ISO EN 19258 & SELECTED NATIONAL APPROACHES

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ENVIRONMENT AGENCY AUSTRIA umweltbundesamt

OUTLINE

- ISO EN 19258 “Soil quality – guidance on the determination of background values”
- Selected national approaches:
  - Italy (Recalling Namur May 2018: A. Vecchio & M. Guerra)
  - Germany: LABO
  - Austrian Standard: ÖNORM L 1075

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ISO 19258 - SCOPE

- **guidelines for the principles and main methods** for the determination of background values for inorganic and organic substances in soils at a **local/regional scale**.
- The site scale is excluded.
- It gives guidelines for **sampling and data processing** strategies. It identifies methods for sampling and analysis.
- This document does not apply to the determination of background values for groundwater and sediments.

ISO 19258 - CONTENT

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ISO 19258: Terms & definitions (1)

3.1 background concentration

concentration of a substance characteristic of a soil type in an area or region arising from both natural and atmospheric diffuse sources such as atmospheric deposition

3.2 background value

statistical characteristic of the total (natural pedo-chemical and anthropogenic) content of a substance in soil

Note 1: Commonly expressed in terms of average, typical, mean, mode, or range of values or a background value

ISO 19258: Terms & definitions (2)

3.4 pedo-geochemical background concentration

concentration of a substance in a soil **resulting from natural geological and pedological processes,** excluding any addition of anthropogenic origin

3.5 pedo-geochemical background value

statistical characteristic of 3.4

3.6 / 3.7 anthropogenic background concentration / value

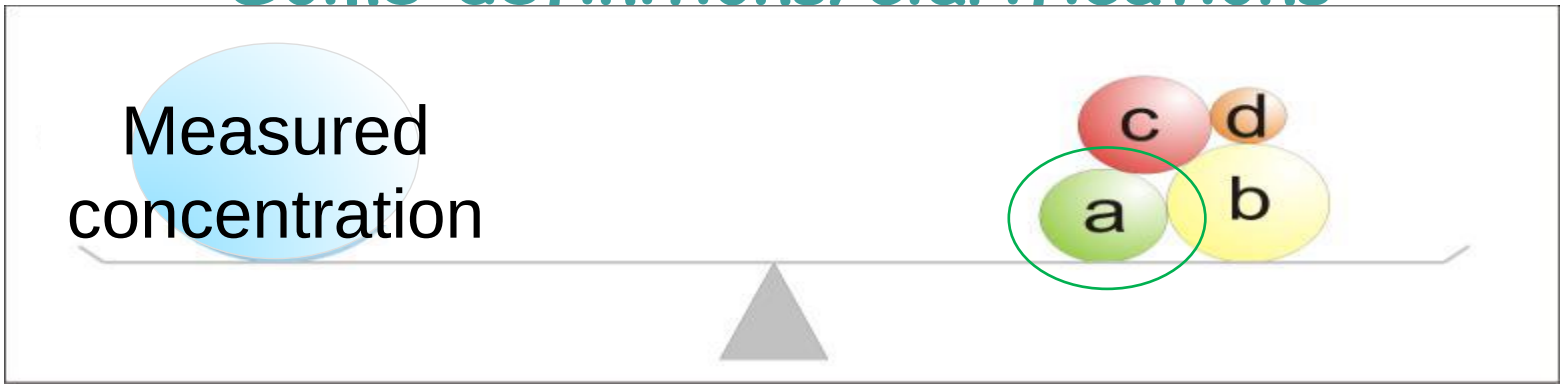
3.9 study area

3-dimensional definition of the area where samples are to be obtained from and, thus, for which the background values are to be determined

ISO 19258 – OBJECTIVES (5.2.1)

- to identify the current concentrations of substances in soils
- to assess the degree of contamination by human activities
- to derive reference values for soil protection
- to define soil values for reuse of soil materials and waste
- to calculate critical levels and tolerable additional critical loads
- to identify areas/sites with atypically enhanced levels of chemical substance concentrations due to …

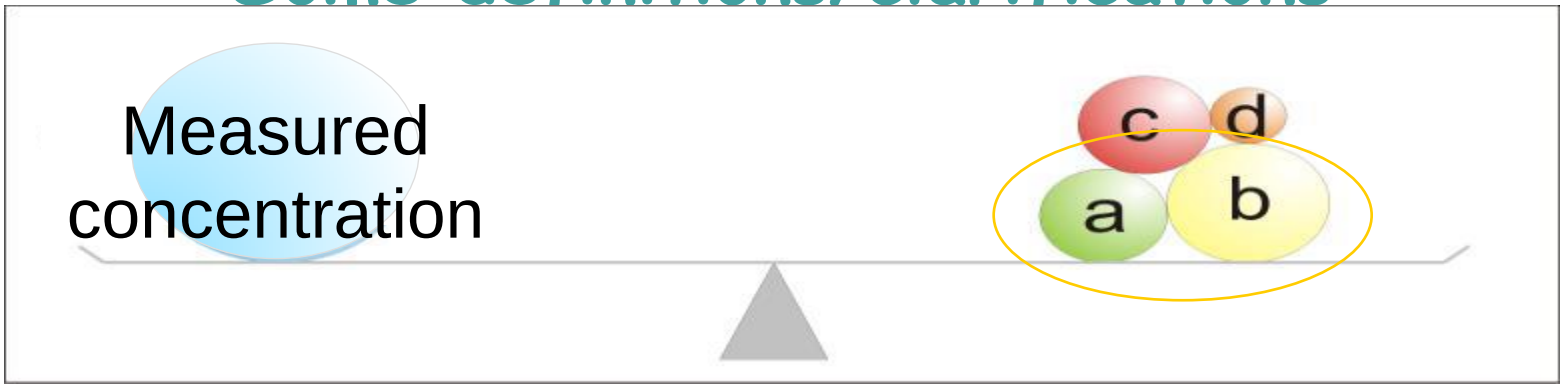
Some definitions/clarifications



Sources: a) natural, b) anthropic diffuse, c) point anthropic on-site d) point anthropic off-site.

"Natural Background" (VFN): distribution of a substance in environmental matrices (soil, subsoil, stone material - i.e. > 2 mm - and groundwater) deriving from natural (geochemical, biological, hydrogeological) processes, with any undetectable or not appreciable human component.

Some definitions/clarifications

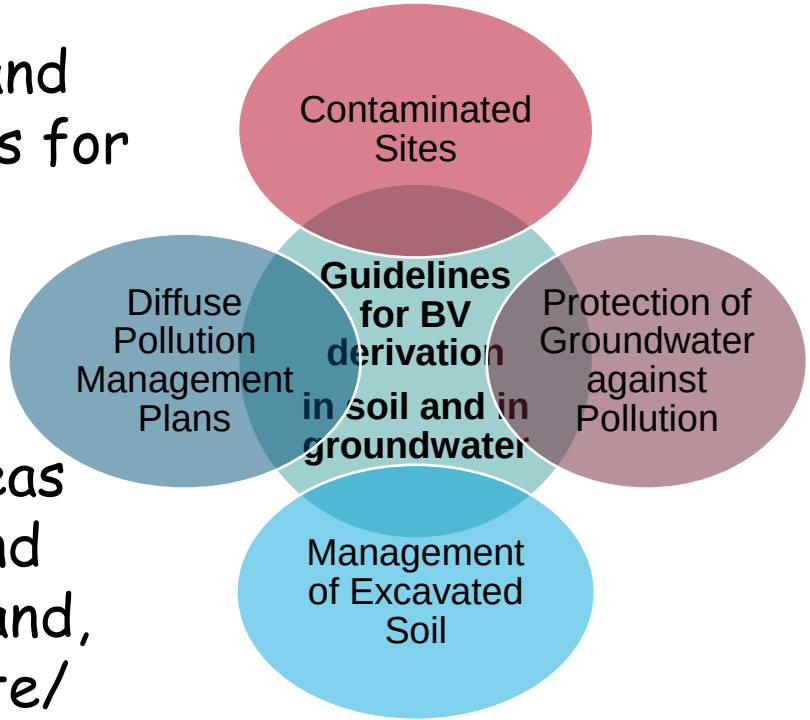


"Anthropic Background" (VFA): distribution of a substance in environmental matrices (soil, subsoil, stone material - i.e. > 2 mm - and groundwater) deriving from natural processes and from diffuse anthropogenic sources. For a given historical environmental context, this distribution represents the most undisturbed state possible with respect to localized sources that can impact on the territory in question.

Definition of BV in different contexts

New Guidelines are more articulated and they try to give practicable indications for BV derivation even in very different contexts (in terms of scale, scope and results of the assessment).

Current regulations consider BV in areas with very different characteristics and therefore the way BV is "quantified" and, the way BV is "compared" with the site/ matrix of interest should be different .



Soil: Contamination & Background

Policy Context	Diffuse pollution	Cont. sites Management	Management of excavated soil		
	in situ	*in situ*	*cont. sites (on-site reuse)*	*not cont. sites (on site resuse)*	*off site management*
Soil status: not contaminated	C<CSC or VFN	C<CSC or VFN/VFA C<CSR	C<CSC or VFN C<CSR	C<CSC or VFN	C<CSC or VFN
Action	No action		Excavated soil do not follow waste regime Reuse is possible		
Soil status: contaminated	C>CSC or VFN	C>CSC or VFN/VFA C>CSR	C>CSC or VFN C>CSR	C>CSC or VFN	C>CSC or VFN
Action	Diffuse Pollution Manag. Plans	Detailed investigation, Remediation, Other measures	Excavated soil follows waste regime Excavated soil cannot be reused as by-product		

CSC – screening values for soil (Cont. Sites legislation)
CSR – site-specific target values determined after a HHRA (Cont. Sites legislation)
VFN – natural background & VFA – antropogenic background

AUSTRIA: ÖNORM L 1075 (1)

TITLE: “Principles for the evaluation of the content of selected elements in soils

[3rd edition: 2017]

CONTENT:

- defined controlling key factors
- ***ANNEXES: Background Values (tabelled)***
  - land use related + further controlling factors
  - 85 % percentile
- Trigger Values

Tabelle A.1 — Elementgehalte Ackerböden (mg · kg-1; 85-er Perzentile ohne Ausreißerbereinigung), (Quelle: [62])

Klassifikationskriterium	Klassifikationsbereich	As	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Se	Tl	V	Zn
Carbonat-Beeinflussung (CaCO3)	carbonat-beeinflusst	14,8	0,4	13	54	35	0,27	1,3	36	29	0,42	0,3	55	100
	n	512	530	518	526	530	512	504	526	530	481	23	69	530
	carbonat-unbeeinflusst	14,5	0,3	16	55	30	0,24	0,8	35	25	0,36	0,6	51	100
	n	486	623	621	623	623	486	484	623	623	368	58	67	623
pH-Wert	4 bis unter 5	14,7	0,2	15	65	33	0,29	0,9	34	24	0,38	0,3	47	113
	n	89	98	98	98	98	89	89	98	98	75	2	4	98
	5 bis unter 6	14,7	0,3	16	55	32	0,23	0,8	37	26	0,33	0,8	59	102
	n	272	339	336	336	339	272	272	336	339	200	25	47	339
	6 bis unter 7	16,1	0,3	15	53	31	0,23	0,9	37	26	0,37	0,3	51	100
	n	210	277	268	276	277	210	202	276	277	161	30	46	277
	≥ 7	14,0	0,4	12	54	34	0,27	1,2	34	25	0,43	0,3	50	95
	n	425	438	435	437	438	425	423	437	438	413	24	37	438

Source: ÖNORM L 1075

AUSTRIA: ÖNORM L 1075 (2)

Key factors to consider for interpretation

(as well already considered in BV Annex tables)

- geological situation
- pH (lime content)
- organic matter
- soil type (particle size distribution)
- depth of soil profile

AUSTRIA: ÖNORM L 1075 (3)

element	TV	Use-related TVs (Trigger Values)								
		farming	cultivation of wine, fruits & hop		pasture		forests		urban areas	
		pH > 6	pH < 6	pH > 6	pH < 6	pH > 6	(i)	(ii)	(iii)	(iv)
As	20				30	30				50
Cd	0,5	1,0		1,0	1,0	1,0	1,5	3,0	2,0	2,0
Cu	60	100	150	150		100			100	150

Source: ÖNORM L 1075

i. **$CaCO_3$ neglible; humus, top soil (0 – 20 cm)**

ii. **$CaCO_3$; humus, A & B horizon**

iii. **oral ingestion likely**

iv. **oral ingestion and gardening unlikely; pH > 6**

AUSTRIA: ÖNORM L 1075 (4)

Application

➔ Trigger Values: inform whether further investigation is necessary

➔ not legally binding

❑ technical scientific background to be considered

- ❑ when legally binding threshold values on soil and waste are under development
- ❑ on site scale

GERMANY: LABO
BACKGROUND VALUE REPORT (1)

Background Values for inorganic and organic substances in soil (revised and amended 4th edition: 2017)

- follows generally definitions and concepts of ISO 19258
- advocates 50 % & 90 % percentiles
- provides for background values at “Länder”-level (provinces) and as well at federal level

GERMANY: LABO BV-REPORT (2)

Key factors to consider for interpretation

- geological situation
- organic matter content
- land use
- soil horizons
- **area typology** (to classify likelihood of anthropogenic influences)

GERMANY: LABO BV-REPORT (3)

Technical approaches for data analysis

- data harmonisation
- dealing with values below detection limit
- calculation of background values
- determination of uncertainties

NOTE:
also ISO EN 19258 highlights considerations on technical approaches

GERMANY: LABO BV-REPORT (4)
RECOMMENDATIONS: KEY FACTORS, POLLUTANTS

	SOIL PROFILE / HORIZONS		
	humus	top soil	underground
INORGANIC SUBSTANCES			
geological setting	ooo	+++	+++
Organic matter content	---	ooo	---
Land use	Xxx	xxx	ooo
Area typology	xxx	xxx	xxx
ORGANIC SUBSTANCES			
Geological setting	---	---	---
Organic matter content	---	xxx	---
Land Use	xxx	xxx	---
Area typology	xxx	xxx	xxx

LABO BV-REPORT (5) APPLICATION

➔ **characterisation of soil quality**

➔ **considered connected to various legal topics**

- soil (precaution and remediation)
- diffuse soil pollution (area approaches)
- IED implementation
- waste (reuse of materials)
- (ground-)water
- air quality

PERSONAL SUMMARY / CONCLUSIONS

USE OF BACKGROUND VALUES

A. **characterisation of soil (the natural system)**

B. **preparing informed decisions (the social system)**

➔ importance of terms and definitions

➔***language matters!*** – it's about helping common understanding

➔call for **clear objectives**

➔**transparency**: technical approaches and data quality

➔**tailoring systemic approaches** (as simple as feasible – symplicity helps!)

THANKS FOR LISTENING

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