Experience with Dust Measurements in Three Dutch Museums

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ONDERZOEKSTUURMANSCHAP

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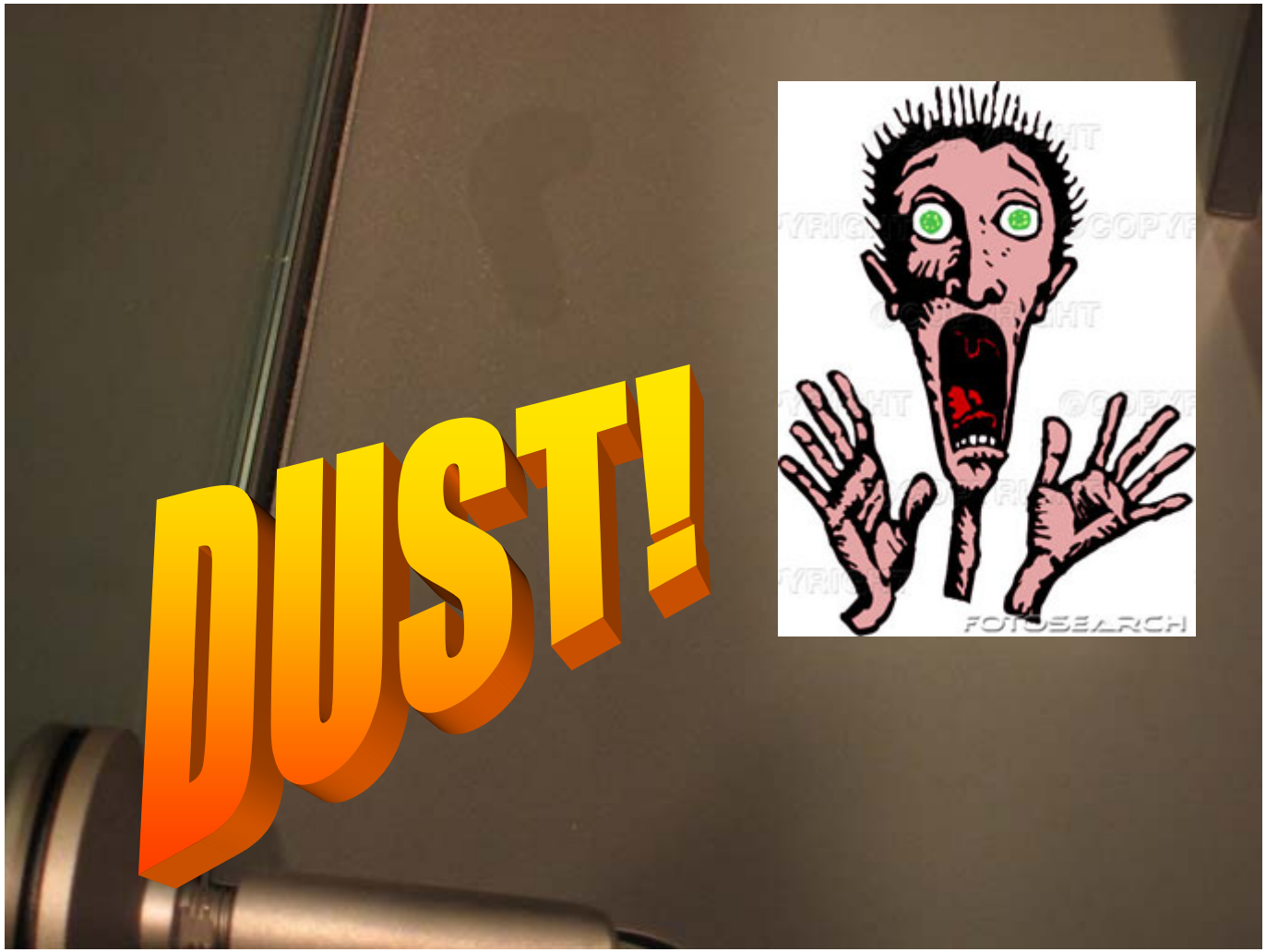

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Objectives

- NOT to define what “too much dust” is
- Development of a simple method for monitoring dust accumulation, e.g.:

- before, during, and after construction

- visitor impact

- Assist in defining what “too much dust” is

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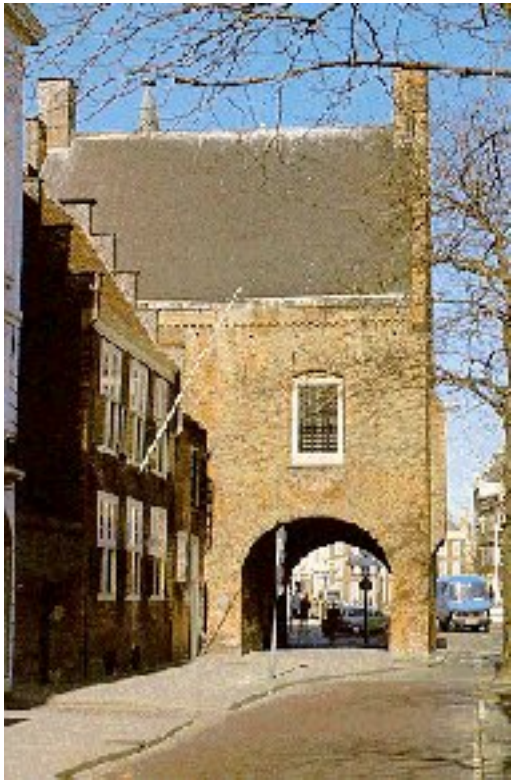
Museum Gevangenpoort and Galerij Prins Willem V



http://www.gevangenpoort.nl/

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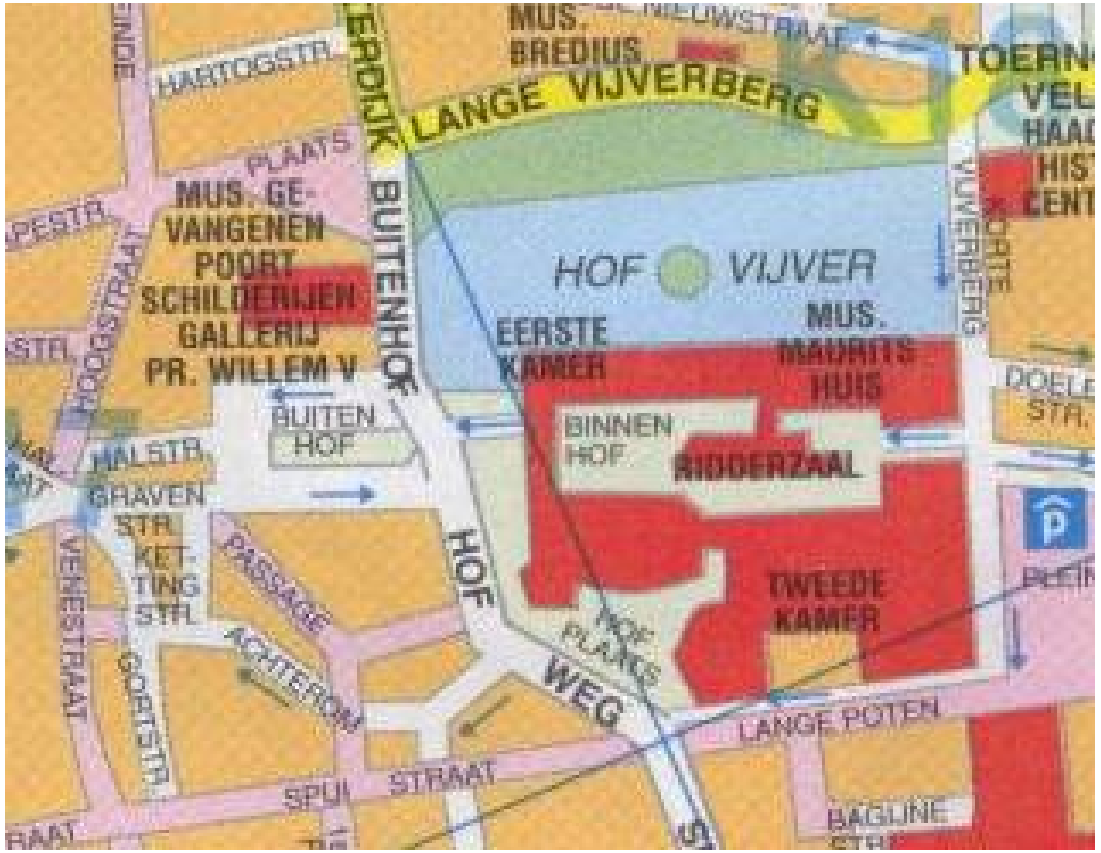
ONDERZOEKINSTRUMENT

Gevangenpoort/Galerij Willem V



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National Museum of Ethnography
Leiden

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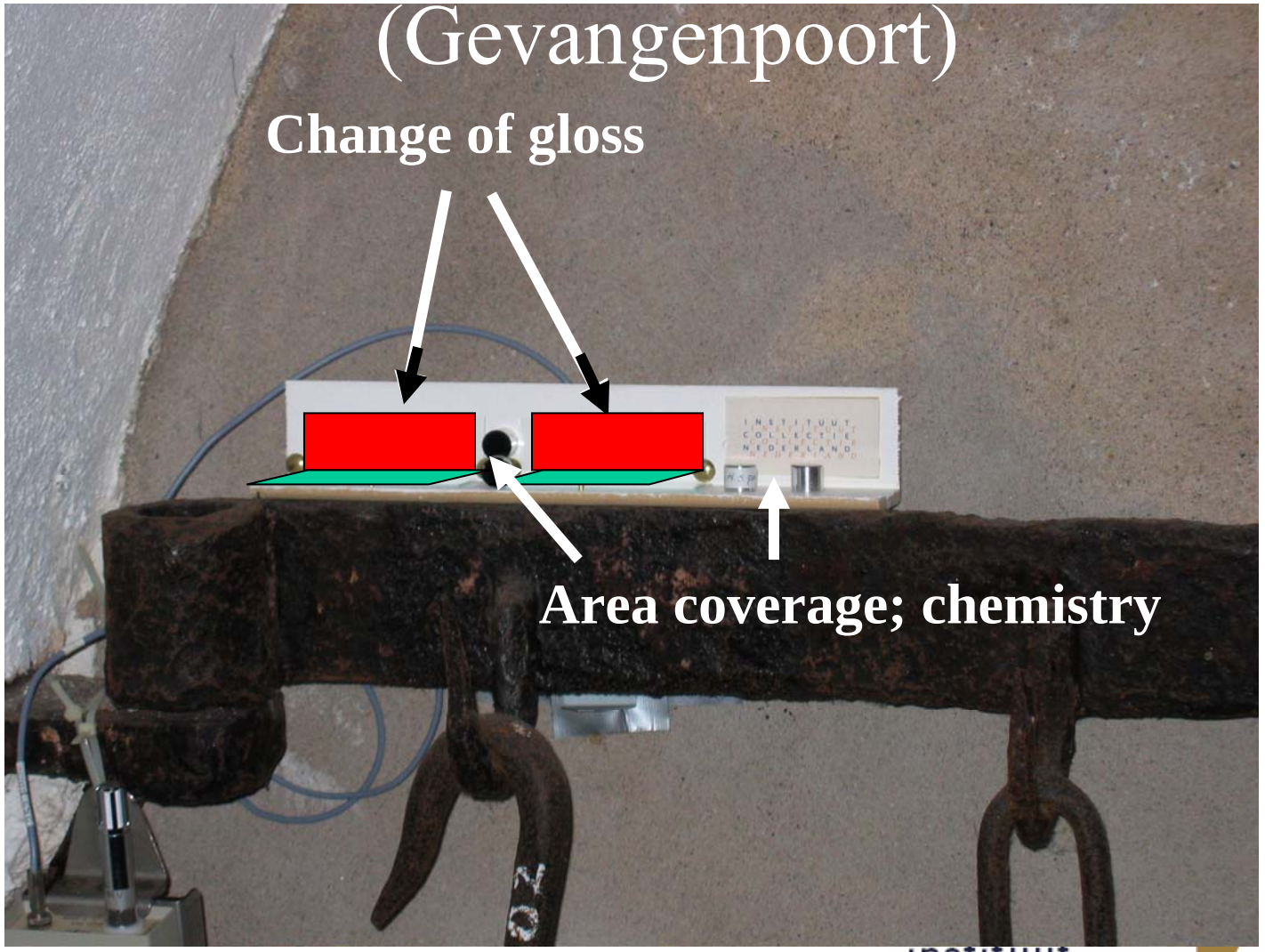
ONDERZOEKSTUURMEETSCHAP

Dust monitoring technique (Gevangenpoort)



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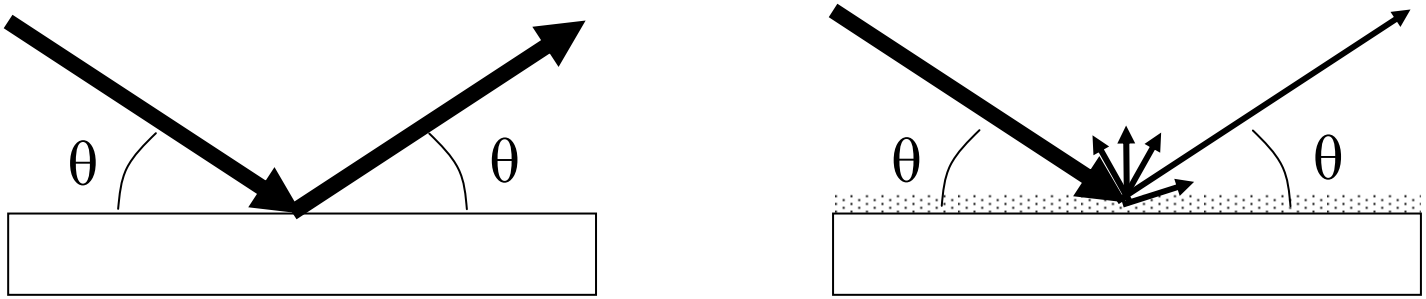
Glossmeter



$\Theta = 20, 60, 85°$

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Measurement of change in gloss

- Rate of change in gloss: horizontal and vertical surfaces; paintings = varnished (vertical) surfaces

- How and how often?
- Slides cleaned with “dust-free” cloth
- Once a week/month with “new” glass slide
- “Permanent” slides (once in several months)

- Statistics?
- Slides cleaned with “dust-free” cloth
- Reusing slides

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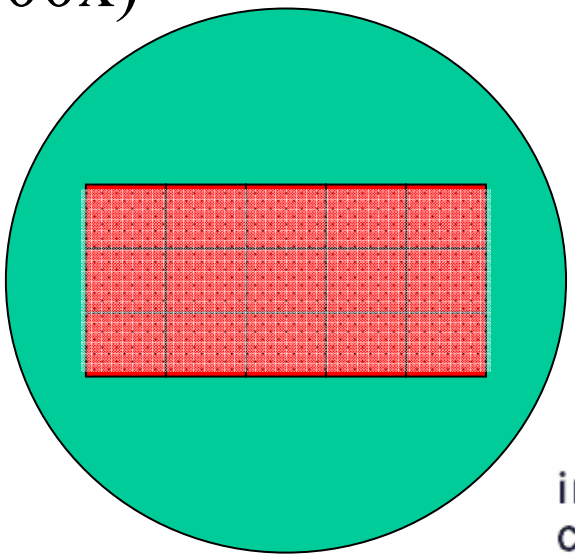
Measurement of coverage area and chemistry

- Use of standard carbon stickers in SEM
- Semi-automated EDS analysis of particles
- Image J area analysis of standard area on sticker (15 photo's at 200x)



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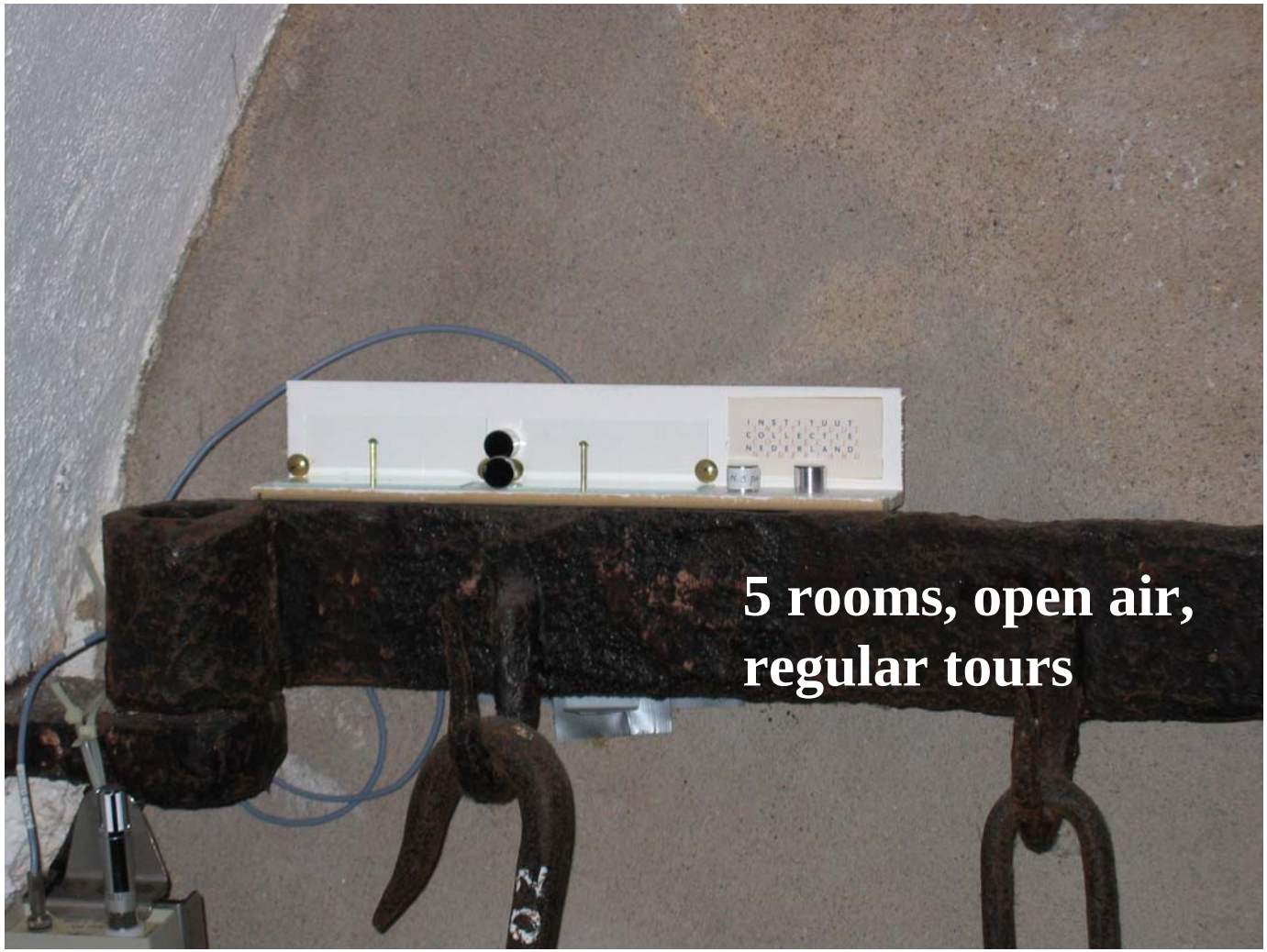
Gevangenpoort



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Galerij Prins Willem V

5 positions, empty, no visitors,
air conditioned

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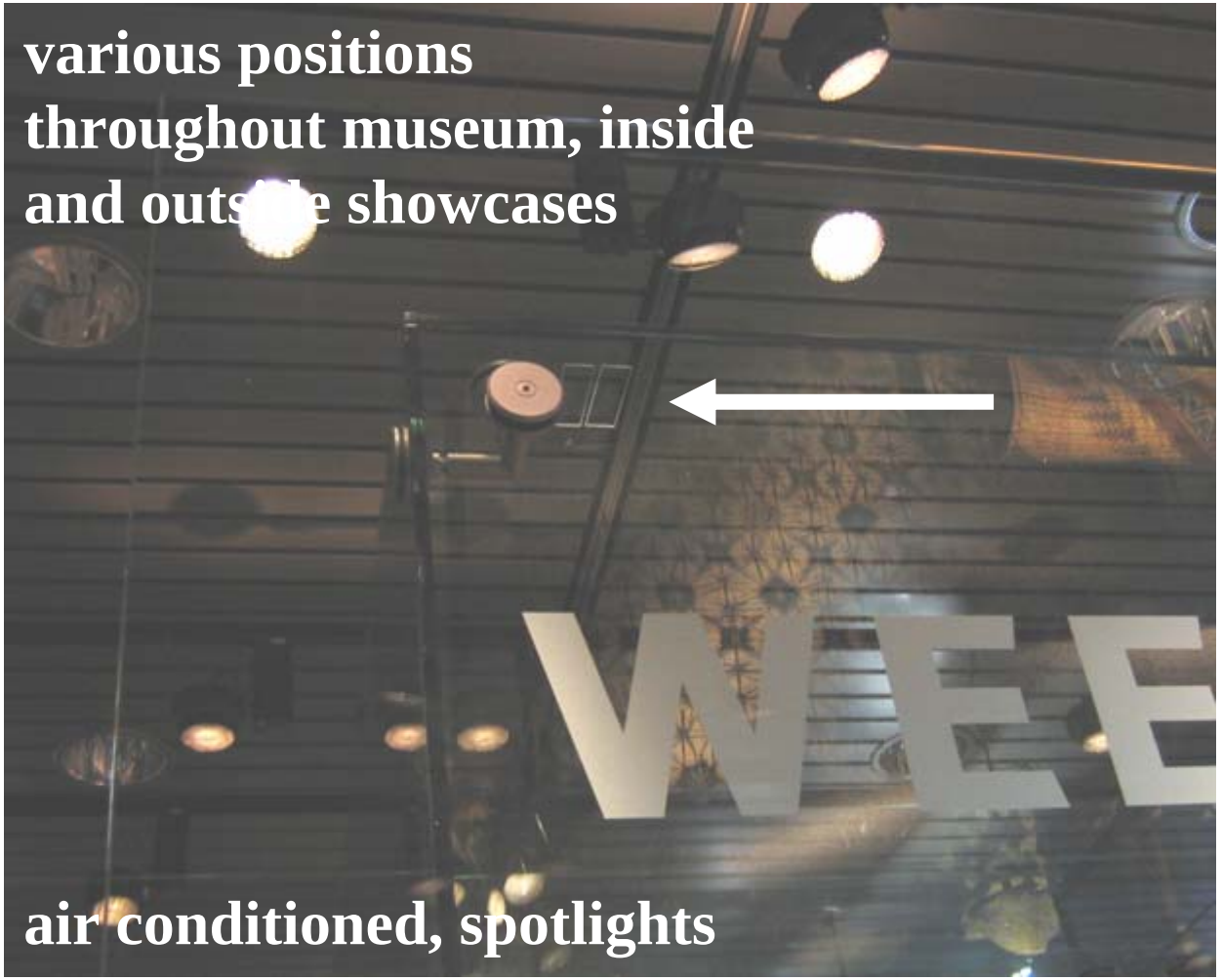
National Ethnografic Museum Leiden



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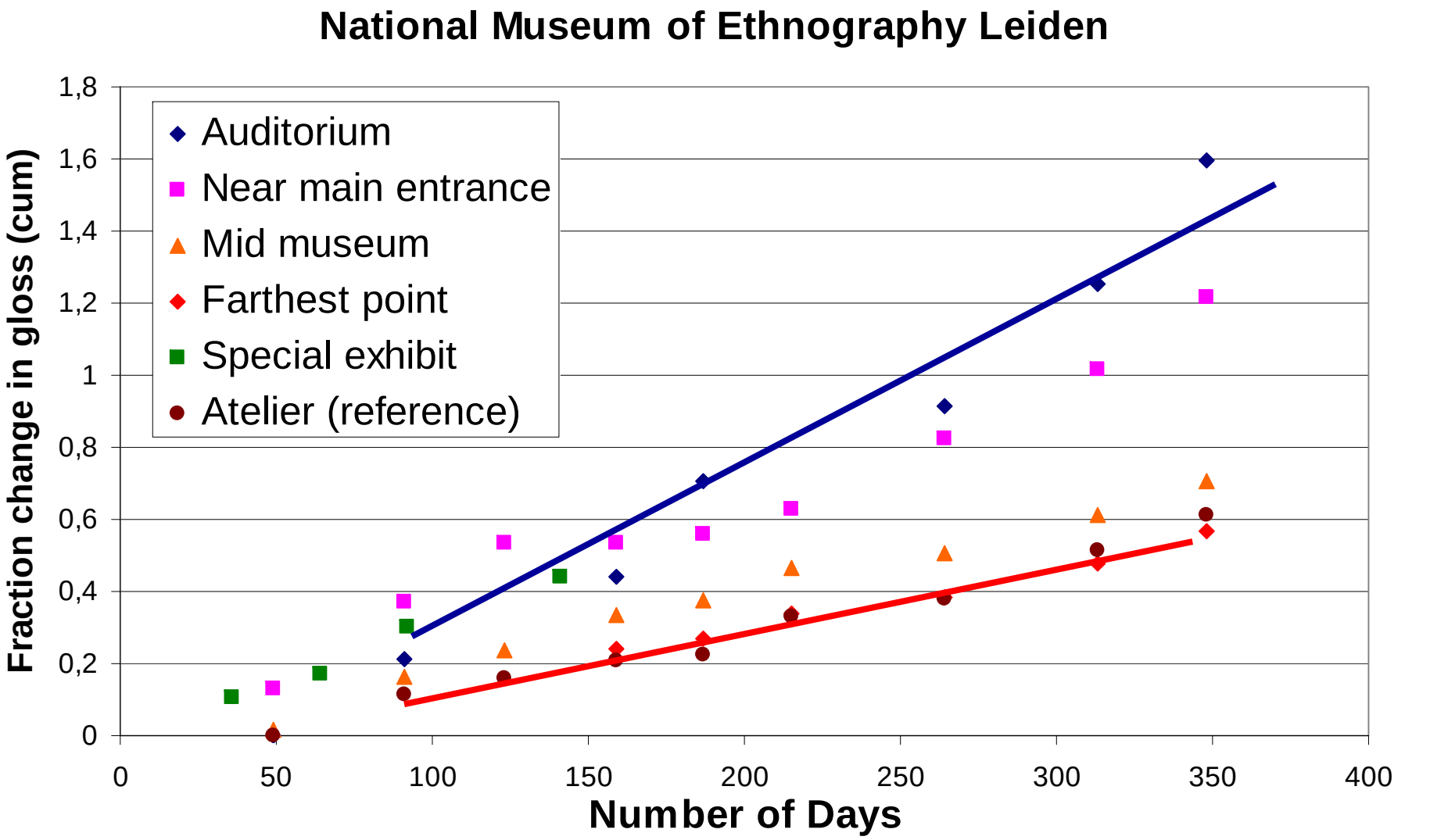

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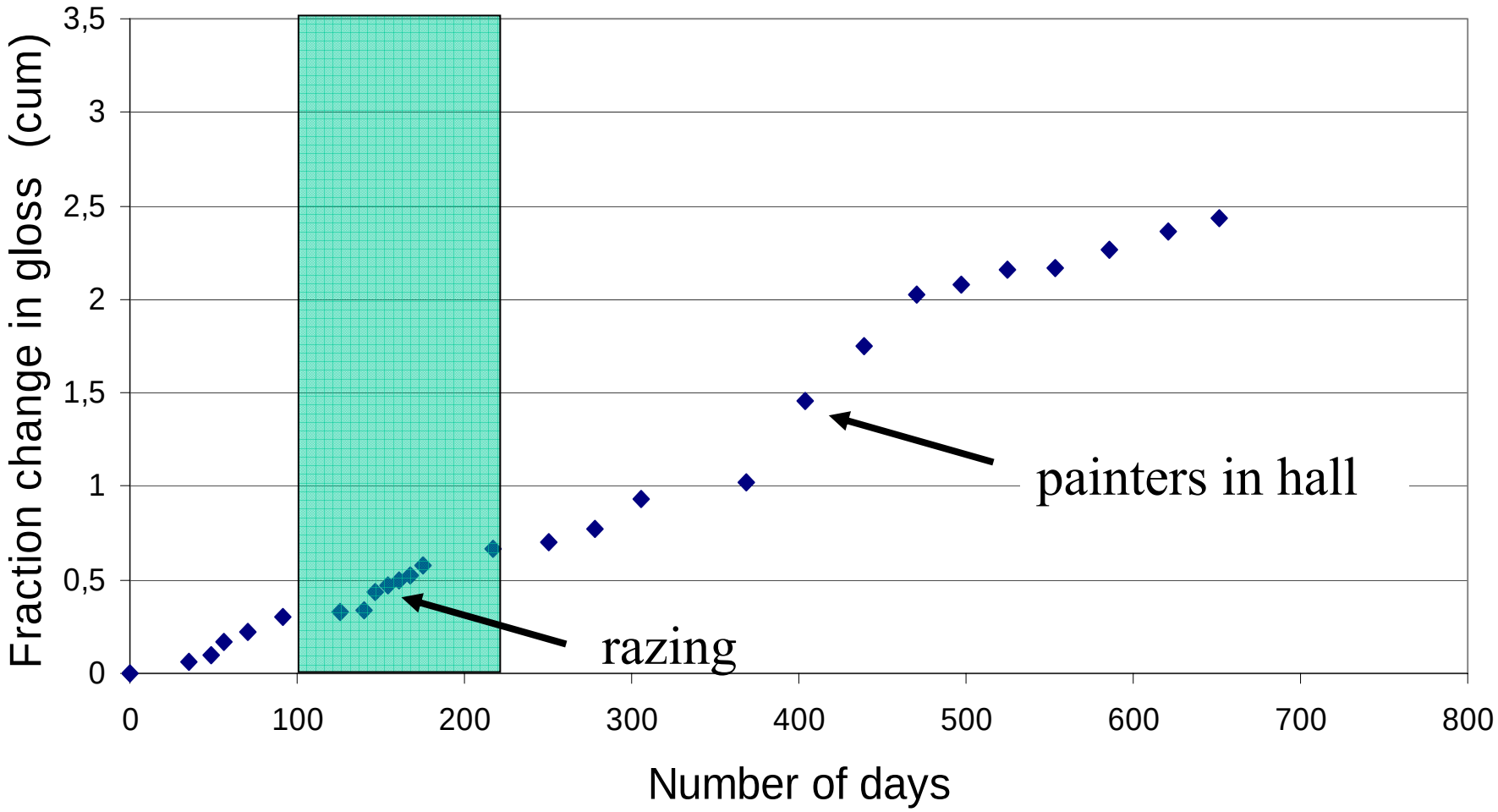
Willem V pos 1 85H



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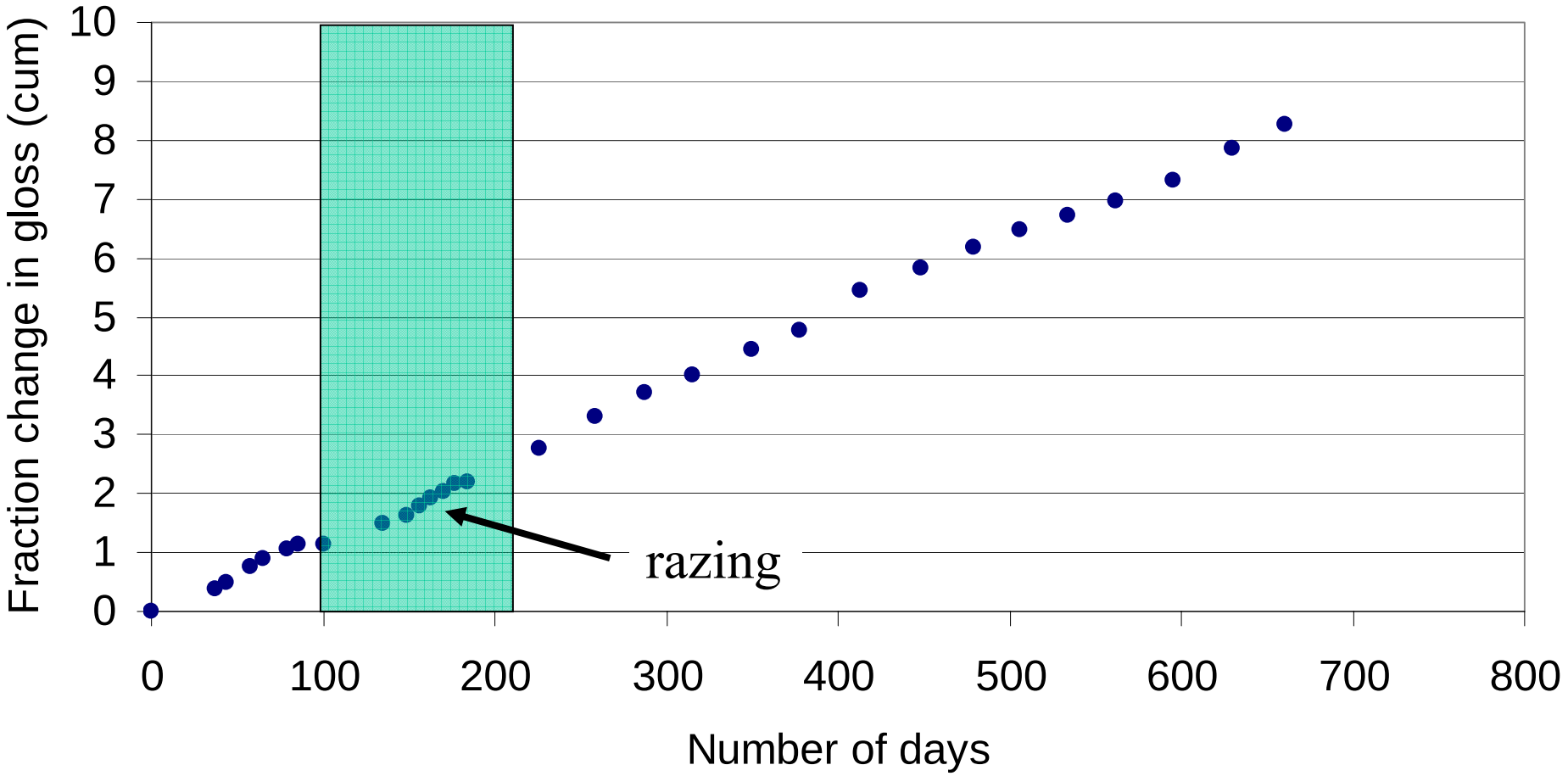
Gevangenpoort Pos 4 85H



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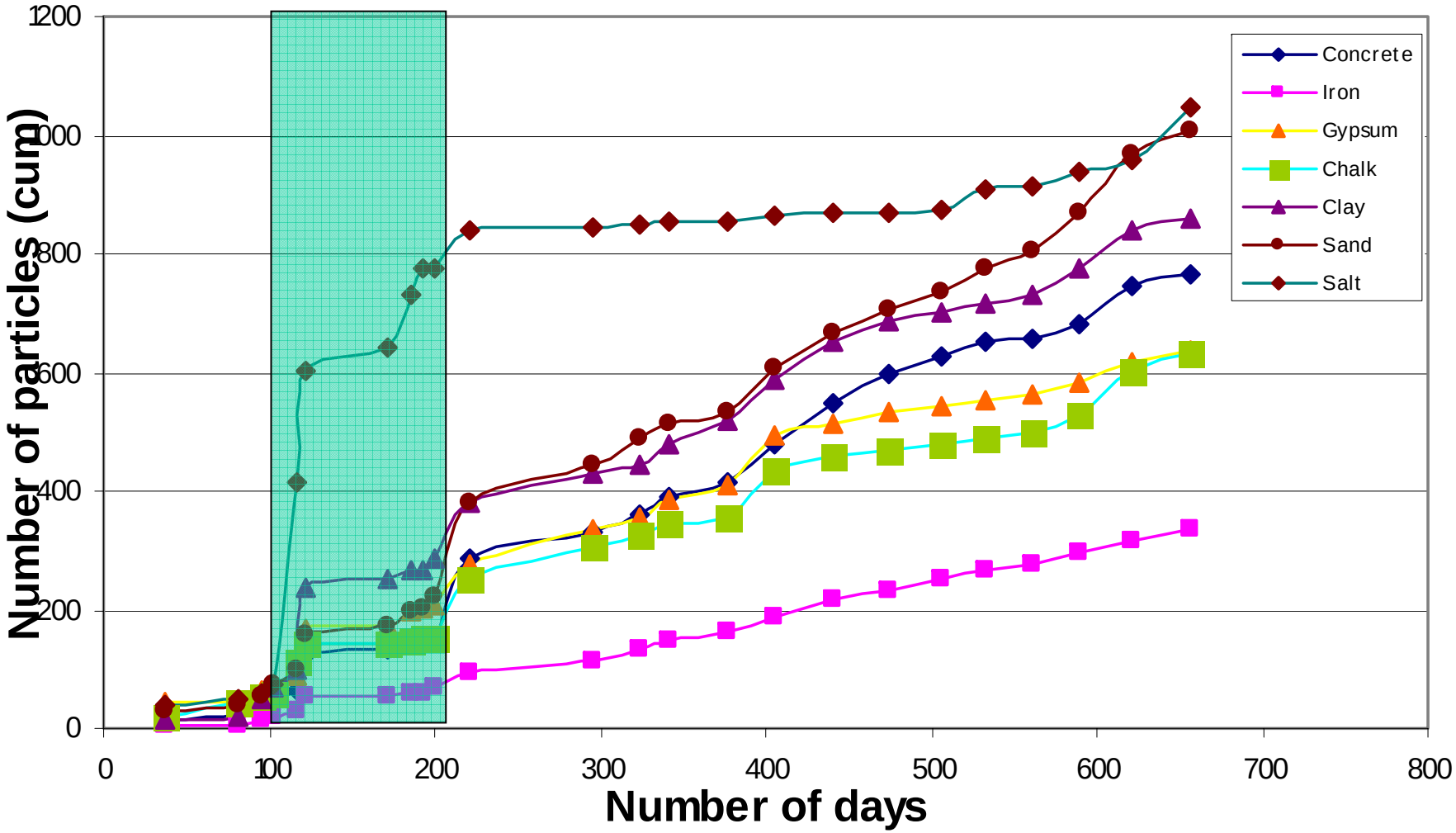
Gevangenpoort Pos. 4



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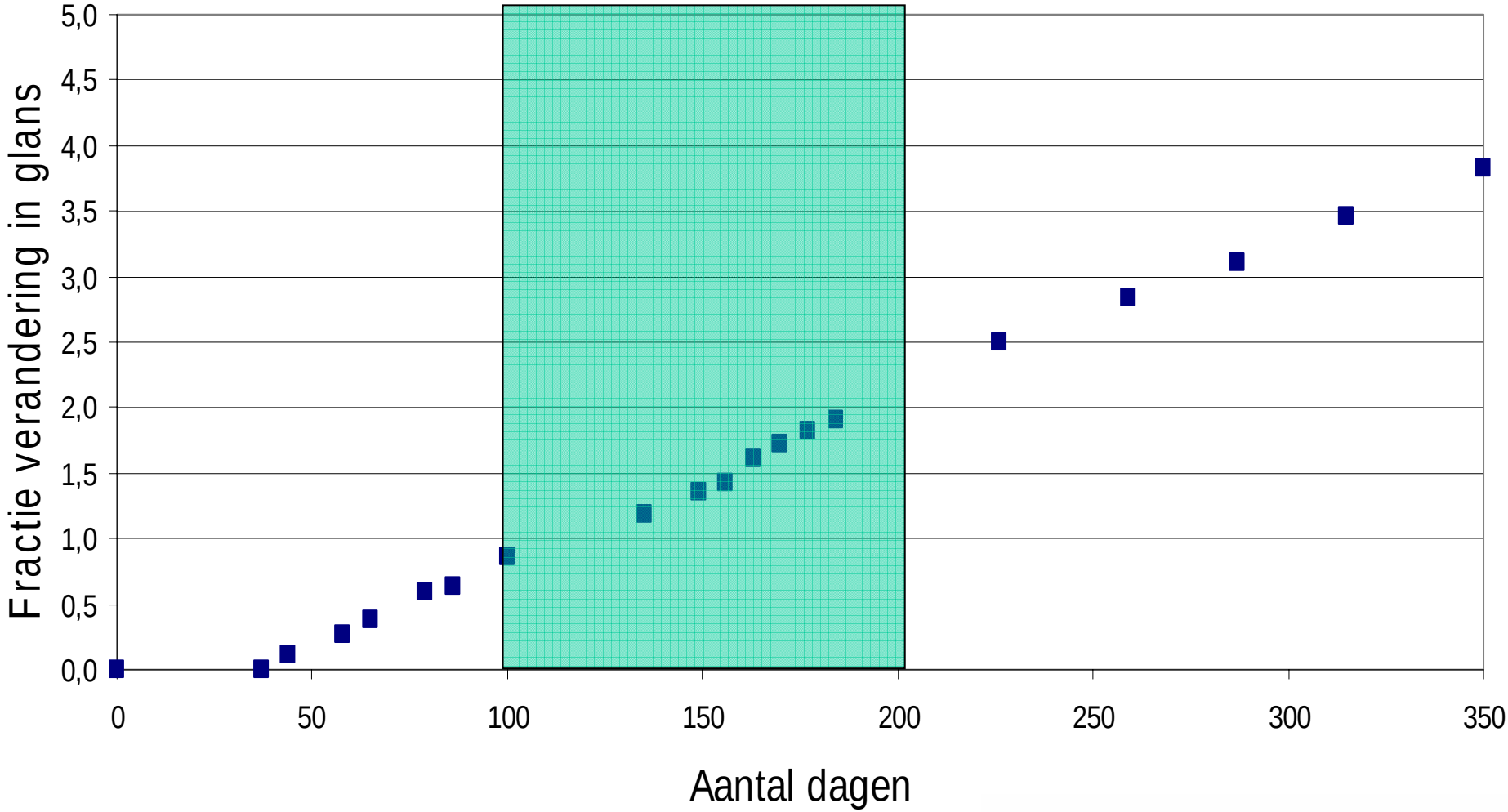
Gevangenpoort Pos 5 85H



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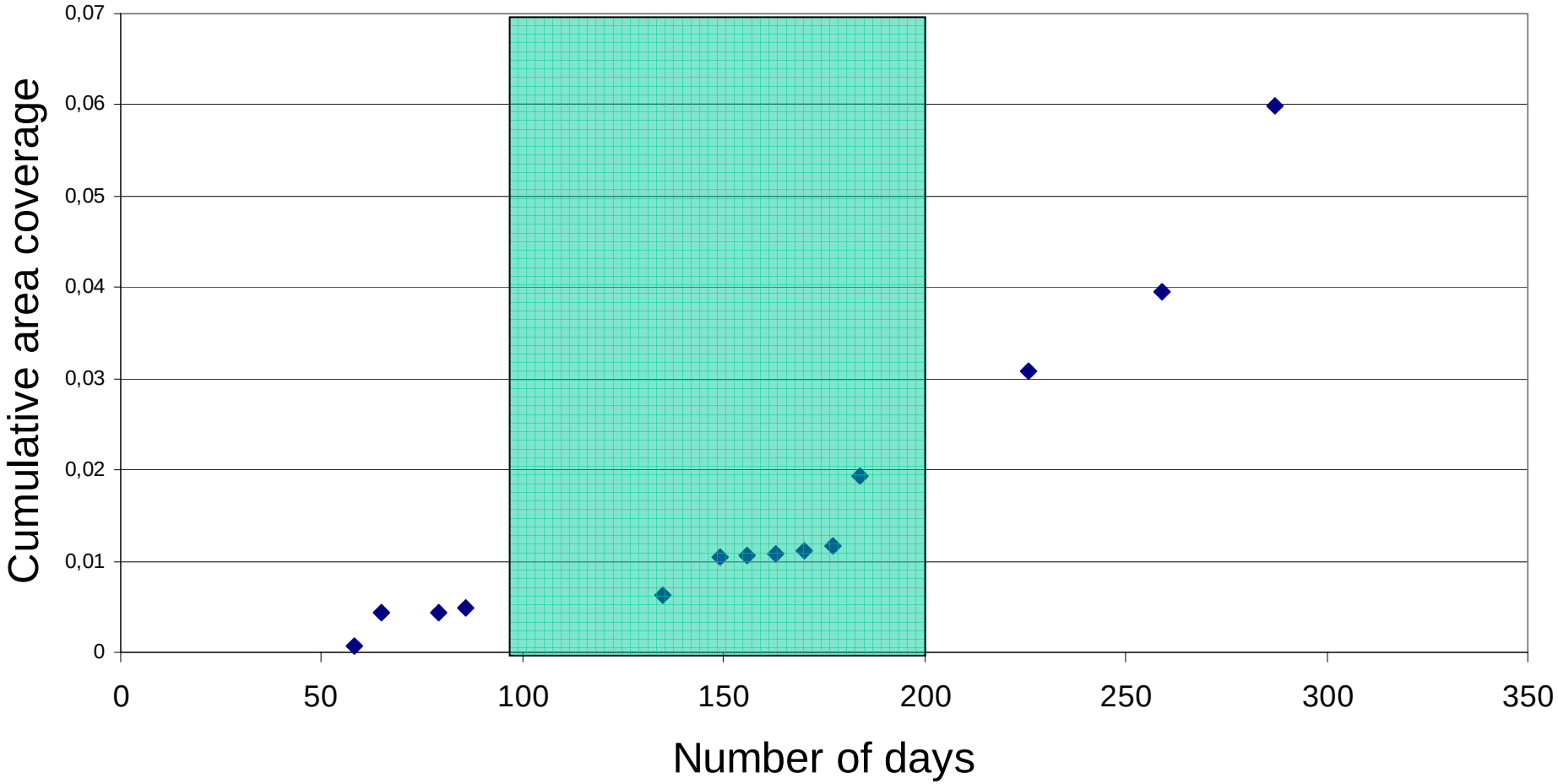
Gevangenpoort Pos. 5



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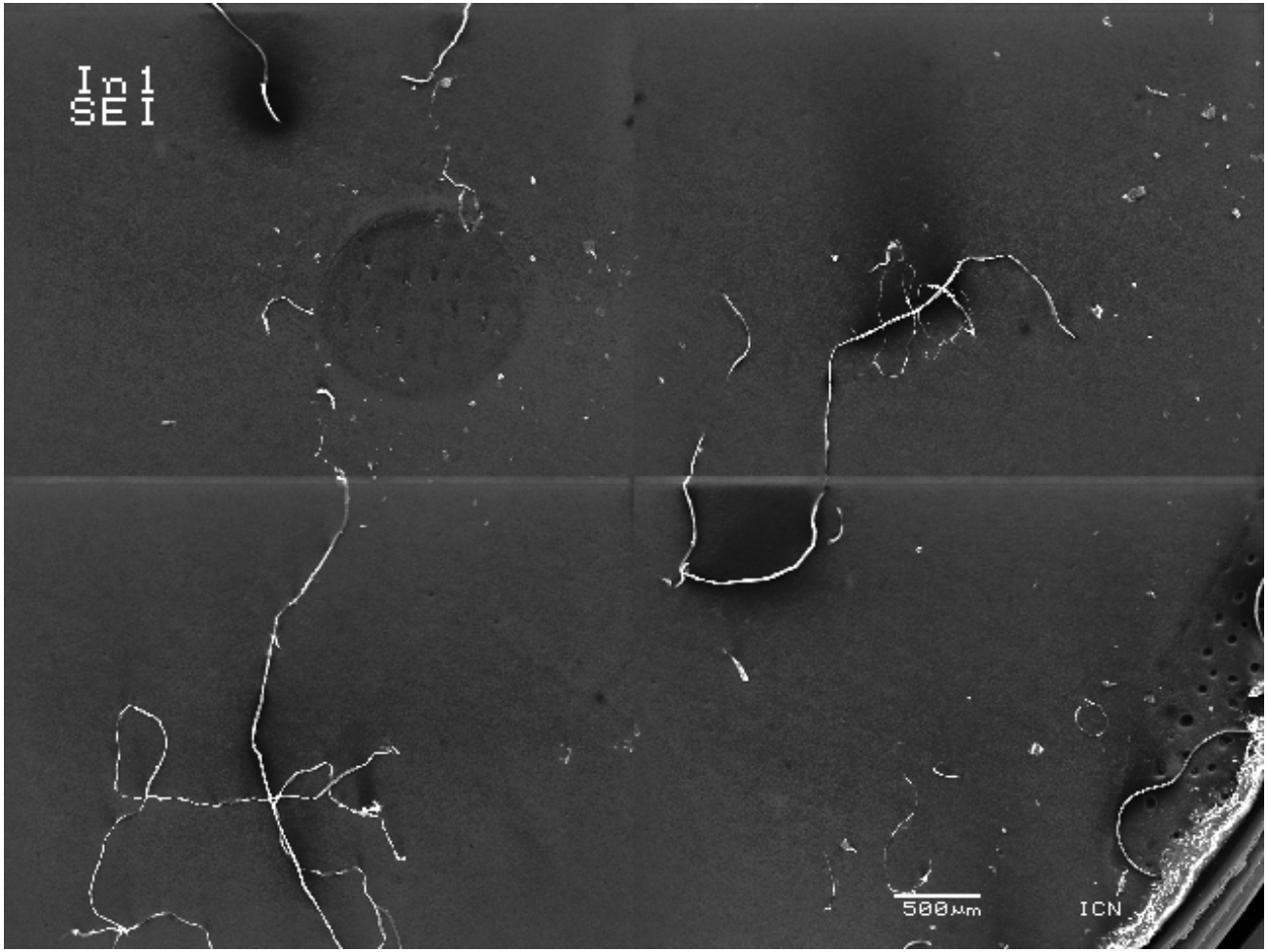

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Some Preliminary Conclusions

- Gloss measurements appear to be useful as simple method for monitoring dust collection rates
- Air conditioned museum: dust brought in by people (Leiden)
- Relationship between inside and outside (Willem V)?
- Additional chemical analyses required for “open-air” museums / “aggressive” situations (Gevangenpoort, Willem V)

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ONDERZOEKSCHAP

What is “too much dust”?

- Definition of “too much dust” is subjective and is NOT DIRECTLY measurable
- Relate subjective definition to measurable quantity (e.g. rate of accumulation to given amount)
- 3% loss of gloss in historic house (textiles) = major cleaning
- 0,2% area coverage by dark particles on white background is “noticeable”
- 33% loss of gloss on gray metallic shelf = not visible until object was removed (Leiden)

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Work to be done

- Direct relationship between rates of change in gloss and area coverage (simple monitoring)
- Indirect relationships between rates of change in gloss, area coverage, and chemistry
- Statistics