



Revision of Manuals on

(A) XV Monitoring of Air Quality

(B) VIII Assessment of Ozone Injury



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(A) Monitoring of Air Quality



Objectives



- Quantification of annual immissions of O_3 , SO_2 , NO_2 , NH_3
 - accuracy level of $\pm 30\%$
 - data completeness of 80% per period
- Detection of temporal trends of O_3 , SO_2 , NO_2 , NH_3 on a plot (significant changes within 10 years with a 95% significance level).
- Detection of spatial trends of O_3 , SO_2 , NO_2 , NH_3 across Europe (significant trends with a 95% significance level).

(A) Monitoring of Air Quality



Scope and Application



Table 1. Quick reference of variables to be measured with passive and active samplers for the air quality monitoring programme.

Form	Variable	Reporting unit	Level II	Level II core	Level I	Value *	DQO	DQL
AQP	O ₃	ppb	o	m **	n	MC	±30%	75%
AQP	NH ₃	µg m ⁻³	o	o	n	MC	±30% ***	75%
AQP	NO ₂	µg m ⁻³	o	o	n	MC	±30% ***	75%
AQP	SO ₂	µg m ⁻³	o	o	n	MC	±30% ***	75%
AQA	O ₃	ppb	o	o	n	hourly data	-	-
AQA	NH ₃	µg m ⁻³	o	o	n	hourly data	-	-
AQA	NO ₂	µg m ⁻³	o	o	n	hourly data	-	-
AQA	SO ₂	µg m ⁻³	o	o	n	hourly data	-	-

o = optional; m = mandatory; n = not measured

** Active ozone measurements are recommended to be combined with hourly meteorological measurements for ozone flux modeling. For plots with active measurements, additional passive samplers are optional.

(A) Monitoring of Air Quality



Quality Assurance & Quality Control



- Submitted data from passive samplers are checked for **plausibility** and compared to known concentration ranges and variability from the same region (see chapter 5.2.1).
- Submitted data are checked for **completeness** (see chapter 5.2.2).
- Results from duplicate (and triplet) passive samplers are compared;
- Results from passive samplers are checked against those from **active samplers**;
- **Field blanks** are included in the entire transport- and storage-process and analyzed to test for disturbing factors during preparation, transport, handling, and storage.

(A) Monitoring of Air Quality



Issues and Comments ...



- ✓ Two versus three replicates for passive sampler tubes
Two are mandatory but three are strongly recommended

(B) Assessment of Ozone Injury



Objectives



- Quantification of ozone injury occurrence on a selected number of Level II plots across Europe.
- Detection of temporal trends on a selected number of Level II plots in Europe (significant changes within 10 years with a 95% significance level for individual plots).

(B) Assessment of Ozone Injury



Scope and Application



Table
visible

Survey

In-plot

OZ

OZ

OZ

Off-plot

OZ

OZ

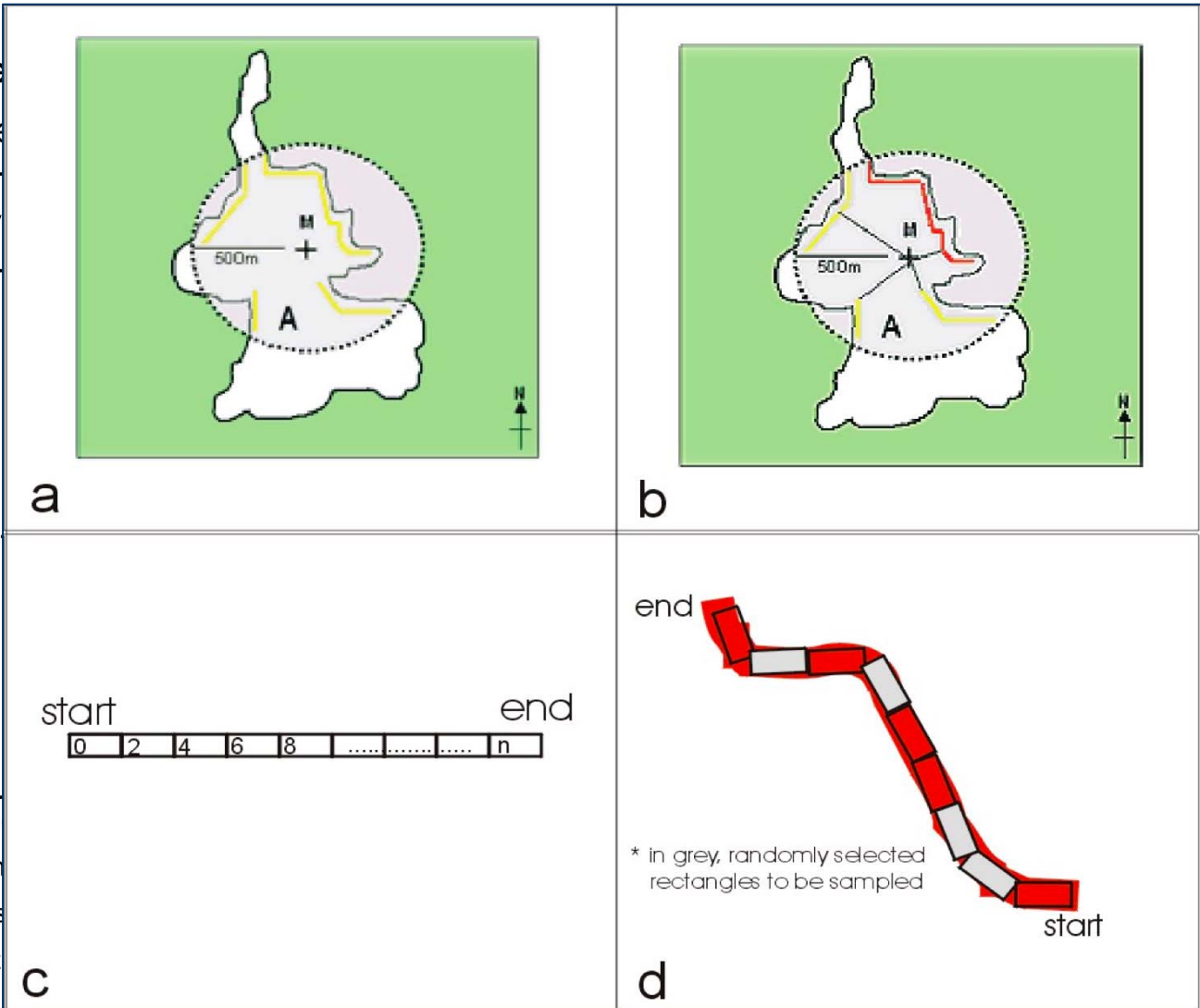
OZ

o = opti

* recom

In-plot s

Off-plot



e

Level I

n

n

n

n

n

n

(B) Assessment of Ozone Injury



Quality Assurance & Quality Control



Table 5. Data completeness requirements for the assessment of ozone visible injury

Variable	Reporting unit	Data completeness
In-Plot survey		
Symptomatic leaves or needles per branch and plot	Score per branch	At least 80% of the required branches scored
Off-Plot survey		
No. of quadrates assessed (LESS) per plot	Species name & code	At least 80% of the expected number of quadrates according to the adjusted sample size

Notes

Inn-plot survey: within IM plot

Off-plot survey: LESS and LESS-plus

For definition of adjusted sample size, see Annex I, Table A-1.

(B) Assessment of Ozone Injury



Quality Assurance & Quality Control



Table 6. Data quality objectives (DQO) for individual expert assessing ozone visible injury

Type of exercise	Variable	Data quality objectives
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How can we apply DQO and DQL for countries that do not attend the training courses?

Table 7. Data quality limits for the assessment of ozone visible injury

Type of exercise	Variable	Data quality limits
Photo exercise	Scoring (symptomatic or not) of several plants	≥ 70% of the individuals fulfill DQO
Fresh material exercise	Scoring (symptomatic or not) of several plants	≥ 70% of the individuals fulfill DQO
LESS survey	Frequency of quadrates including symptomatic plants (% of forest edge vegetation area affected)	≥ 70% of the individuals fulfill DQO



Collaboration



- **FP7**
The impact of atmospheric pollution on European land ecosystems and soil in a changing climate
- **COST action FP0903**
Climate Change and Forest Mitigation and Adaptation in a Polluted Environment (COST Action FP0903)
- **ICP-Vegetation / O₃ flux**



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