GeoZS Geološki zavod Slovenije 75let

RESEERVE

Secondary Raw Materials in W. Balkan Mineral Register

RESEERVE final regional conference| 26th May 2021 | Robert Šajn

eit Regional Innovation Scheme

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SRM in the ESEE region (WP5)

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GEOLOŠKI ZAVOD

МАКЕДОНСКО ЕКОЛОШКО ДРУШТВО

RZGRS - GGRS Republički zavod za geološka istraživanja Republike Srpske Geological Survey of the Republic of Srpska - GSRS

The main purpose of this WP is to acquire information about the mining and metallurgic waste sites and create database to improve their accessibility and simultaneously to fill the gaps in this part of Europe.

Evaluation and classification of potential SRM, identification of extraction possibilities and environmental impact assessment had been performed.

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WP 5 Tasks

5.1 Identification of relevant data providers and examination of SRM data quality and format
5.2 Synthesis and creation of a common SRM data set
5.3 Evaluation of mine and metallurgic waste as potential source of raw materials
5.4 Harmonisation mine and metallurgic waste data into existing EU mining classification system

WP 5 Deliverables

5.1 Report on competent sources and existing SRM data.
5.2 West Balkan Mineral Register of SRM data.
5.3 Report on creating West Balkan Mineral Register of SRM data.
5.4 Data integration report (transfer into existing EU mining classification systems).
5.5 List of potential secondary sources with economic value

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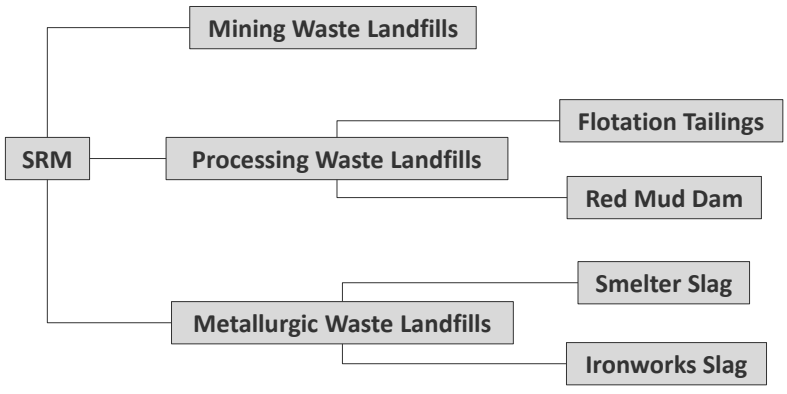
Classification dendrogram of SRM



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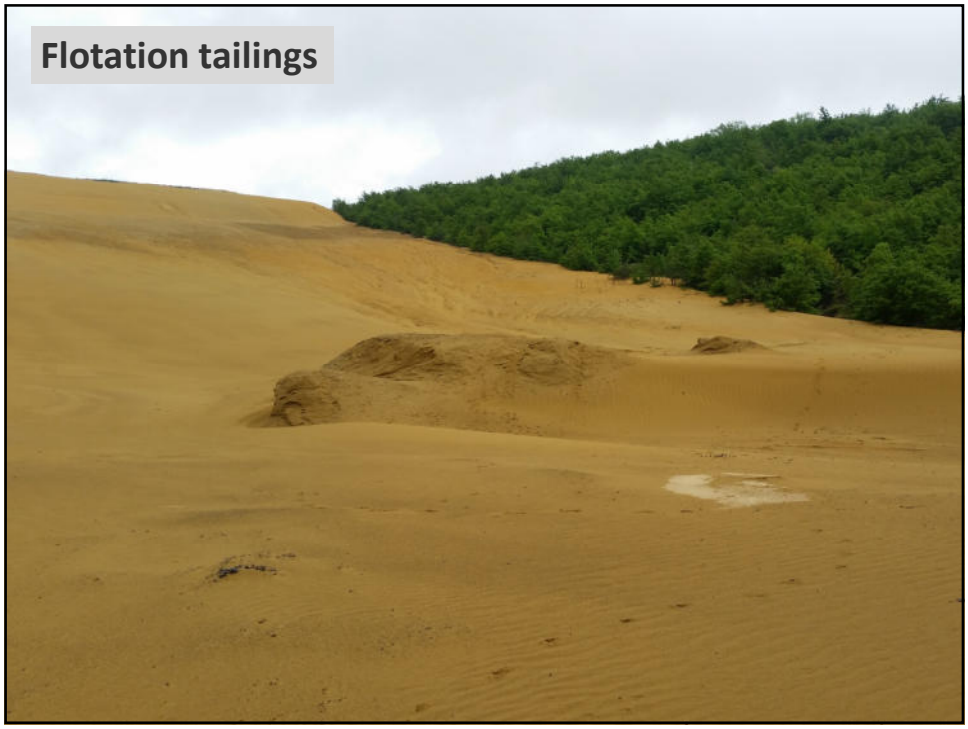

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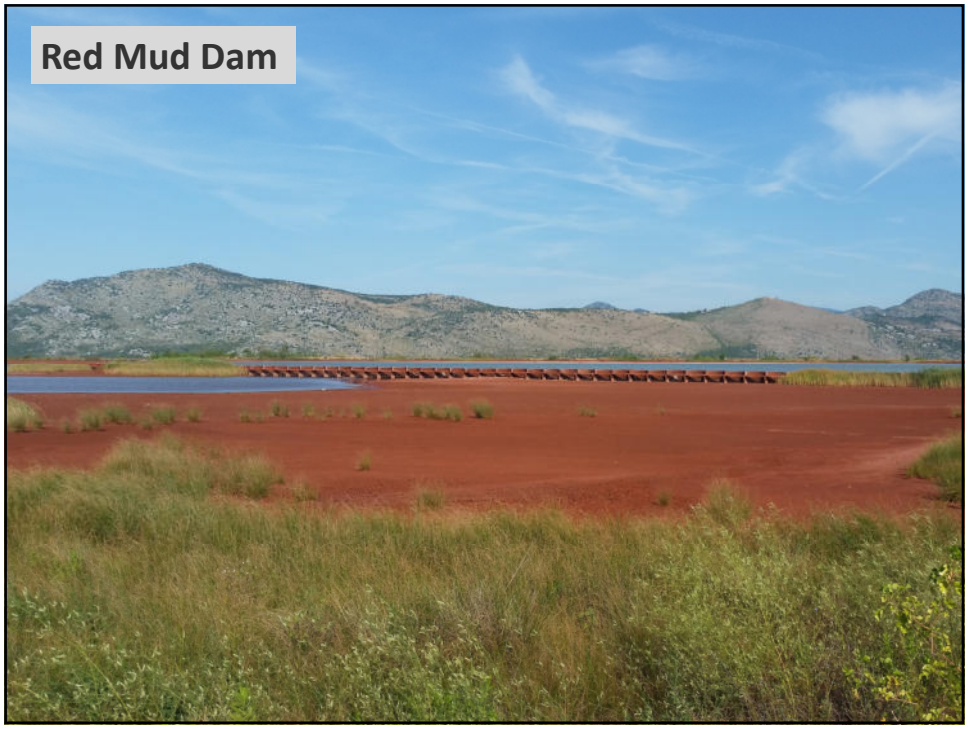

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The Initial Phase

The authorized national authorities, mostly the TPs had been providing data for SRM mineral register. This phase had been completed in the first half of 2019. The data sets had been reviewed and corrected periodically with each task partner.

It had been found that in many cases the collected data had been too general and unreliable, because they are declared as waste material without economical value that cause only environmental concern. This is completely contrary from the PRM.

The most common obstacles and problems were:

- inaccurate, unspecific, or unverified coordinates,
- data generalization and very general estimates,
- general lack of data.

Very often, the one SRM landfill site is composed of several separate landfills, especially those that are still active, they are chemically very different from each other due to changes in technological processes in the past.

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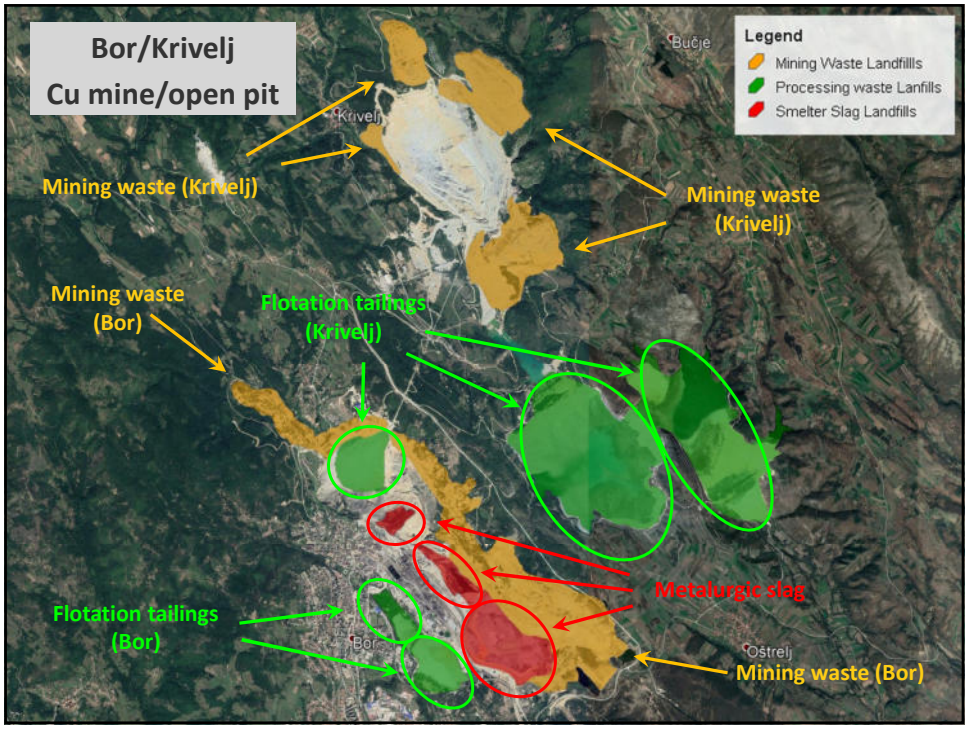

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The Final Phase

The 25 most promising sites had been inspected, the samples had been collected and analyzed. This phase had been completed at the end of 2020 what resulted with data collection from **113 sites (1461 deposits)**. All collected data had been carried out using remote sensing methods in combination with existing open-source data bases and visual verification in Google Earth Historical Imagery.

Open-source databases:
http://www.euromines.org/mining-europe/
http://www.europe-geology.eu/mineral-resources/
https://thediggings.com/
https://www.usgs.gov/centers/nmic/
https://www.grida.no/
https://www.mindat.org/

Spatial/geographical data:
https://land.copernicus.eu/pan-european/
https://www.google.com/earth/
https://www.openstreetmap.org/

All collected data are integrated in the Google Earth kml format as well as on the web link of the RESEERVE project official website: **(https://reseerve.front-lab.net/results/west-balkan-mineral-register-of-secondary-raw-materials).**

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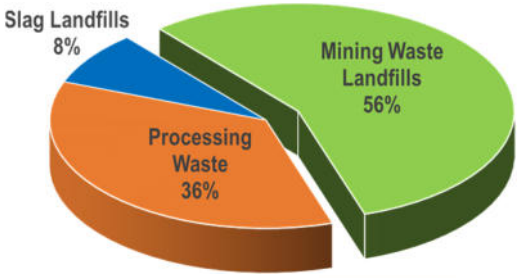
SRM Deposits

Type of landfill	Location	Deposit	Area (ha)
Mining landfills	86	1371	3308
Processing landfills	24	54	2107
Smelter Slag landfills	17	36	47
	113	**1461**	**5893**

2600 million tons

Sites by origin:
- Mining waste
- Processing Waste
- Metallurgic waste

9 variables / 1461 records
ID
Location
Deposit
Longitude
Latitude
State
Type
Element
Area (ha)



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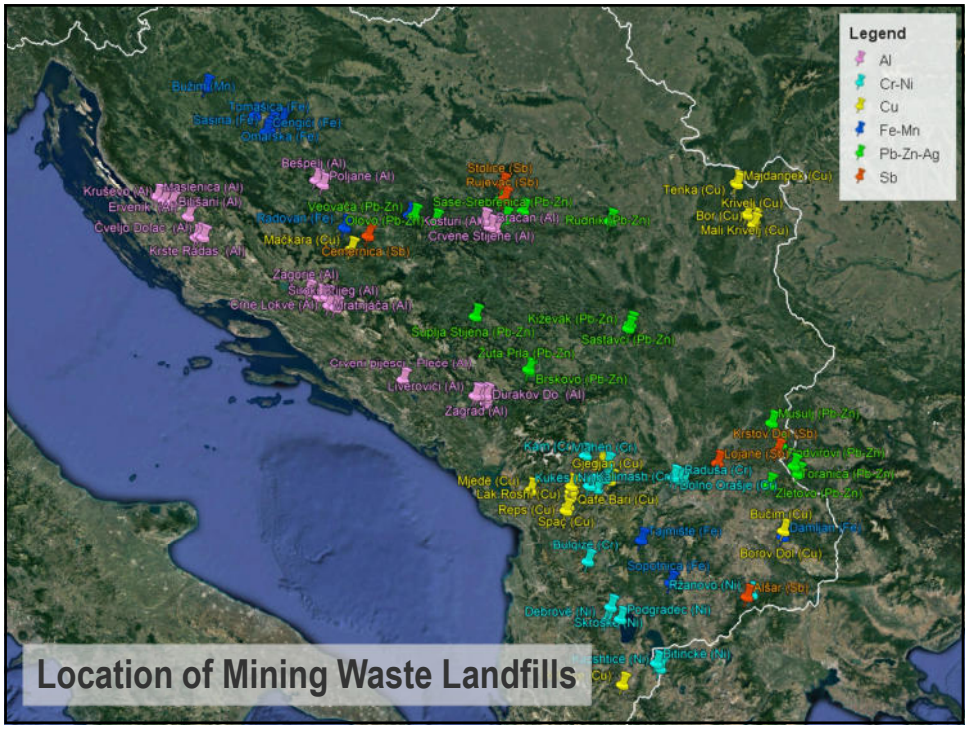
Legend
Al
Cr-Ni
Cu
Fe-Mn
Pb-Zn-Ag
Sb
Location of Mining Waste Landfills

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Legend
Processing Waste Landfills
Smelter Slag Waste Landfills
Location of Processing and Smelter Slag Waste Landfills

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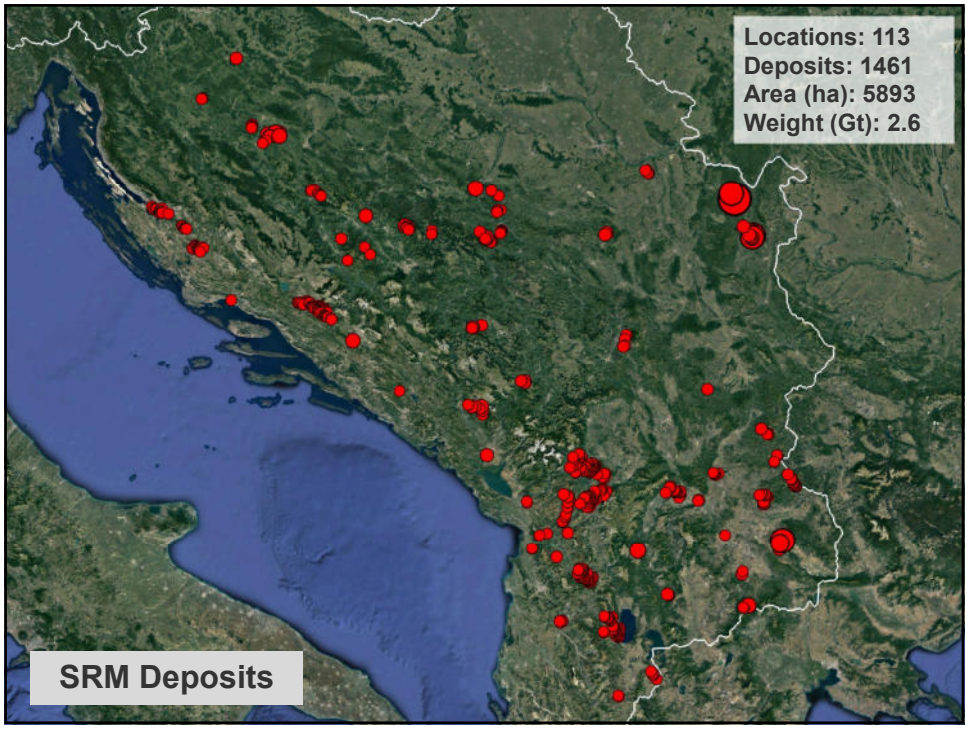

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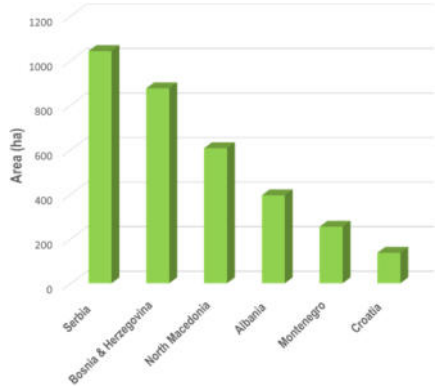
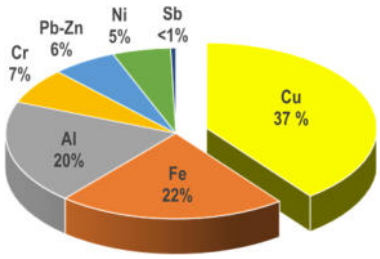
Mining Waste Landfills (1533 locations/3543 ha)





State	Area (ha)	Area (%)
Serbia	1042	31
Bosnia & Herzegovina	875	26
North Macedonia	606	18
Albania	395	12
Montenegro	254	8
Croatia	137	4

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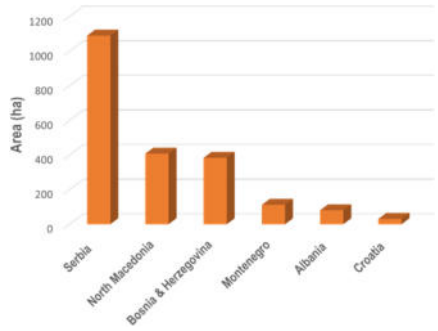
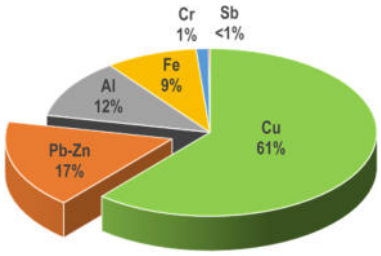
Processing Waste Landfills (64 locations/2315 ha)





State	Area (ha)	Area (%)
Serbia	1090	52
Bosnia & Herzegovina	408	19
North Macedonia	384	18
Albania	112	5
Montenegro	81	4
Croatia	31	2

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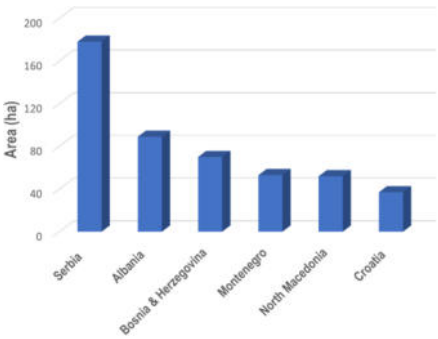
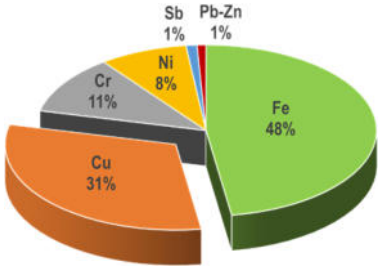
Smelter Slag Waste Landfills (64 locations/478 ha)





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Montenegro	81	4
Croatia	31	2

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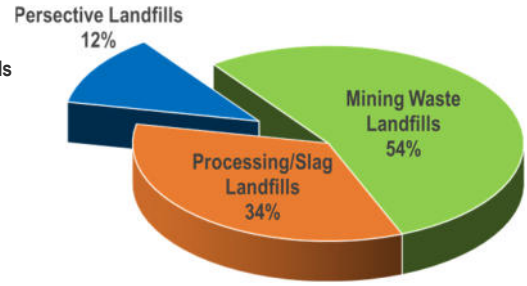
Perspective SRM deposits



Criteria for determining prospective landfills

- Size > 0.5 Mt.
- Inactive / abandoned / non-remediated sites
- Older flotation methods used
- Promising chemical composition
- Possibility to use extraction methods

Mining waste and flotation tailings of porphyry beds are unattractive
All locations (except in Albania) were physically visited
All collected information/data were verified

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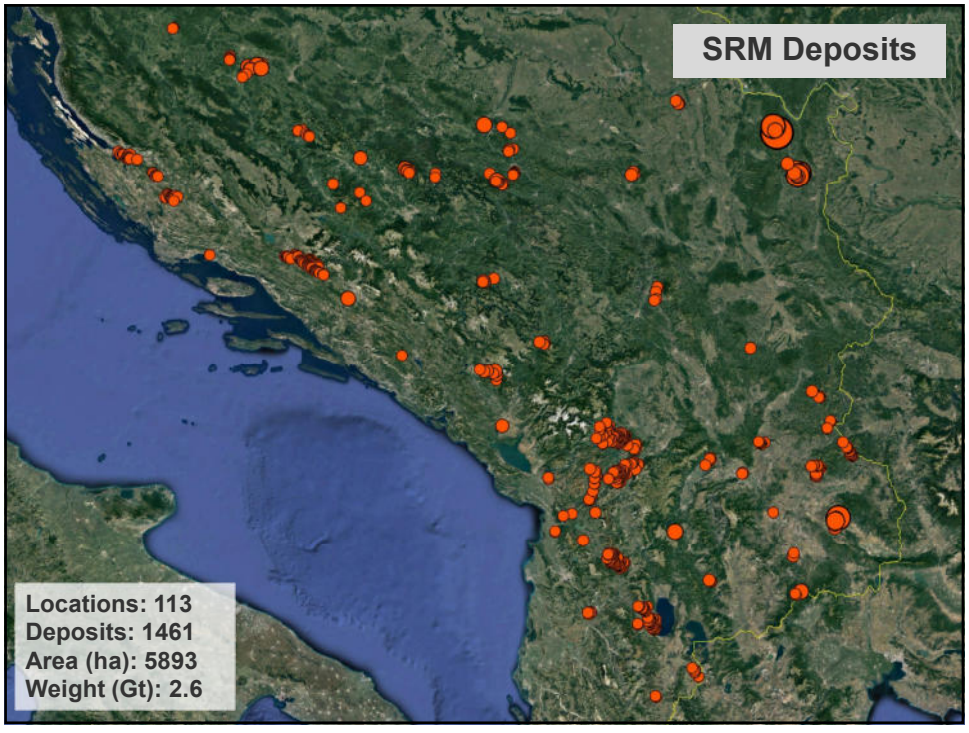

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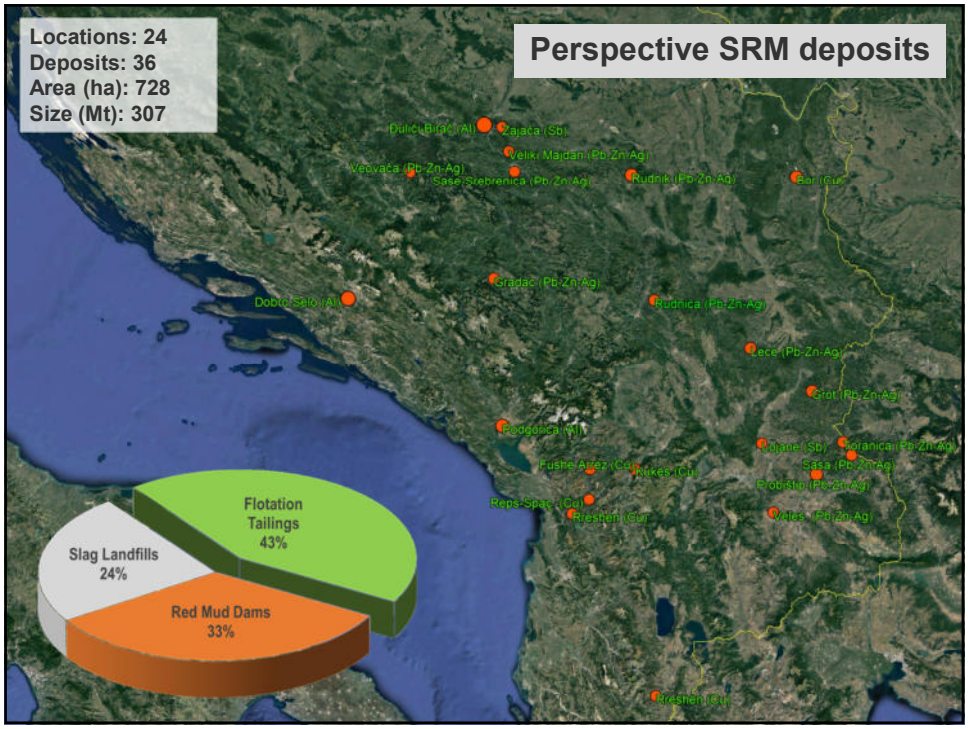

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Perspective location

Sites by origin:

- Processing waste (Red Mud Dam)
- Processing waste (Flotation Taillings)
- Metallurgic waste (Smelters)

Data divided into:

- Basic data
- Origin of waste
- Technical data
- Geological data
- Environmental information

Locations: 24
Deposits: 36
Area (ha): 728
Weight (Mt): 307

21 variables / 36 records

ID
Location
Deposit
Country
Longitude
Latitude
Mine (Name)
Processing Facility (Name)
Mining/Processing activity
Mine/Processing facility status
Last Manager
Deposit Type
Deposition Period
Main elements
Deposit status
Storage
Surface (ha)
Weight (Mt)
Restoration
Chemical composition
Environmental impact

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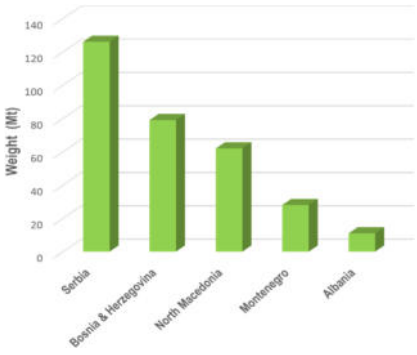
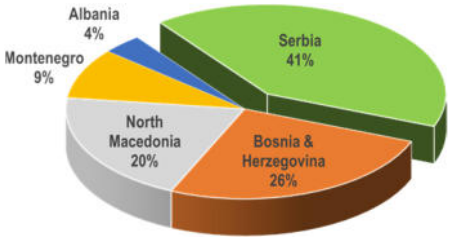
Deposit by countries





Country	Weight (Mt)
Serbia	126
Bosnia & Herzegovina	79
North Macedonia	62
Montenegro	28
Albania	11

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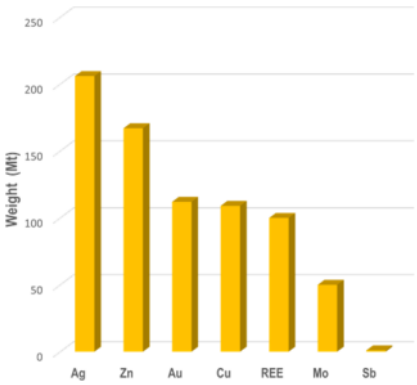
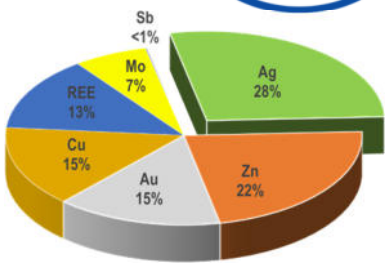
Potential valuables





Element	Weight (Mt)
Ag	206
Zn	167
Au	112
Cu	109
REE	100
Mo	50
Sb	1

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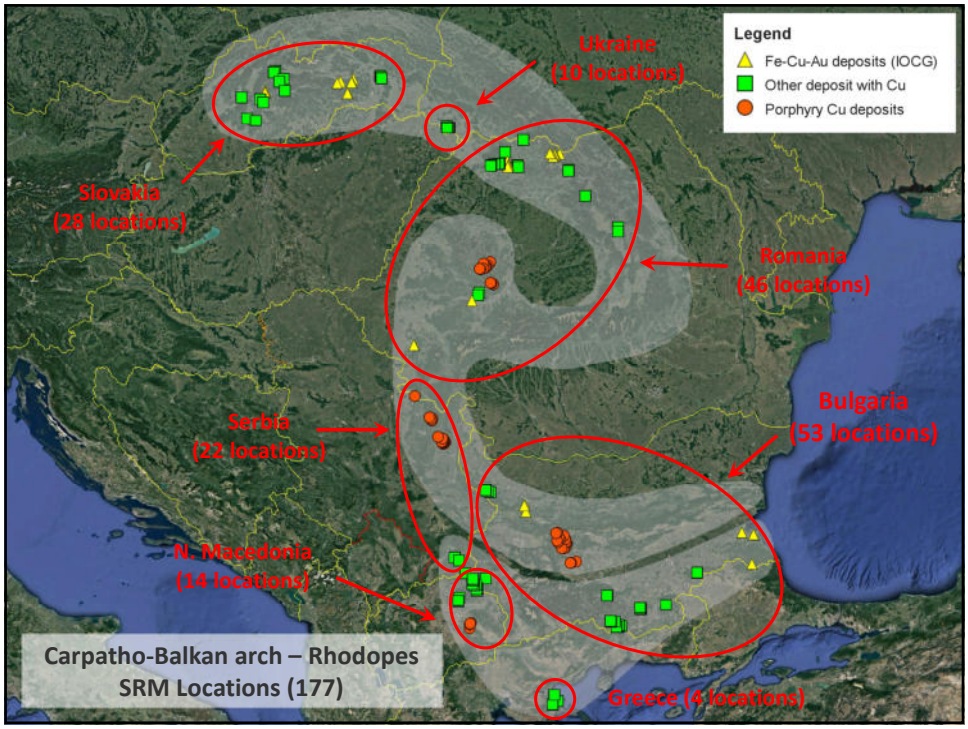
Legend
Fe-Cu-Au deposits (IOCG)
Other deposit with Cu
Porphyry Cu deposits
Ukraine
(10 locations)
Slovakia
(28 locations)
Romania
(46 locations)
Bulgaria
(53 locations)
Serbia
(22 locations)
N. Macedonia
(14 locations)
Carpatho-Balkan arch – Rhodopes
SRM Locations (177)
Greece (4 locations)

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Thank you!

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