

Figure 1 Welcome screen of the SIMONA IT Tool

A stream of cooperation

Project co-funded by the European Union (ERDF, IPA and ENI)

PROJECT TITLE	Sediment-quality Information, Monitoring and Assessment System to support transnational cooperation for joint Danube Basin water management
ACRONYM	SIMONA
PROJECT DURATION	1st June 2018 to 30th Nov 2021, 42 months

AUTHORS:

Bese PÁL, HU, Geonardo Environmental Technologies Ltd. Contact to the authors: <u>bese.pal@geonardo.com</u>

RESPONSIBLE(S) OF THE DELIVERABLE:

Bese PÁL, HU, Geonardo Environmental Technologies Ltd.

CO-RESPONSIBLE(S) OF THE DELIVERABLE:

András SZÉKÁCS, Mária MÖRTL, Katalin Mária DUDÁS and Gyozo JORDÁN, Hungarian University of Agriculture and Life Sciences (HU-MATE)

EDITING:

Bese PÁL, HU, Geonardo Environmental Technologies Ltd.

DATE OF PREPARATION

30/11/2021

For further information on the project, partnership and the Danube Transnational Programme:

www.interreg-danube.eu/simona

FIND SIMONA PROTOCOLS ON THE WEBSITE!





Table of Contents

A stream of cooperation

1.	Sun	nmary4
2.	Intr	roduction
	2.1.	Purpose of this document
	2.2.	References
3.	Def	initions, acronyms and abbreviations4
4.		r stories4
	4.1.	Overview4
	4.2.	Browsing publicly available data
	4.3.	Registration
	4.4.	Monitoring site details
	4.5.	Recording monitoring site observation data
	4.6.	Submitting sediment sample data14
	4.7.	Uploading laboratory results15
	4.8.	Data analysis
	4.9.	Exporting WISE compatible reports
	4.10.	Add new monitoring site17
	4.11.	Manage quality standards17

Page 3 | 19

1. SUMMARY

The SIMONA-Tool IT application is a web application for collecting, analysing sediment sample data, running risk evaluation and generating sediment quality reports. The software has been launched for beta testing and access has been given to a selected group of test users. This document aims to support the testing phase by describing the system's available functions.

2. INTRODUCTION

2.1. Purpose of this document

This document gives a high-level, easy-to-understand overview about the user interface and available functions of the SIMONA-Tool IT application.

2.2. References

- <u>SIMONA IT Tool</u>
- <u>Eionet Data Dictionary</u>

3. DEFINITIONS, ACRONYMS AND ABBREVIATIONS

CAS	Chemical Abstracts Service
GDPR	General Data Protection Regulation
QS	Quality Standard
WISE	Water Information for Europe

Table 1 Definitions and abbreviations

4. USER STORIES

4.1. Overview

User story is an informal, natural language description of features of a software system. In this document the SIMONA-Tool's functions are demonstrated thought user stories, written from the perspective of the end user.

Page 4 | 19

A stream of cooperation Project co-funded by the European Union (ERDF, IPA and ENI)

4.2. Browsing publicly available data

Several features are openly available to visitors without having a registered account. These are primarily related to browsing water quality monitoring sites and getting an overview of the latest sediment quality status. The tool can be launched from the main navigation bar or by clicking on *Launch the tool* button on the welcome screen.

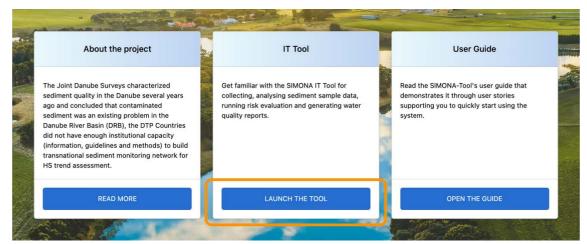


Figure 2 Launch the tool button highlighted on the welcome screen

A document repository is available under the *Documents* section where users can find useful information about the applied methodology and standards.

		Documents	
PUBLICATIONS			•
elements (PTEs) and persistent org organic matter, clay minerals, sulph detailed information on the historic	uenced by human activity, acting a anic pollutants (POPs) depends or rates, and carbonates also affect r	s and/or the carrier of pollutants, becoming a source of pollution topography, the oxic- anoxic conditions and kinetics of the sorp tetal mobility in the sediments (bottom and stream sediments, su d, and if the PTEs and POPs are attached to stored alluvium, it ca	if environ- mental conditions change. The transport of potentially toxic tion/desorption processes. Moreo- ver, pH, salinity, and the presence of spended matter sediment, floodplain sediment). Sedi- ments provide in turn them from being a sink to a source of pollutants for the sediment

Figure 3 Documents section



4.2.1 User interface elements

The layout of the tool's screen is divided into six main panels:

1. Main navigation bar

On the top of the screen the main navigation bar provides links to other parts of the web application.

2. *Map*

The central element of the user interface is the map displaying information about monitoring sites, water bodies and water quality status evaluation results. The current scale is displayed on the bottom left corner.

3. Search-by-address tool

For quicker navigation the tool provides this search tools that allows users to enter a postal address then move the centre of the map to the corresponding geolocation.

4. Layers

On the aside panel, using the switches users can specify the kind of data to be displayed on the map. By default, surface waterbody monitoring sites and sediment quality status layers are selected. These layers are displayed on the map as interactive markers. By clicking those markers further details are available.

5. Quality standard manager

For specific user groups the quality standard manager is available on the aside panel that allows them to set up or update quality standards by specifying concentration threshold values against specific substances.

6. Monitoring site browser

Monitoring sites are listed at the bottom of the screen. Filtering by countries and searching by keyword is available above the list. Each record on the list provides a button that sets the centre of the map to the corresponding monitoring site's coordinates.

Page 6 | 19

Canube Transnational Programme Danube Transnational Programme SIMONA	ide GÞ			1
Search by location 3	Esztergom	Nagymaros Vác		Aesa jõlmatvan 2
Search for an address	i jfalu	Tahitótfalu	•	
Layers 4	Dorog D	Puna-Ipoly emzeti Park		1 he
Water quality status		Szentendre		Kar
Monitoring sites	. 24	Ponaiz Dunakes	Veresegyház	Aszód
Surface water	Pili	svörösvár Solymar	Eát	löllő
Ground water		Solymar		in a
Surface water bodies	Zsámbék	1.	Kistarcsa	• Isaszeg
Sub units	Bicske	Budapest	Péc	ei 🖂
River basin districts	Biatorbágy	Budaörs	Ma	Sülys
Quality standard 5	• To	rökbálint	Vecsés	Gyömrő
	usacsa	Érd	Gyál Ül	.6
	@mepbex	Szigetszentmiklós	\mathcal{K}	Monor
		holomoulio	O Maphox O OponSt	notMap Improve this may
S All countries ▼	Q Sync:			6
Country Name				Thematic id
• AT ACHAU, BR			300012	AT300012
• AT SCHWECHAT, BL 369			300020	AT300020
• AT BREITENAU, BR HAUS	NR.184		300103	AT300103
1 2 3 4 5 6 7 8	9 10 Þ H		1	- 100 of 139187 items

Figure 5 Main user interface elements



The layout is divided by two collapsible panel: one horizontal and on vertical. In case there is not enough space on the device's screen (e.g., on mobile devices) the tool automatically hides the supporting panels that can manually be opened again.

Figure 4 Mobile layout

Page 7 | 19

4.2.2 Searching for monitoring site

Information provided by the tool is primarily available linked to specific monitoring sites. Hence a key action is to find the monitoring site of interest. The tools support this action in the following three ways.

Geolocation	The map is centred to the device's current location, if available.
Geocoding service	Using the search-by-address tool sites can be found by address.
Search by keyword	Monitoring sites can be found by their name using the free text search method provided by the list view on the bottom panel.

Table 2 Supporting methods for finding monitoring sites

Geocoding service allows the user to enter parts of the monitoring site's address then select the specific address from the suggestion list.



Figure 6 Geocoding service displaying suggestions

Monitoring site list can also be used for search for a monitoring site. By entering a keyword, the list gets filtered and shows buttons that moves the map to the specific monitoring site.

Ground water		Palak	Da	
Surface water bodies				
Sub units		ÓBUDAI GÁZGYÁR	Újpesti vasúti hid	
River basin districts	IBS International Business School		T. Wasser	
Quality standard	Retro	⊈ Obudai szigete, úcs	NÉP	SZIGET
	á Table – Le Gara			Vácių
	Auchan	Gammy		
	Omepbox		© Mapbox © Opens	treetMap Improve this map
O Hungary	▼ torkolat felett Q ync:			
Country	Name			Thematic Id
♥ ни	TORKOLAT FELETT		HU101845781	HU101845781
♦ 102	TORROLAT FELETT		HU101845839	HU101845839
• ни	VÁC, TORKOLAT FELETT		HU101845884	HU101845884

Figure 7 Filtered monitoring site list

A stream of cooperation

Project co-funded by the European Union (ERDF, IPA and ENI)

4.2.3 Monitoring site details

Basic monitoring site details are openly available to visitors that can be accessed by clicking on the marker of the site. Markers are linked to summary popups listing basic details about the site and the current sediment quality evaluation results.

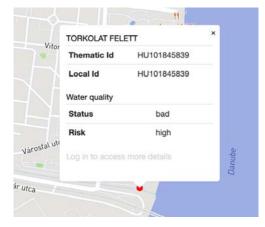


Figure 8 Monitoring site summary

4.3. Registration

Registering an account is open to everyone and requires minimum amount of data to be entered: first name, last name and email address. These data will be stored by the platform hence subject of *GDPR* and the user needs to read and accept the privacy policy first.

	J.M Register to	
which a winterfa blusters water	SIMONA	
145 31	First name	MARCH SAN
And Andrew Arts	Last name	
X II in all a	Last name	
AND HEAR AND AND AND	Email address	
	Policy.	and the second second
STARS OF THE REAL	Back to home Sign In Regsiter	AND STREET
	A A A A A A A A A A A A A A A A A A A	

Figure 9 Simplified registration form

After submitting the basic personal information, a confirmation email is sent to the given email account containing a custom link that can be used to verify it.

Page 9 | 19

A stream of cooperation Project co-funded by the European Union (ERDF, IPA and ENI)

Consulto Transmitional Programme SIMONA	
Dear Lorem, Your SIMONA account has been created and you can log in here using the following access data: email address: test@pbd.hu password: Best regards, the SIMONA team	

Figure 10 Confirmation email sent after account registration

4.4. Monitoring site details

Registered users have access to more information associated to a monitoring site depending on their role.

4.4.1 Risk evaluation results

Risk assessment with regards to the selected monitoring site against a specific quality standard can be quickly carried out on the *Overview* tab of the *Monitoring Site Details* dialog. Using the drop-down list at the top of the panel one can select a quality standard. Once the standard is selected, the assessment gets performed using the threshold values defined by the standard. On the result view components are listed along with the corresponding status and risk results.

OVERVIEW	GENERAL DETAILS	SITE OBSERVATIONS	SEDIMENT SAMPLINGS	LABORATORY RE	ESULTS A	SSESSMENT
QSsed fro	m EQS dossiers 👻					
1,2,3,4,5,6	-Hexachlorocyclohexan	e	10.3		bad	high
17beta-Es	tradiol		0.33		bad	high
Aclonifen			760		bad	high
Anthracen	ie		147.8	1.16667	good	low
Benzo(a)p	yrene		91.5	1.16667	good	low
Benzo(b)fl	luoranthene		70.7		bad	high
Benzo(g,h	,i)perylene		42	1.16667	good	low
Rep.zo/k)fl	luoranthene		675		bad	hiah

Figure 11 Assessment results by substances

Page 10 | 19

4.4.2 General geographic details

Monitoring sites belong to a specific geographic location. Following the *WISE* geographic classification, the relevant water body, sub unit and river basin district is shown. Each feature is linked to their Eionet Data Dictionary record.

Monitoring Site Deta	ails					□ ×
OVERVIEW	GENERAL DETAILS	SITE OBSERVATIONS	SEDIMENT S	AMPLINGS	LABORATORY RESULTS	
Monitoring	Site		Water Boo	dy		
Name	TORKOLAT FE	LETT	Name		RANYHEGYI- ÉS HATÁRRÉTI ATAKOK	
Thematic Id			Thematic Id			
Local Id	HU101845839		Local Id	н	JAEP279	
			Zone Type			
			Specialised Z Type	one riv		
Sub Unit			River Basi	in Distric	ct	
Name	DUNA		Name	A DUNA-VÍZ RÉSZE	ZGYŰJTŐ MAGYARORSZÁGI	
Thematic Id			Thematic	HU1000		
Local Id	HUAEP	2180	Id			
			Local Id	HU1000		

Figure 12 Geographic details of monitoring site

4.4.3 Monitoring site observations

Observation data collected during surveillance monitoring about the site is listed under the *Site Observations* tab. The list shows each record of observations where details can be edited and documents can be stored.

VERVIEW GEN	ERAL DETAILS SITE OBSER	VATIONS SEDIMENT SAMPLINGS	LABORATORY RESULTS	ASSESSMENT
0	Q + AC	DD NEW SITE OBSERVATION		
2021-10-21	moderate	bad		× D
2021-08-10	good	bad		* × ©
2021-06-15	moderate	good		* × ©
2015-06-18	bad	good		/ × D

Figure 13 List of recorded monitoring site observations

Page 11 | 19

4.4.4 Sediment samplings

Sediment samplings in the system represent the observation event when sediment samples are collected. On the *Sediment samplings* tab such recorded events are listed.

Ionitoring Site Details			
OVERVIEW GENERAL DETAIL	LS SITE OBSERVATIONS SEDIMENT SAMPLINGS	LABORATORY RESULT	S ASSESSMENT
0	+ ADD NEW OBSERVATION		
▶ 2015-06-10	HU101845839/7		/ × 0
▶ 2014-07-11	HU101845839/6		/ × 12
▶ 2012-07-09	HU101845839/5		/ × 0
▶ 2011-08-04	HU101845839/4		1 × 12
▶ 2010-06-22	HU101845839/3		/ × 0
▶ 2010-04-20	HU101845839/2		/ × 0

Figure 14 Sediment samplings that took place at the monitoring site

4.4.5 Laboratory results

On the *Laboratory results* tab actual concentration information is shown for each sample collected under the registered samplings. This data is produced by laboratories as a result of the analysis of samples.

Monitoring Sit	te Details					□ >
OVERVIEW	GENERAL DETAILS	SITE OBSERVATIONS	SEDIMENT SAMPL	INGS	LABORATORY RESULTS	ASSESSMENT
		Drop	files here to upload			
0		् <u>+</u> LABORATORY	(RESULTS TEMPLAT	E		
Subst	ance		Quantity	UoM		
Sample:	HU101845839/6/SS					
Arsen	ic		11.3	mg/kg		X
Cadm	ium		2.12	mg/kg		×
Chron	nium		35.4	mg/kg		/ ×
Сорре	ər		54.1	mg/kg		X
Mercu	irv		0.06	malka	0	

Figure 15 List of measured concentration details of components

Page 12 | 19

4.4.6 Assessments

For researchers the *Assessment* tab allows to run quick risk evaluation against a single substance.

OVERVIEW	GENERAL DETAILS	SITE OB	SERVATIONS	SEDIMENT	SAMPLINGS	LABORATORY RE	SULTS ASSESSMENT
Start date		÷					
End date		t	2008	0.1	mg.kg-1		high uncertainty
Substance			2008	0.1	mg.kg-1		high uncertainty
QS	2.00		2008	0.1	mg.kg-1		high uncertainty
Q5			2008	0.1	mg.kg-1		high uncertainty
			2008	0.1	mg.kg-1		high uncertainty
			2008	0.1	mg.kg-1		high uncertainty
			2010	0.1	mg.kg-1		
			Status		Risk	Uncertaint	r

Figure 16 Custom assessment

4.5. Recording monitoring site observation data

Monitoring site observation data can be submitted by filling in the *Site Observation* form, specifying observation details in the following categories:

- Monitoring site identification
- Hydromorphology
- Hydrography
- Water quality
- Physiography
- Other site-specific features



MONITORING SITE IDENTIFICATION	
Monitoring Site Observation date	
TORKOLAT FELETT 10/13/2021 2:00 PM	Ŀ
Downstream end (Longitude) Downstream end (Latitude) Upstream end (Longitude) Upstream end (Latitude)	
	\$
Monitoring site length Monitoring site altitude	
	•

Figure 17 Monitoring site observation form

4.6. Submitting sediment sample data

Sediment samples belong to samplings, therefore, details about the observation (e.g., sampling date, weather and water conditions) need to be entered. Once this information is given arbitrary number of samples can be added to the sampling.

Observation			□ ×
SAMPLING IDENTIFICATION			
Sampling date			
12/13/2021 12:31 PM 🛗 🕒			
WEATHER CONDITIONS			
Air temperature		Humidity	Precipitation
measurement O estimation	Air pressure	measurement 🧿 estimation	measurement O estimation
Select an option 🔹	🔷 mbar	✓ Select an option	Select an option 🔹
Wind speed			
measurement O estimation	Wind direction		
Select an option 👻	n/a	•	
WATER CONDITIONS			
рН	Electric conductivity	Redox potential	Dissolved Oxygen
	🖕 uS/cm	▼ mV ▼	💂 mg/L 🔻

Figure 18 Sediment sampling details

In the 2^{nd} step information about each sample is requested.

A stream of cooperation

Project co-funded by the European Union (ERDF, IPA and ENI)

Page 14 | 19

Sample			□ ×
SAMPLE IDENTIFICATION	SAMPLING DETAILS	SAMPLE DESCRIPTION	
Code	Sampling system	Sample volume	
	•	🔶 dm3	•
Analysed matrix	Equipment	Weight	
- · · · · · · · · · · · · · · · · · · ·	Composite sample	Ç g	•
Duplicate sample	Number of sub-samples	рН	
			A
	÷		▼
Duplicate sample identifier		Electric conductivity	
	Point sample		
		uS/cm	

Figure 19 Sediment sample details

4.7. Uploading laboratory results

On the *Laboratory results* tab of the *Monitoring Site Details* dialog – for those who are allowed to upload – a file upload panel is available. Using the drag-n-drop method laboratory results can be submitted as an Excel spreadsheet.

Monitoring Site Detai	s				□ ×
▲ NERAL DETAILS	SITE OBSERVATIONS	SEDIMENT SAMPLINGS	LABORATORY RESULTS	ASSESSMENT	
		Drop files here to upload	i		

Figure 20 Panel for uploading laboratory results

The scheme of the spreadsheet must follow a predefined structure to be processable by the system. Namely, all the components need to be referenced by their *CAS* code and associated to a sample identifier generated by the tool.

					phenomenonT	r i i i i i i i i i i i i i i i i i i i		resultQualityO		n	neter
monitoring	Site monitoringSiteIdent	ifier parameterWate	observedPropertyDeterminan proc	edureAnal	imeSamplingE)	resultObserve	bservedValue	procedureLOQ	parameterSampl_S	edi
Identifier	Scheme	rBodyCatege	dCode 🛛 👻 ysec	dMatrix 💌 resultUom	💌 ate 🔍	sampleIdentifier	🔻 dValue 🛛 🔻	BelowLOQ 💌	Value 🔻	eDepth 💌 n	he 🔻 paramete 💌 res
SDR01BS	ProjectCode_SIMONA	RW	CAS_7440-38-2_Arsenic and its com S-200	00 mg/kg	2020-08-05	5 SDR01BS/CR/TL	2,52	false	0,005		5
SDR01BS	ProjectCode_SIMONA	RW	CAS_7440-43-9_Cadmium and its co S-200	00 mg/kg	2020-08-05	5 SDR01BS/CR/TL	1,98	false	0,003		5
SDR01BS	ProjectCode_SIMONA	RW	CAS_7440-47-3_Chromium and its c S-200	00 mg/kg	2020-08-05	5 SDR01BS/CR/TL	44,1	false	0,03		5
SDR01BS	ProjectCode_SIMONA	RW	CAS_7440-50-8_Copper and its com S-200	00 mg/kg	2020-08-05	5 SDR01BS/CR/TL	18,6	false	0,1		5
SDR01BS	ProjectCode_SIMONA	RW	CAS_7439-97-6_Mercury and its con S-200	00 mg/kg	2020-08-05	5 SDR01BS/CR/TL	0,09	false	0,005		5

Figure 21 Laboratory results

Page 15 | 19

4.8. Data analysis

For researchers a dedicated *Assessment* tab is available in the *Monitoring Site Details* dialog. It allows the user to carry out custom assessment against the stored laboratory results using four input data: startand end date of the period of interest, the selected substance and the custom *QS* value.

Start date	10/13/2004	Ë
End date	10/13/2021	
Substance	Arsenic	•
QS	2.00	*

Figure 22 Assessment input

The assessment results are summarised in a tabular layout as well as listed by observations.

Status	Risk	Uncertainty
bad	high	1.16667

Figure 23 Assessment summary

4.9. Exporting WISE compatible reports

Report generation in WISE compatible format is done by the system automatically with no further input required than pressing the *Report* button on the *Monitoring Site Summary* popup.

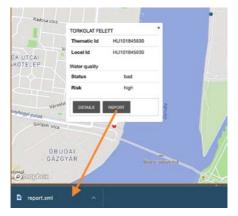


Figure 24 Downloading WISE compatible report



4.10. Add new monitoring site

Monitoring sites can be added to the database by clicking on the map and selecting the *Add new monitoring site* option.

ADD NEW MONITORING SITE

Figure 25 Context popup for adding new site

As a second step the new site's name is required to be specified. Once it is submitted the site can be accessed.

4.11. Manage quality standards

Region managers, national contacts and researchers can manage the system's quality standard database. From the aside panel the Quality Standard Manager can be launched.

Qual	ity Standard Manager				⊐ ×
\otimes		Image: Contract of the second seco	DARD		
		Description		Uploaded by	
Þ	QSsed from EQS dossiers	Sediment Quality Standards from EQS dossiers	EU	Kata Dudás	/ ×
*	SIMONA QSsed	QS sediment values calculated by SIMONA team, based on EQS dossiers	EU	Kata Dudás	X

Figure 26 List of quality standards

New quality standard can be added by specifying its name, description and the intended scale of it.

Page 17 | 19

Quality Stand	ard Manager			٥	×
0	م + ADD NEW QUALITY STANDARD				
QSsed f b dossier	Quality standard Cuality Standards from EQS	×	1		
► SIMON.	Name		ï		
	Description				
	Scale				
	EU				
	country				

Figure 27 Adding new quality standard

On the detail panel of each quality standard the list of substances is available along with their *QS* value.

Quality Standard Manager										
0	م + ADD NEW QUALITY STANDARD									
		Description			Uploade					
- 14 - 14 - 14 - 14 - 14 - 14 - 14 - 14	QSsed from EQS dossiers	Sediment Quality Standards from EQS dossiers	EU	Kata Dudás		ıdás	/X			
	0	۹ +								
				QS		Unit				
	CAS_608-73-1	1,2,3,4,5,6-Hexachlorocyclohexane		10.3	,	ug/kg	X			
	CAS_50-28-2	17beta-Estradiol		0.33	,	ug/kg	∕ ×			

Figure 28 QS values defined by a quality standard

Each value can be updated by clicking on *Edit* and specifying the substance and the threshold in a selected unit of measure.

A stream of cooperation

Project co-funded by the European Union (ERDF, IPA and ENI)

Page 18 | 19

Quality Standard Manager												
⊘ Name ↑		Q + ADD Description) NEW QUALITY STANI	DARD Scale								
QSsed from dossier		Sediment Quality S dard limit - 1,2,3,4,	tandards from EQS 5,6-Hexachlorocycl	ohexane		□ ×	X					
∞ 5	Substance											
	Anthracene											
	Sampled and a	nalyzed media										
CAS	Sediment - F	raction below 63 µm				•						
CAS	QS											
	10.30					\$						
CAS (Unit of measur	e										
CAS	ug/kg					•	×					
V	Water body cat											
CAS	Coastal wa	ater body										

Figure 29 Editing QS value

