



FRAME

FORECASTING AND ASSESSING EUROPE'S
STRATEGIC RAW MATERIALS NEEDS

WP7 Historic Mine Sites revisited

Deposit Fact Sheet

Szklary

Authors: Stanisław Z. Mikulski



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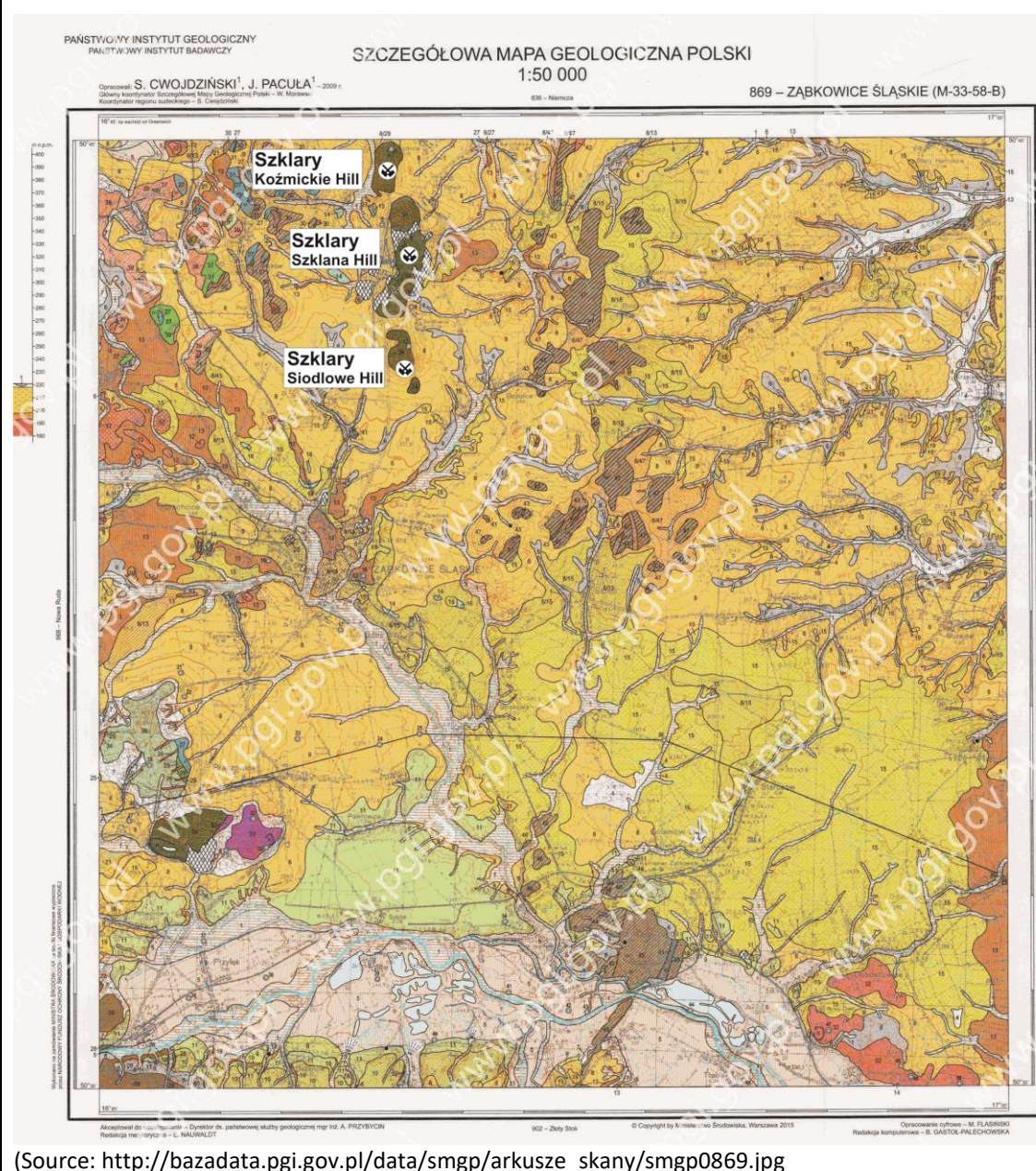




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Name of deposit	Szklary
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STRATEGIC RAW MATERIALS NEEDS

Location	Country	(nearest) Town	Coordinates	
	Poland	Ząbkowice Śląskie	Latitude	Longitude
			50° 38' 46"N	16° 49' 43"E

Main Commodity/ies	Ni
By-products	chrysoprase, opal
CRM potential	Co, Pt, magnesite (MgCO ₃)

Type of deposit	Lateritic / Saprolitic					
Mine Status	closed					
Period of activity	Start	End				
	1889	1983				
Production	Annual production	Tonnage	type	Cumulative historic production (period)	Tonnage	Type
	1889-1920 underground	300-360t	Ni	1889-1920	~9 600 t	FeNi
	1922-1935	closed				
	1936-1945 open pit	c.a. 1000t	FeNi	1936-1945	10 000 t	FeNi
	1946-1950	?		-	-	
	1955-1983	800-1500t	FeNi	1955-1983	20 100 t	FeNi
	Total			1889-1983	~ 40 000 t	FeNi

Regional Geology		
Host rock(s)	Age of host rock	
Sedimentary, chemical weathering cover of Upper Paleozoic ultramafic massif (Devonian peridotites and serpentinite)	Paleogene (Oligocene)	
Mineralization		
Ore forming minerals	Age of mineralization	Ore grade
Pseudo-clinochlor-Ni, and nickel-manganese oxide, chrysoprase, chalcedony, opal, Ni-layer silicates (minerals of the talc and pyrophyllite group, pimelite, Ni-montmorillonite, Ni-vermiculite, schuchardtite).	Paleogene (Oligocene)	0.8% Ni



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Deposit Type

Lateritic / Saprolitic



Weathering crust with Ni-layer silicates formed due to hydrothermal and supergeneous alteration of serpentinite massif.

Reserves	Reserves (t ore)	Code	Category/ies
	17 210 000	Polish category	A, B and C ₁
Resources	Resources (t metal)	Code	Category/ies
	125 000	Polish category	A, B and C ₁

Access restrictions	yes	no	unknown
		no	
	Type of restrictions		



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	A fragment of the former opencast mine excavation covered with crushed rock material. The Szklary Szklana Hill deposit	
Ownership	Type of owner	Name
	State	

References	Literature	Links
	Mineral Resources of Poland. 2017. Szamałek K., Szuflicki M., Malon A., Tyimiński M.(Eds.); MIKULSKI S.Z., 2012 – The occurrence and prospective resources of nickel ores in Poland. [in Polish]. Bulletin of the Polish Geological Institute (Biul. Państw. Inst. Geol.), 448: 287–296.	http://geoportal.pgi.gov.pl/css/surowce/images/2017/pdf/mineral_resources_of_poland_2017.pdf

Remarks
The “Szklary Siodlow Hill” and “Szklary Koźmickie Hill” deposits are considered as undeveloped. Historical production took place only within the central part of the Szklary deposits, e.g. in the “Szklary Szklana Hill” deposit.



Summary of results from studies during the FRAME project

NEW FIELD WORK	Method	Results
	Geochemical pXRF investigation in the drilling cores warehouse	Initial X-ray examinations of cores from the 6 historic boreholes (2007) using a field XRF spectrometer. The geochemical studies showed elevated concentrations of a range of elements (Ni, Co, Fe, Mn, Ti, Cr, Mg, Al). 5 samples were collected for further geochemical and mineralogical investigation.

NEW ANALYSIS AND RESEARCH APPLIED	Method	Results
	(1) Portable XRF spectrometer; (2) Geochemical methods: (a) WD-XRF, (b) ICP-MS, and (c) GF-AAS; (3) Mineralogical identification of Ni-bearing mineral by PXRD method	5 selected Ni-bearing saprolite samples from two historic boreholes - Bobolice B3 and Bobolice B4, were subject of complex geochemical studies. Samples were taken from depth interval of 15-26 m. Ad. (a) The content of trace elements were determined in pressed powder 5 new samples (As, Ba, Bi, Br, Cd, Ce, Co, Cr, Cu, Ga, Hf, La, Mo, Nb, Ni, Pb, Rb, Sn, Sr, Th, U, V, Y, Zn, and Zr). Analyses were performed by wavelength dispersive X-ray fluorescence spectrometry (WD-XRF) method using a Philips PW-2400 spectrometer. ad. (b) The content of trace elements (Ag, In, Re, Sb, Se, Te, Tl, and W) were determined after decomposition with a full mixture of HCl, HNO₃, HF, and HClO₄ acids using a Perkin Elmer ICP-MS Elan DRC II mass spectrometer by means of the inductively coupled plasma mass spectrometry (ICP-MS). ad. (c) Au, Pd, and Pt were measured using a Perkin Elmer model 4100 ZL spectrometer by graphite furnace atomic absorption spectrometry (GF AAS) method). Elevated concentrations of critical elements (Co, Pt, and Re) as well as Ni, Cr and trace elements were revealed in 5 representative Ni saprolite samples the Szklary deposit. (3) 14 samples from historic boreholes were subject of mineralogical studies with use of X-ray powder diffraction (PXRD).



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NEW DATA	Method	New Results
	Identification of Ni bearing minerals by PXRD and their weight % contents in bulk sample. Determination of critical elements contents in Ni –bearing saprolitic ore.	As a results of PXRD research the mineral crystalline compositions of the weathered serpentinite (saprolite) were determined. The main minerals of Ni carriers are pseudo-clinochlor-Ni and Ni-manganese oxide. Among the gangue minerals present in saprolite ores there are mainly in crystalline form: vermiculite, quartz, talc, tremolite, calcite, aragonite, lizardite, enstatite, and locally also ferroholmquistite, zinnwaldite and magnetite. The percentage of these minerals varies (e.g. Ni-manganese oxide c.a 4%, and pseudo-clinochlor-Ni 2 to 13%). There are also numerous veinlets of cryptocrystalline silica colored by Ni admixture in a greenish color - chrysoprase. The geochemical results of ICP-MS, WD-XRF and GF AAS measurements of 5 saprolitic rock samples confirmed increased concentrations of such strategic elements as Co and Pt, which are associated with Ni saprolitic ores.