



5,000 Years of Gold Mining in Georgia: Is it Time for Land Reclamation Yet?

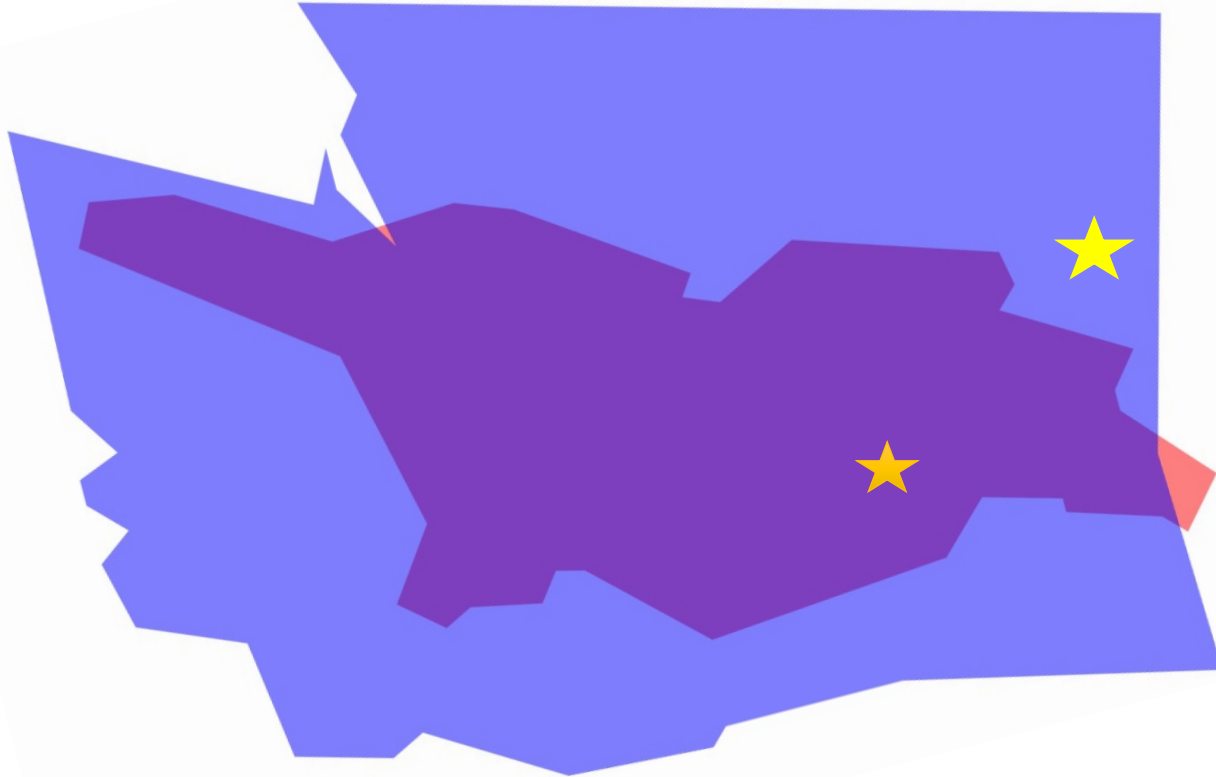
Marika Avkopashvili

American Society of Mining and
Reclamation, June 8, 2016

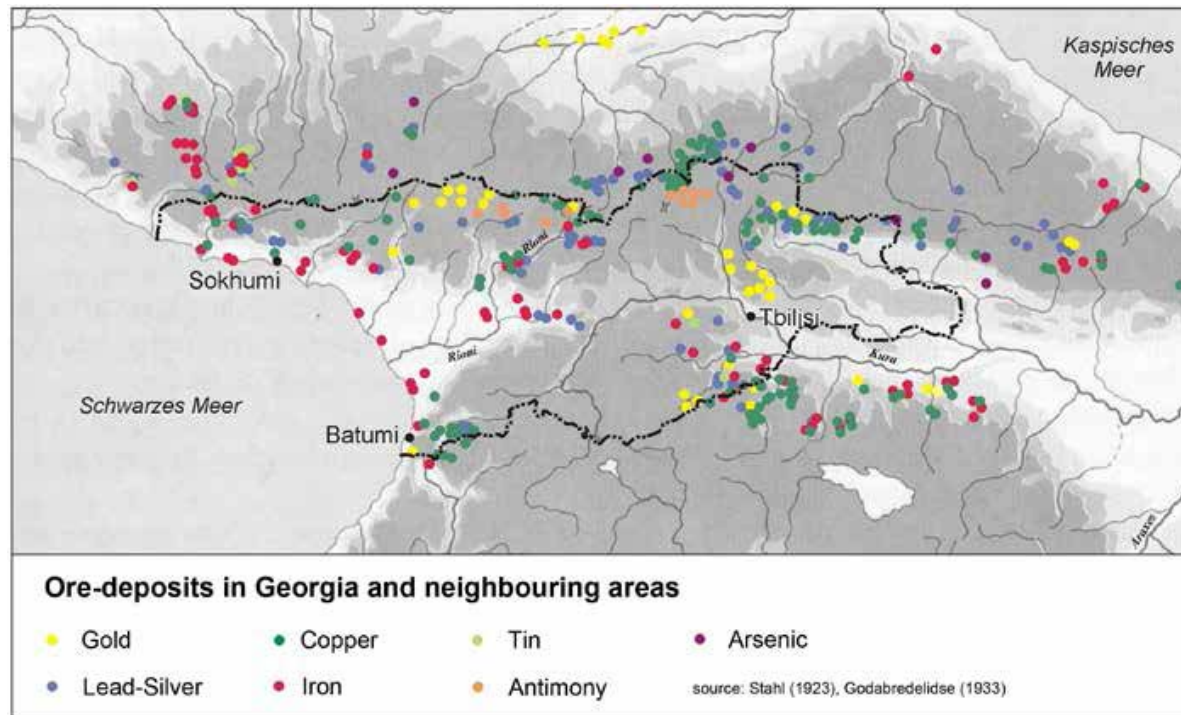
Location



Location



Ore deposits and ore occurrences in Georgia and surrounding countries.



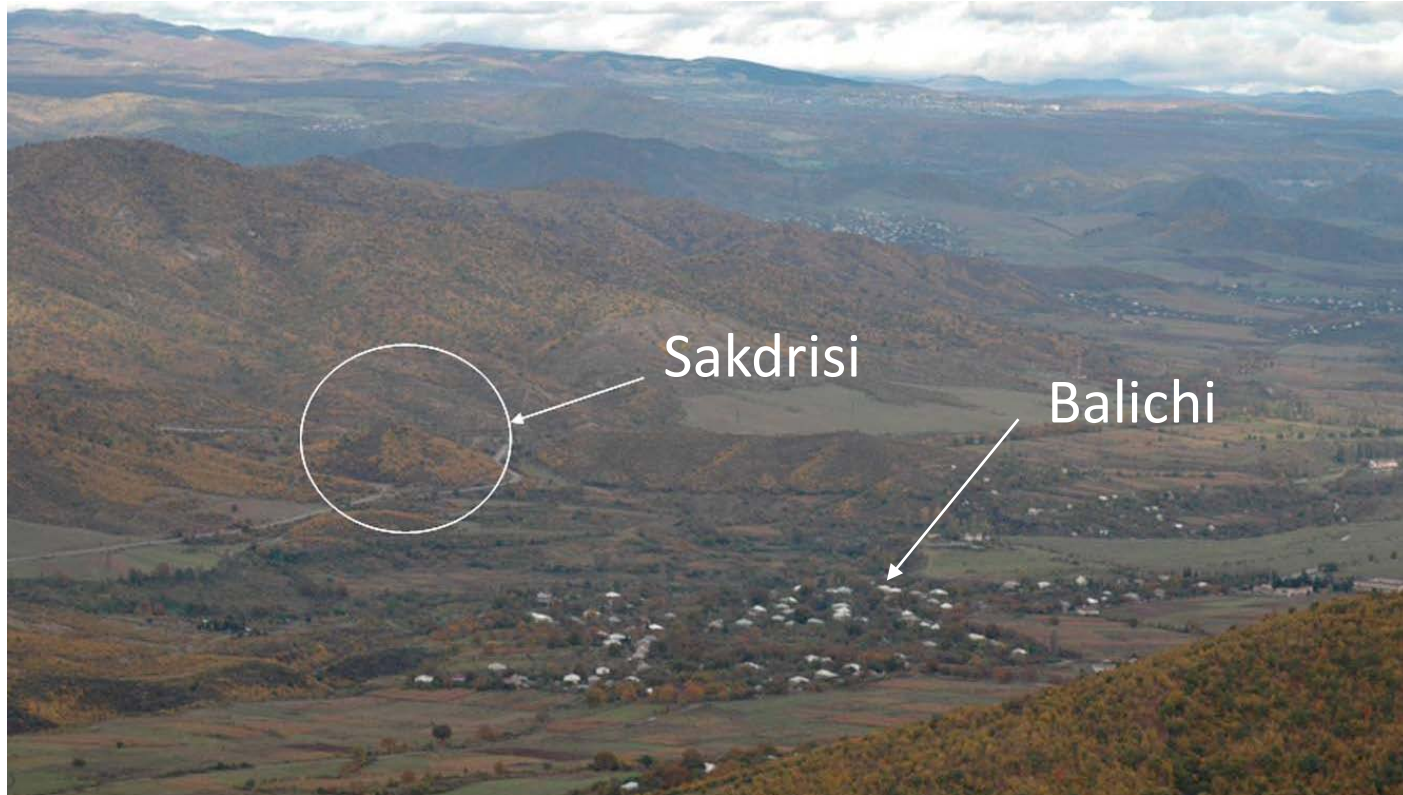
Important Mining Sites



History of my family



A Little History About Mining



A Little History About Mining



A Little History About Mining



A Little History About Mining



Mining Area



Ore Extraction



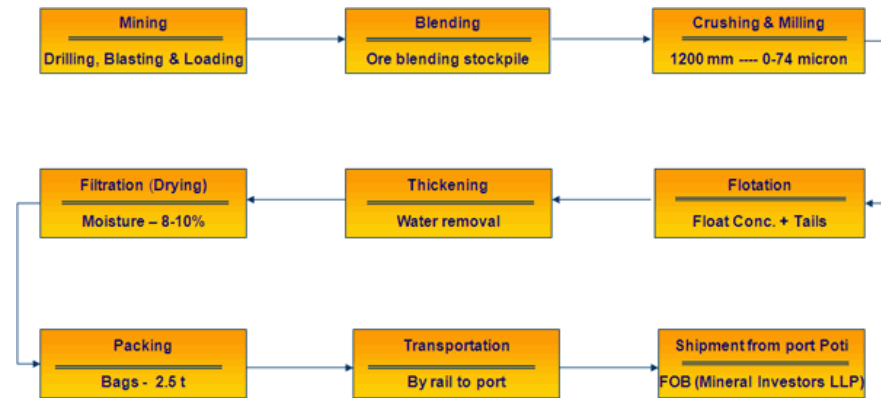
Ore Processing

Main ore types:

- Gold-copper,
- Copper-zinc,
- Copper-barite, Quartzite,
- Barite-polymetallic.



Ore Processing Plan



Gold Cyanidation



Gold Cyanidation



Gold Cyanidation



Tailings

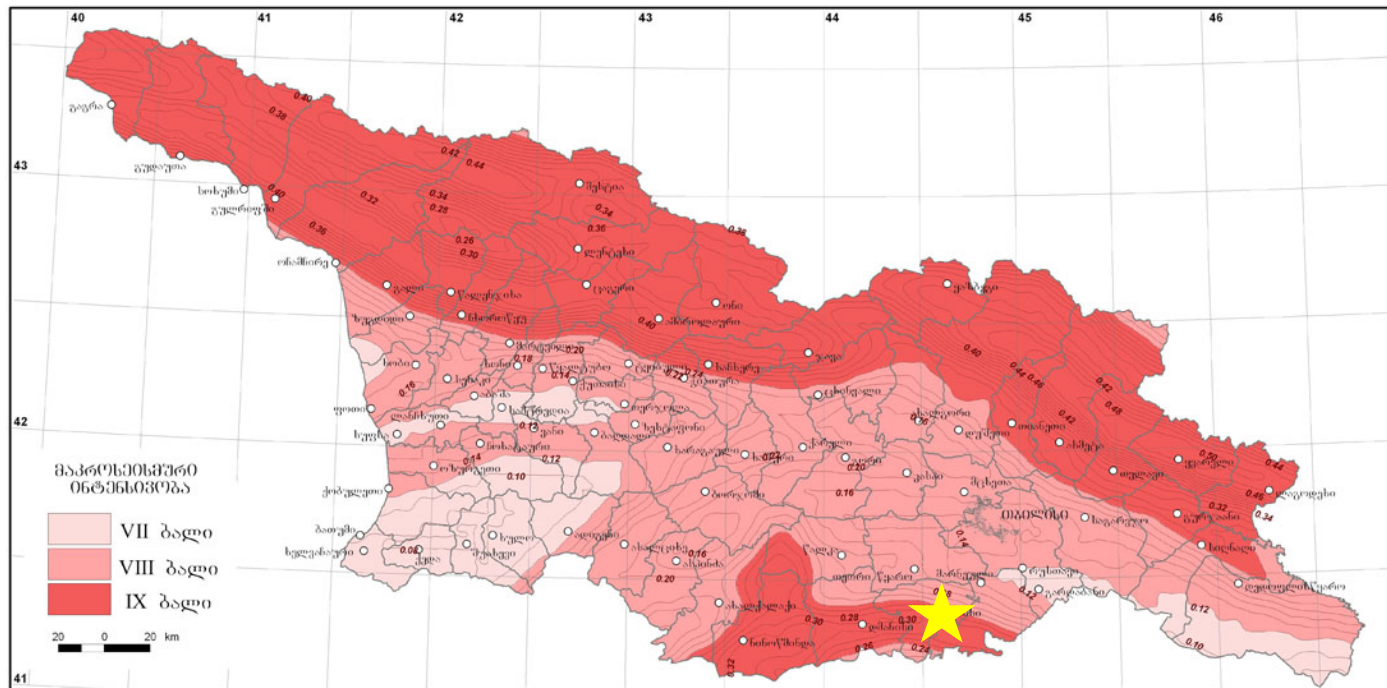


Tailings



Tailings

საქსმური საშიშროების რუკა
მაქსიმალური კორიზონტული აქვარება



Reclamation



Reclamation



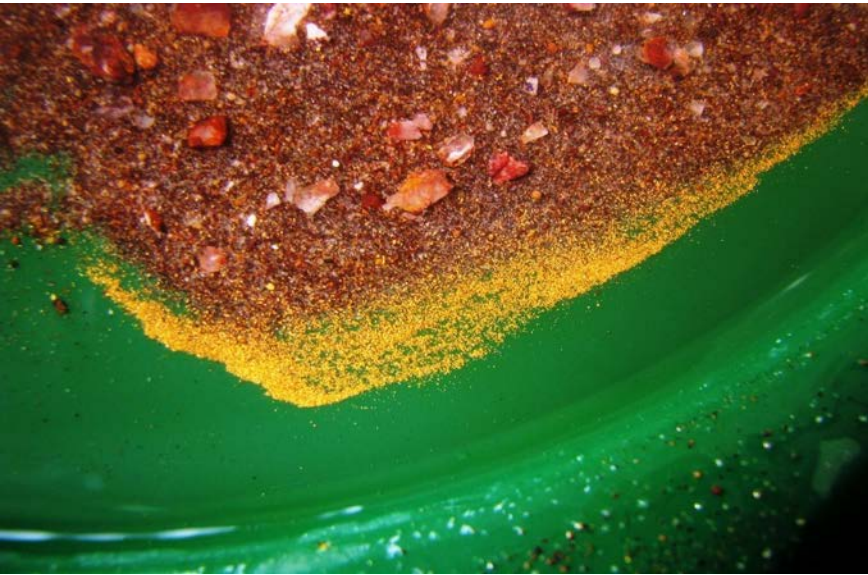
ირაკლი
აგეოფაშვილი
, May 2016

Reclamation



Equisetum spp., horsetail

What do we know about the Au content?



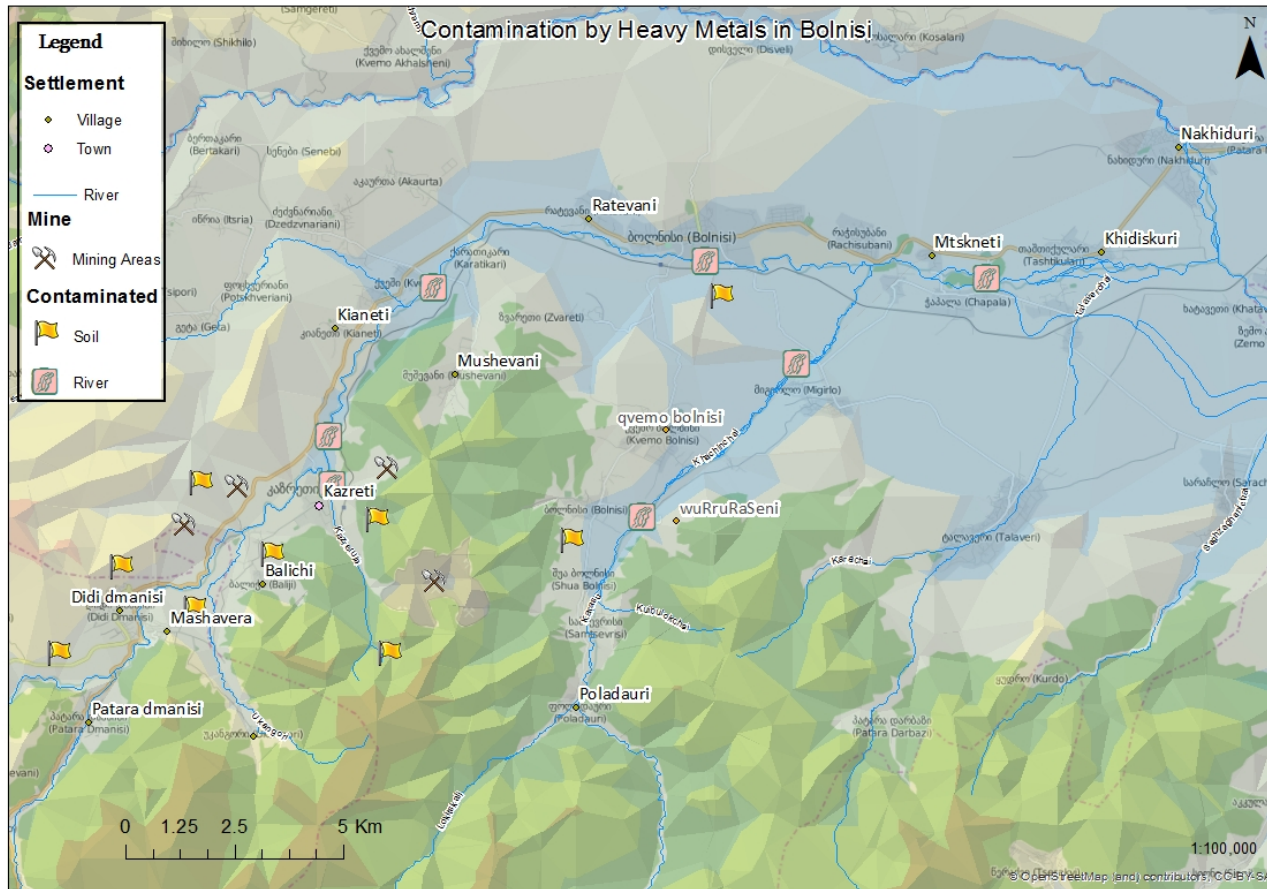
Report by Prof. Dr. Andreas Hauptmann, 2013

Production

metals	2007	2008	2009	2010
Copper (tons)	9,920	12,125	12,125	6,725
Gold (ounces)	70,547	70,547	70,547	70,547

USGS 2010 Minerals Yearbook, Georgia.

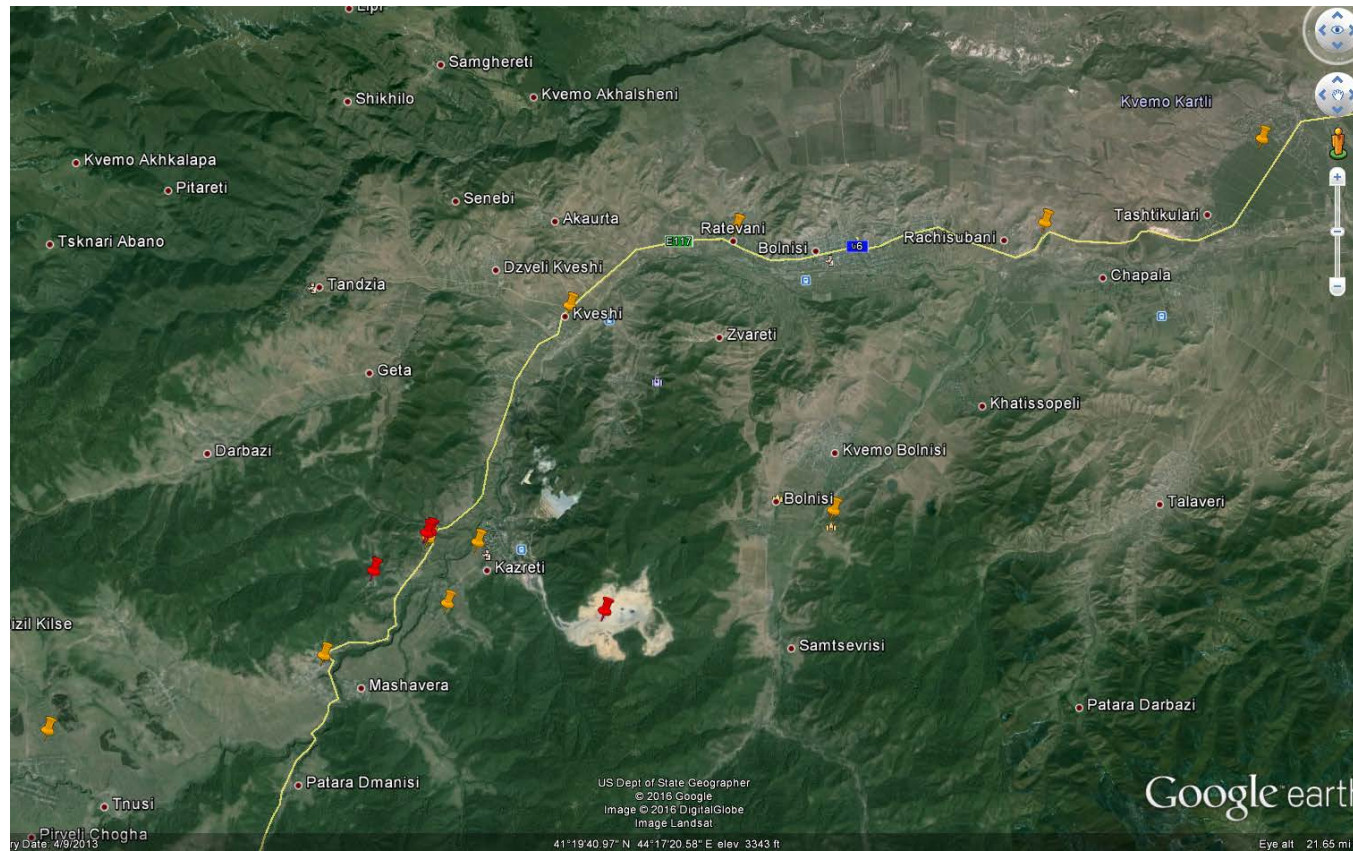
Map of Contaminated Areas



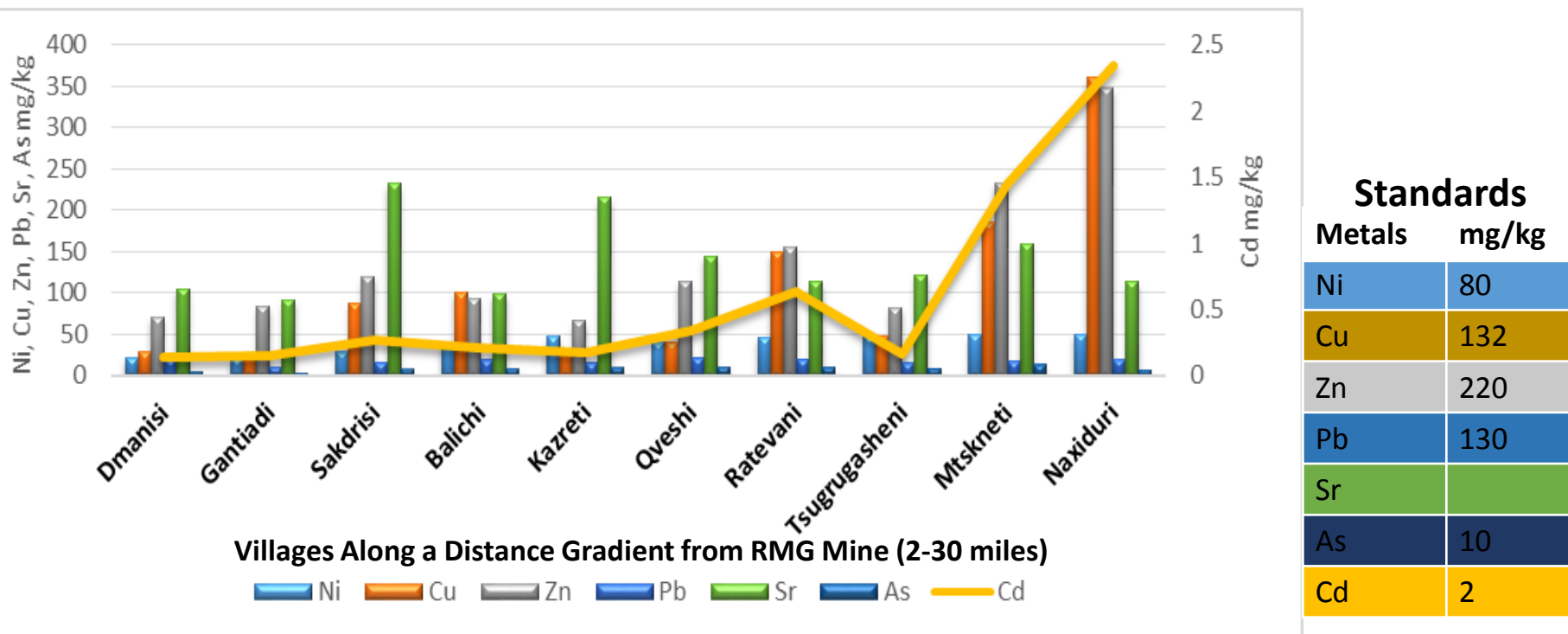
Contamination



Soil Sampling



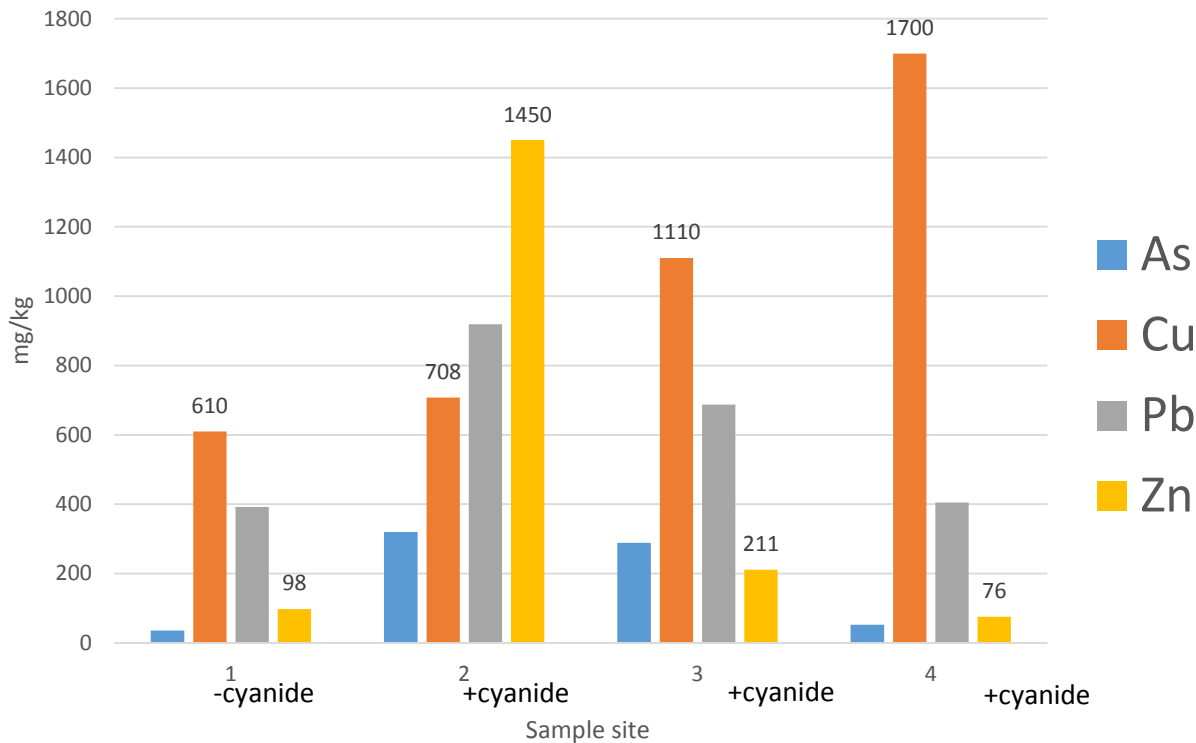
Agricultural Field Soil Sample Analysis



Unpublished data, University of Georgia, Savannah River Ecology Laboratory, ICPMS

Mine Site Data, Montana State University

Metals Concentration at the RMG Mine

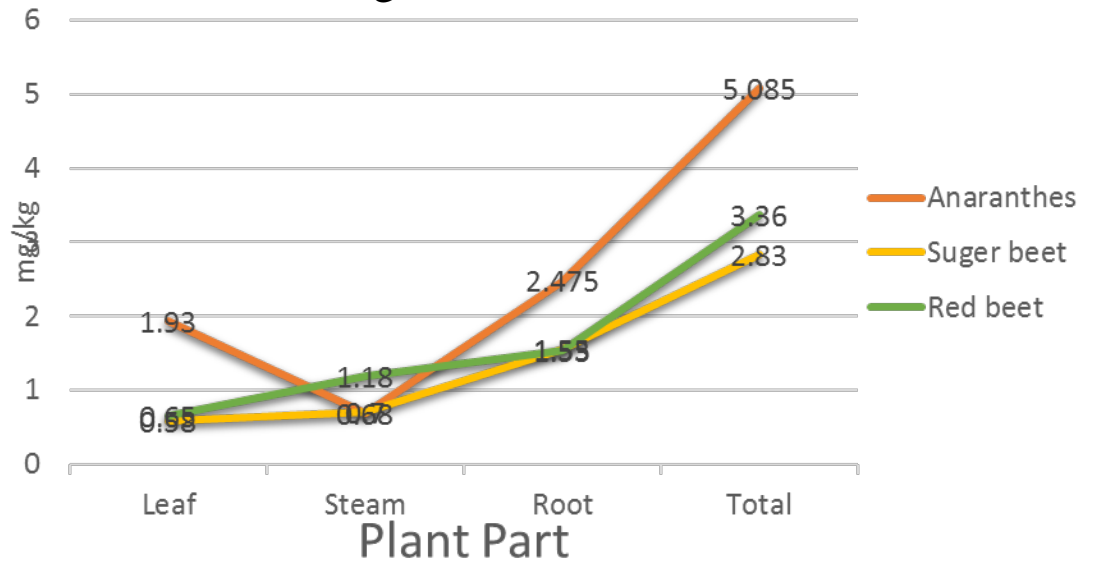


Soil Remediation

- Phytoremediation



Concentrations of Cd (mg/kg) in plant parts of Amaranth, Sugar Beet, and Red Beet



ICP-MS, 2012

Soil Remediation



Soil Remediation



Problems and solutions

Problems:

- Absence of suitable mining regulations;
- EIS was prepared by RMG (conflict of interest);
- Company does not have any closure plans;
- Lack of mitigation systems for environmental pollution;
- Poor working conditions and low wages for those in the mining industry;
- RMG is a Russian-owned company, and Russian-Georgian relations are strained;

Solutions:

- Could we adopt mining practices from nearby counties mining the Caucasus?
- Economic benefits to initiate closure during active production;
- Increase transparency in data collected and data reported;
- International collaboration (USAID, USFS, universities) for improved reclamation outcomes.

Thank you!

Marika Avkopashvili

marika.avkopashvili.1@iliau
ni.edu.ge

შოთა რუსთაველის ეროვნული სამეცნიერო ფონდი
SHOTA RUSTAVELI NATIONAL SCIENCE FOUNDATION



Collaborators:

Giorgi Zedginidze (TSU)

Guranda Avkopashvili
(TSU)

ony Hartshorn (MSU)

annon Dillard (MSU)

ukri Avkopashvili (RMG)