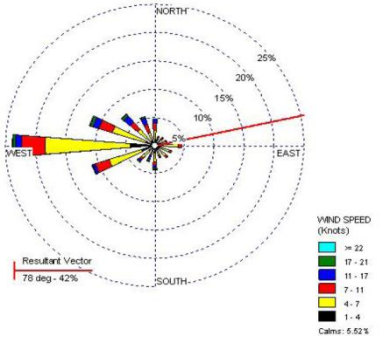
Factors that affect air pollutants sampling

- Meteorology
  - ✓ Season
  - ✓ Temperature
  - ✓ Relative humidity and precipitation
  - ✓ Wind speed
  - ✓ Wind direction
- Spatial variation
  - ✓ Topography
- Temporal variation
  - ✓ Dairy, monthly, yearly sampling
  - ✓ Seasonal sampling
- Analytical capacity
- Costs









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Location of sampling points

- Easy access
- Protected from vandals
- Infrastructure: electricity, telephone…
- Free of obstacles

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Analytical capacity

- According to the objectives: air quality, stationary or mobile source, public health ...
- Analytical equipment available
- Appropriate analytical methods
- Pre-concentration of samples prior to analysis
- Detection limits
- Portable analyzers

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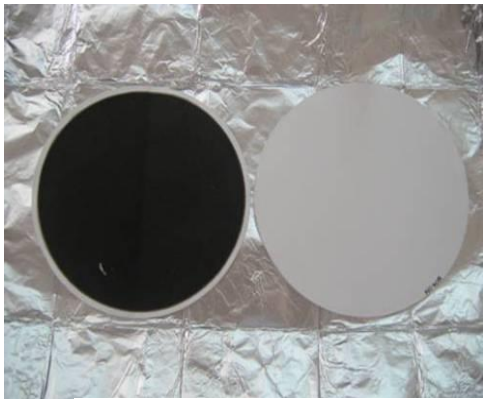
Costs

- Active/passive samplers
- Continuous monitoring
- Duration and extension of the field campaign



Quality Control

- Laboratory Blank
- Field Blank
- Duplicates
- Periodic calibration of analytical equipment
- Certification of calibration gases

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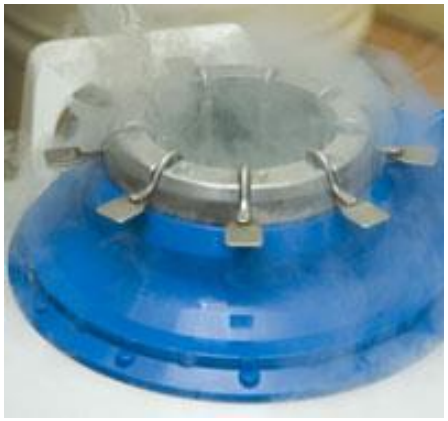
Transport and storage

- Suitable conditions for analytes (temperature, humidity, darkness)
- Registry of samples
- Labeling of samples



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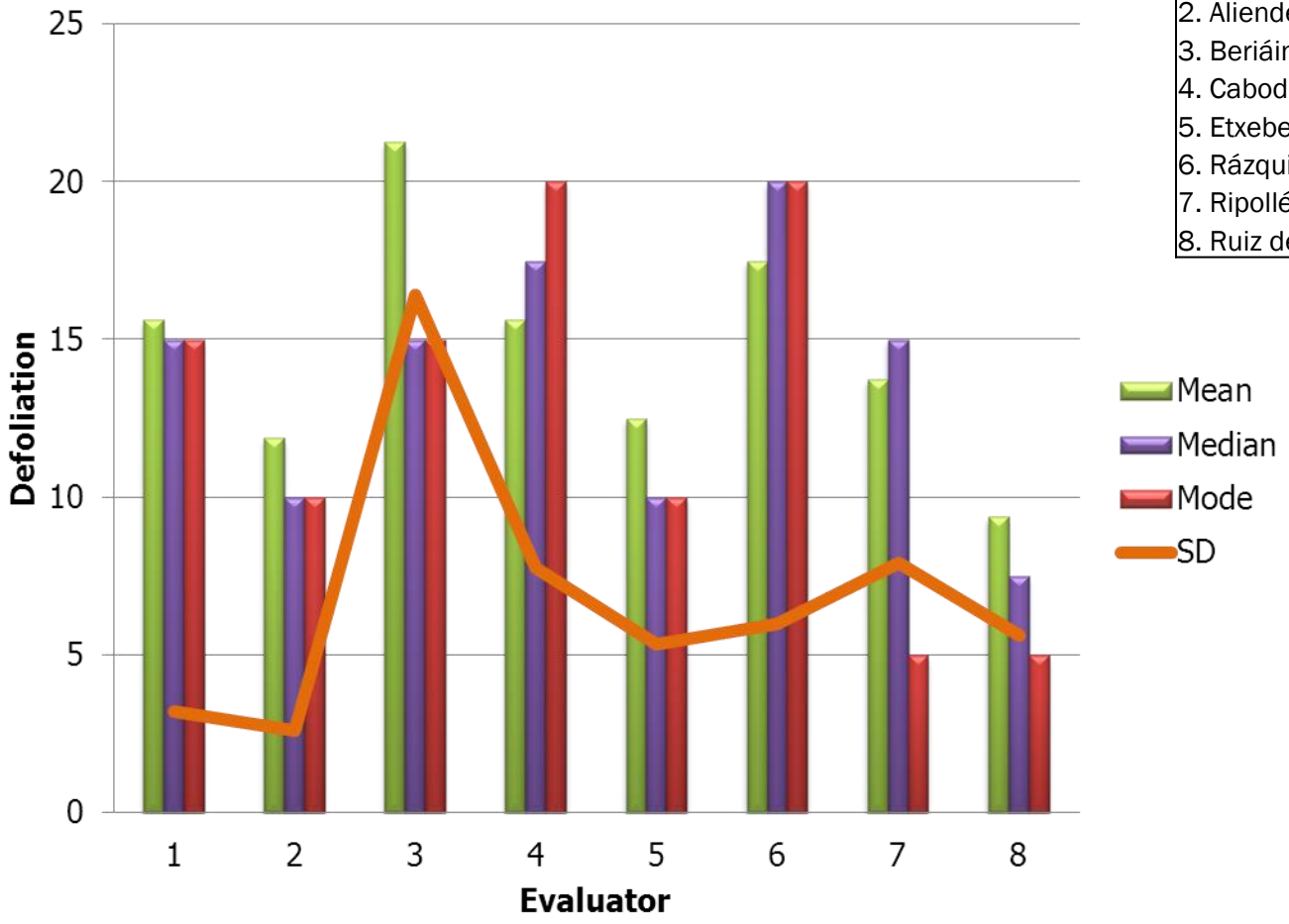
Forest damage assessment



Name
1. Aldaz, Paula
2. Aliende, Andrea
3. Beriáin, Pablo
4. Cabodevilla, Andrea
5. Etxeberria, Eider
6. Rázquin, Idoia
7. Ripollés, María
8. Ruiz de la Cuesta, Ignacio

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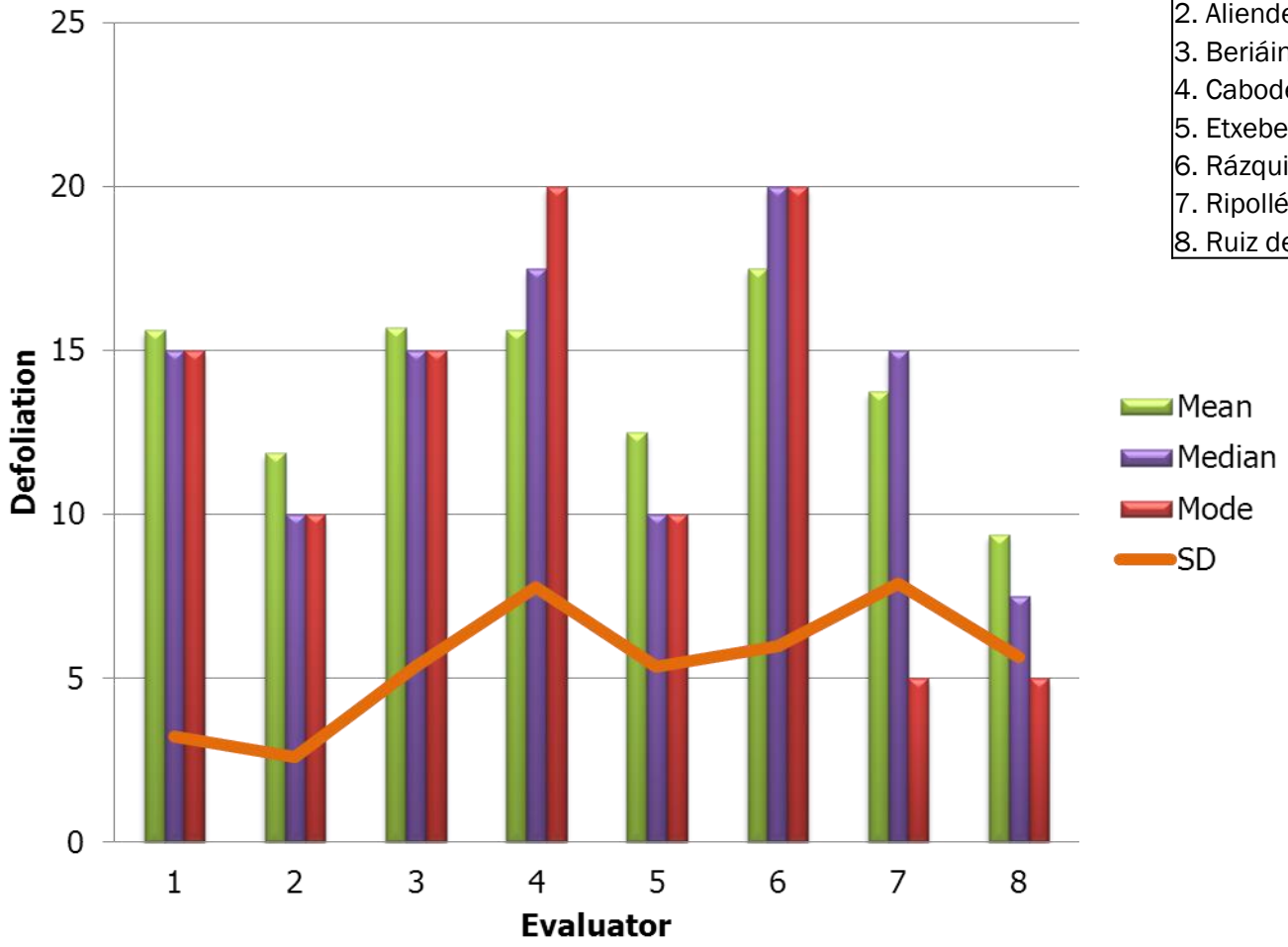

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