

Image by Geosense:
FE bearing mineral identification – Rosia Montana, Romania

Newsletter

2ND ISSUE

Table of content

Editorial note	1
Report on the end-user workshops and surveys	2
Public appearances	4
ImpactMin e-training lunch soon	5
2011 field work news from the demonstration sites	8

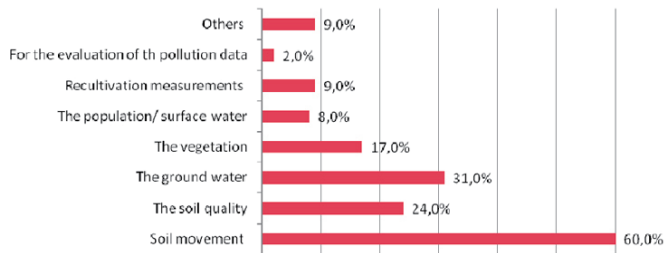
Editorial note

Mankind has been observing the environment since the ancient societies and wanted know what would happen next. Today, the "modern man" is watching the Earth with equipments trying to predict what is happening around us. Is it going to rain tomorrow? Or how much that particular glacier melted in the last five years? Humankind has developed very sophisticated tools for observing the Earth. GEOSS set up the goal to coordinate the development of every possible EO tools to be able to watch most of our planet's environment related phenomena. EO tools record the actual status of our environment. It is always the human interpretation what we are going to do with all those thousands of terabytes of data that we store on our servers. In the ImpactMin project, we have proposed a range of earth observation tools and services that can be used to monitor the impact of mining activities. These tools aim to produce value added data, and in particular, provide quantitative assessment of earth systems that surround the extraction industry.

REPORT ON THE END-USER WORKSHOPS AND SURVEYS

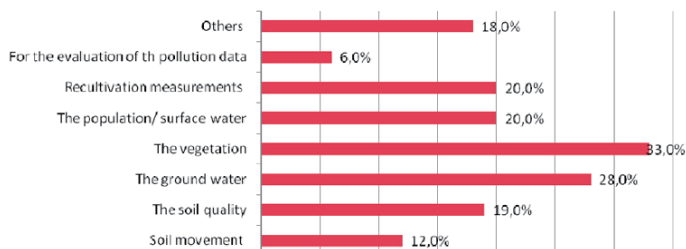
Since the end of 2010, DMT (Germany) is observing, defining and monitoring the end-users' needs. To this aim, a national workshop was organized in August 2010 in Essen, Germany. Several representatives of the mining industry

Legal/ statutory requirements



were present at this event and discussed about the end-users' needs. To get a more detailed view and a broader mix of participants, an online poll had to be extended from national to an international survey. In order to handle such an extensive poll, an online questionnaire was created by DMT and refined with all ImpactMin team members.

Voluntary requirements



The online poll has reached out to the “mining, metal and mineral” sector, “environmental organizations”, “public authorities”, “manufacturing industries”, “construction engineering” and “other” sectors who are related to remote sensing and the impacts of mining. More than 100 worldwide companies, authorities and manufacturer took part in the poll.

An interesting contrast appeared through the analysis of the survey, how different entities utilize remote sensing for legal measurement requirements and for voluntary purposes. Overall, the

first online survey allows us to get some insights of remote sensing users. Now, after six months, DMT runs its second flight of the online survey to generate new input and to monitor the results from the first survey.

RMGC, EUFAR SUPPORTED FLIGHT PLANS 2011

An airborne hyperspectral survey of the area was supported by Rosia Montana Gold Corp. and by the European Commission through the EUFAR program following a successful proposal of the ImpactMin consortia members. A CASA 212 RS aircraft equipped with AHS and casi1500i sensors was selected. An INTA team of nine members, including researchers and crew, was involved in this activity. Flight attempts were made in two different periods, between 29/06–03/07/2011, and 25–26/07/2011 respectively. Due to bad weather conditions, both attempts were unsuccessful.

PURSuing THE WILL OF MOSTAR CITY ADMINISTRATION

The Townhall would like to reassure itself if there is hazardous material around the city or not, and thus they supported ImpactMin objectives to use novel technologies to assess these very specific geohazards by airborne gamma-ray survey, which would be a good complementary assessment of ground based measurements spatio-temporally.

EO-MINERS AND ECEHH AT THE 2ND INTERIM MEETING OF IMPACTMIN

In February 2012, the Consortium members will meet in Cluj to discuss specific project objectives and technical details of EO-Miners project and the research activities by the European Centre for Environment and Human Health, in order to identify tie points for future collaboration.



ImpactMin project is co-funded by the European Commission under the Framework Programme 7.

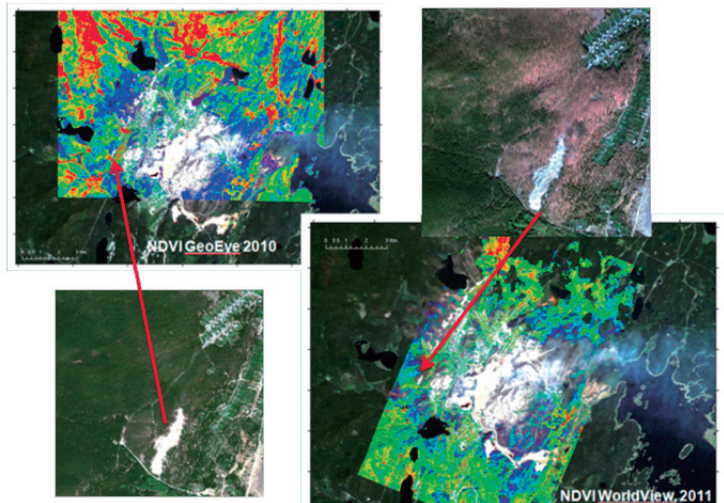
FRASCATI REPORT



The annual meeting of the Geological Remote Sensing Group (GRSG) was held in Frascati (Italy) and hosted at ESA ESRIN during December 7-9 2011. The event co-hosted the Oil and Gas Earth Observation group workshop, thus several researchers from academia and private sector took part in the event. The event was dedicated to advances in geological remote sensing; so, it provided a good opportunity to ImpactMin partners to share results about the project activities in front of an expert audience. Marc Goossens (Geosense) gave a speech on the progress of several demonstration site surveys (above picture). The focus of his presentation was on Mostar–Vihovici mine and Karabash–Russia. His speech included the introduction of the sites and the advancements in surveying. Preliminary results were shown of the hyper-spectral overflights and the orthophoto mosaic and the high precision DEM based on the Unmanned Aerial Vehicle test flight. He also presented the promising results of the corre-

lation of the Russian field works (spectral and lichen samples) and the use of satellite imagery (Landsat, GeoEye, Worldview 2) to detect and characterize the environmental effects of the Karabash smelter (images below). The project coordinator, Peter Gyuris (Geonardo), made a presentation about the project in general based on the poster that was exhibited at the workshop. The presentation is available to download at [this link](#).

In November 2011, the GEO VIII plenary took place in Istanbul and the advancement of GEOSS was presented from all continents by the participating countries and institutions. ImpactMin project was presented at the European Commission's stand and leaflets were distributed to the visitors at the Euro-GeoSurvey's stand. The project partners have planned several public appearances for 2012 such as at the Geospatial World Forum 2012 (Amsterdam) and the IGARSS 2012 that will take place in Munich (Germany) in July 2012. A couple of submitted papers are waiting to be accepted in various conferences and we will provide you with up-to-date information where can you hear about more ImpactMin results.



ImpactMin project is co-funded by the European Commission under the Framework Programme 7.

IMPACTMIN E-TRAINING

Soon to be launched

Developing the ImpactMin tools and methods would have limited impact if the uptake of results were not promoted in an efficient way. This is why the Consortium has decided to implement an active e-training campaign to help facilitate the fast uptake of the project results and that can reach all stakeholders on a trans-European and even global scale. The proposed e- training program will offer a unique distance learning opportunity without the usual constraints of traditional education. The Consortium is expecting significant and quantifiable impact to be generated by these new e-training services. The e-training course is currently in development and testing phase and will be fully available in the last year of the Project and thereafter at www.impactmin.eu.

2011 FIELD WORK NEWS FROM THE DEMONSTRATION SITES

Amer Smailbegovic (Photon d.o.o.):

REPORT ON 2011 FIELD ACTIVITIES AT THE MOSTAR DEMO SITES

Bosnia and Herzegovina



*Figure – Example of hyperspectral imagery collected over Mostar study site (May, 2011)
Bosnia and Herzegovina*

During April-June 2011, the Vihovici mine site, various sites within city of Mostar and Neretva river have all been extensively appraised with water and spectroscopic sampling programs to support the planned airborne hyperspectral survey. Personnel from the Faculty of Civil Engineering in Mostar, Photon and Geosense have spent several days in the field selecting sites for calibration of airborne data as well as test-sites for water quality measurements. The site appraisal was augmented with two ASD spectrometers, small UAV and ultimately high-resolution airborne hyperspectral data on May 19, 2011.

The analysis of hyperspectral data shows several sites of interest where iron oxide/hydroxide and possibly sulfate minerals occur, which may be related to accumulations of mine-waste as well as household waste materials which could negatively impact the water quality. Several areas of vegetation stress have also been noted in the area. The results from water sampling data suggest that the majority of sampled waters are relatively clean, but that the polluting elements may be contained in the sediment. The research continues with additional sampling and planned gamma-ray data acquisition.

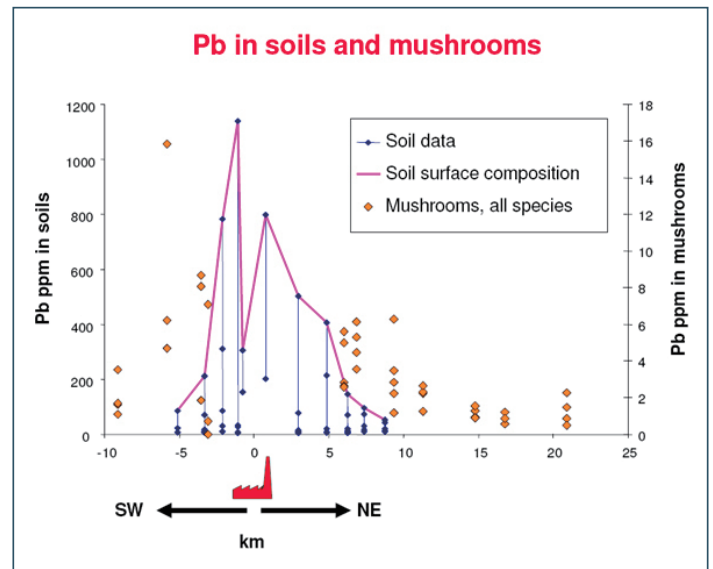


ImpactMin project is co-funded by the European Commission under the Framework Programme 7.

Ben Williamson (University of Exeter):

REPORT ON 2011 FIELD ACTIVITIES AT THE CHELYABINSK-ORENBURG DEMO SITES

Russia



Four field campaigns were undertaken during 2011 at the Russian demo sites. In March, snow, surface water and sediment samples were collected around the smelter and former mining towns of Karabash and Mednogorsk. The aim was to assess the spatial distribution of fallout of acid species and particulate from the smelters and to determine the nature of acid mine waters during the winter period. A second field campaign, in June, was to set up lichen transplant monitoring stations in the Karabash area. This was undertaken by IMIN and a highly experienced lichenologist recruited by UNEXE. The lichen transplants were set up in a ~60 km NE-SW transect centred on the smelter at Karabash. The third campaign was carried out in July 2011 to analyse leaf surfaces by hand-held IR spectroscopy (GEOS), and to sample leaves, lichens, soils, wastes, house dusts, surface waters and sediments around Karabash and Mednogorsk (IMIN, GEOS and UNEXE).

The fourth campaign in September was to collect the lichen transplants, to analysis bark and twig pH, to carryout lichen and more general biodiversity studies and to collect further samples of birch leaves, pine needles, fungi and soils. These samples are in the process of being analysed at IMIN, GEOS and UNEXE. The results of these studies will be used to ground-truth and augment remote sensing studies to assess the impacts on sensitive ecosystems of atmospheric emissions (mainly SO₂ and particulates containing potentially toxic metals) from the smelter and acid mine waters and wastes from mining-related activities. The results will also be compared with those from similar studies carried out 10 years ago as part of the MinUrals contract, to assess the effectiveness of new 'Ausmelt' emissions control technologies installed at the Karabash smelter in 2007.



ImpactMin project is co-funded
by the European Commission under
the Framework Programme 7.

Calin Baci (University of Babes Bolyai)

REPORT ON 2011 FIELD ACTIVITIES AT THE ROSIA MONTANA DEMO SITES

Romania



Rosia Montana is currently one of the most important precious metals deposits of Europe, with documented reserves of about 300 tonnes of gold and 1,600 tonnes of silver. The long-lasting mining activity spanning over almost 2,000 years has generated significant degradation of the environment.

The determined gamma dose was generally in the normal range for Europe. Some slight increases were detected in some spots, however very close to the European threshold.

A large series of soil, rocks and sediments samples were collected from the waste dumps, open pits, future open pit areas, and unaltered

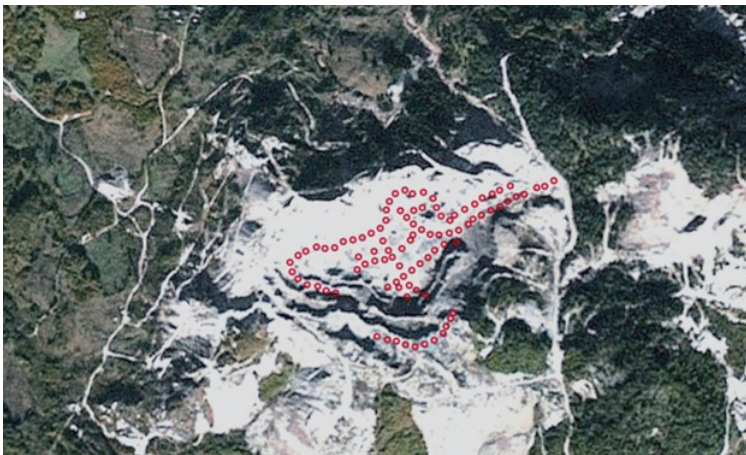


Figure – Ground spectra sampling locations at Rosia Montana open pit (left) and Seliste tailings dam (right)

The set of available satellite image data was enriched with two WorldView-2 images of the area of interest, the first acquired in July 2010, and the second in July 2011. This being one of the most advanced sensors currently available can therefore be utilized for various assessments such as vegetation health, but also for mineral identification (e.g. the cover page image). The level of gamma radiation in the mining area was measured by using an ORTEC digiBASE high performance digital gamma spectrometer.

country rocks. Additionally, chemical iron-aluminium precipitates from streams and acid seepages were collected. Ground infrared spectroscopy was performed by using an ASD spectroradiometer. Selected samples were submitted to mineralogical and chemical analyses.

A complex on-site vegetation spectral survey was started-up in order to assess the response of plants to the stress induced by acid soil/water and heavy metals. The mineralised areas are showing vegetation anomalies, mainly expressed by a strong decrease in biodiversity.



ImpactMin project is co-funded by the European Commission under the Framework Programme 7.

Frauke Ecke (Lulea Technical University)

REPORT ON 2011 FIELD ACTIVITIES AT THE KRISTINEBERG DEMO SITES

Sweden

The UAV mission was performed in the first week of August 2011 with subsequent field sampling in August-September. Vegetation was sampled within three 10 m bands along the stream Vormbäcken at three sampling sites downstream of the Kristineberg mining area. Species were determined in plots (50×50 cm) and their abundance was recorded on a 7-graded scale. The plots were

randomly placed with a minimum distance of 2m between plots. Vegetation stands in the 50×50 cm plots are used for species determination of vegetation stands in the UAV images. In the analyses, we focus on the five most common species. Species composition and biomass in the vegetation plots will be related to the water chemistry in the stream Vormbäcken. We also initiated to accomplish the time series of land cover changes at the Kristineberg mining area by manually digitizing orthophotographs 1954 – 2010 with ca 10-yr time interval.

Figure – The mining area at Kristineberg (UAV image, left) and one of the sampling localities downstream of Kristineberg along Vormbäcken (right). Both sites were visited during the field trip in June 2010



GENERAL INFORMATION



Partners:

Geonardo Ltd. – GEO
Geosense – GEOS
University of Exeter – UNEXE
Lulea University of Technology – LTU
Photon LLC – Photon
University of Mostar – GFMO
Institute of Mineralogy, Russian Academy of Science – IMIN
Babes-Bolyai University – UBB
Ukrainian Land and Resource Management Center – ULRMC
DMT GmbH & Co.KG – DMT
Flemish Institute for Technological Research – VITO

Coordinator: Mr. Peter Gyuris, *Geonardo*, coordinator@impactmin.eu

Project Officer: Dr. Efthimios Zagorianakos, *DG Research*

For more information please visit: www.impactmin.eu



ImpactMin project is co-funded by the European Commission under the Framework Programme 7.