MAIL Newsletter 5

November 2021

— Editorial —

Dear friends and colleagues,

Welcome to the new issue of the MAIL project newsletter. MAIL is a cooperation European project funded by the Research Executive Agency (REA). This is the fifth of a total of six newsletters over the course of the MAIL project. The 5th issue presents a brief outline of the progress that has been achieved over the previous period and provides information about the successful implementation of the Midterm Review Meeting.

Since the official start of the MAIL project almost three years ago, there have been significant advances in realizing MAIL's objectives. MAIL is currently in its final stage and the remaining deliverables are in the finalization process. WP2 is advancing according to schedule and MLs classification in Carbon sequestration capacity groups, precision augmentation, and the web application for ML's management are in their final stages. The creation of the Massive Online Open Course is underway. The pilot cases (Use of open source platform and free satellite data to map and monitor MLs, Quantification of carbon sequestration capacity in m/sm MLs, Estimation of carbon stock in forest products, and Change detection and mapping in forest MLs) are currently being finalized. Finally, the guide on success stories for RS techniques and open source data / applications, along with the guide on the financial social and technical aspects of the sustainable development of MLs, and report on the potentialities of emerging stock exchange markets for carbon transactions and proposed policies are underway.

MAIL scheduled its final event to be held by teleconference on December 13, 2021. The MAIL workshop is going to be held on November 25 and the MOOC oriented workshop is going to be held on November 26.

I believe that this brief review of technical progress is a good opportunity for us to present our activities and results, exchange information with you and create awareness in management and usage of marginal land as potential carbon stocks. Please do not hesitate to send your suggestions on this publication as well as on project activities.

Petros PATIAS
MAIL Coordinator
Director of AUTH's Laboratory
of Photogrammetry and Remote Sensing

— Contents —

— Contact Us —

Prof. Petros Patias (Project Coordinator)

School of Rural & Surveying Engineering

The Aristotle University, Univ. Box 439,

GR-541 24 Thessaloniki, Greece

Phone: +30 2310 99 6116

Fax: +30 2310 99 6128

E-mail: patias@auth.gr,

info@marginallands.eu

http://perslab.topo.auth.gr/

— Editorial Board —

EDITORIAL -P. Patias, Ch. Georgiadis, M. Krupiński

CONTRIBUTORS -MAIL Consortium

The MAIL e-Newsletter is an informative publication of the MAIL project for dissemination and promotion of project activities and results. This version of MAIL e-Newsletter is licensed under a Creative Commons License.

The MAIL project

The global climate change is a worldwide problem where its mitigation is one of the 17th Sustainable Development Goals of the UN. An effective mitigation strategy should assess all the possible sustainable actions that can contribute to this direction. A challenging and very prominent contribution to raise CO2 sequestration could come from the Land Use Land Use Change and Forestry sector (LULUCF sector) and the utilization of Marginal Lands (MLs) that today are widely available in the EU. MLs can play significant role as potential Carbon Sinks. Especially those on mountainous and semi-mountainous areas (m/sm MLs) are of great capacity and can contribute actively to that goal having no effect in the agri-food production sector. Even though MLs' contribution is acknowledged the influence of their active inclusion in the climate change mitigation strategies has not yet been estimated in depth.

MAIL focuses on m/sm MLs in order to classify them into Carbon sequestration capacity categories based on innovative approaches fully consistent with the IPCC methods and the UNFCCC requirements. The final goal is to deliver a methodology and application set in a web-based platform format, which will be valuable for policy makers, stakeholders or researchers. Free open access data of other EU initiatives will be combined, (land cover, soil, topography, climate, etc.) in order to detect the potential existence of m/sm MLs. These, will be further examined, validated and classified in Carbon sequestration capacity groups through stratified field sampling. State of the art remote sensing (RS) techniques and free open access satellite images with improved spatial and radiometric resolution will be used in order to augment the accuracy of the produced pilot thematic maps. In addition, actions that have to be taken in order to increase the Carbon sequestration capacity will be proposed, while their feasibility will be assessed. A final methodology will be delivered for on-demand production of thematic maps within Europe.

MAIL - Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy

MAIL project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823805; [H2020 MSCA RISE 2018]

MAIL MOOC

With the end date of the project drawing ever closer, the entire MAIL project consortium has started working on one of the most innovative outcomes of the project, which is the creation of a MOOC (Massive Online Open Courses). The main objective of this online course is to disseminate the methodology and the results obtained during the whole project, in line with one of the most important goals of the European Union programmes, the dissemination of knowledge.

The MOOC "Management of Marginal Lands and Carbon Sequestration Estimation through Remote Sensing and GIS" will be implemented on the UPV[X] platform, the MOOC platform of the Universitat Politècnica de València. The course will be completely free, and everyone interested in attending will be able to do it, with the only requirement of registering on the platform. The MOOC will last approximately 5 weeks and will be divided into 5 sections.

In the first section, the definition and description of the term "Marginal Land" defined by the consortium will be studied, as well as a brief introduction to the classification carried out with the study of the datasets used for the characterisation of MLs.

In the second section, the process of identification and classification of MLs will be deepened, carrying out different exercises with different GIS software. The third section will study the estimation of biomass from remote sensing data using optical, laser and radar information. The fourth section will discuss carbon sequestration policies. Finally, the fifth section, which is purely practical, will show the usage of the platform created by the consortium for the identification and management of MLs, training the user in the different constraints that must be considered when carrying out an analysis in the field of MLs.

From December the course will be accessible to anyone who wants to attend it, so we encourage you to register. The link to the MOOC will be disseminated on the UPV website[x], as well as on MAIL project website and social media.

Dissemination

Two open online events are planned for November and December of 2021:

- 2 days of workshop – 25-26/11/2021
- 1 day final project conference – 13/12/2021.

The workshop is dedicated to everyone interested in the topic of marginal lands management and will provide practical information and tools. During the final conference we will present more details about of tasks of the project.

More information, agenda and registration details about both events you can find on project website.

The potential of Marginal Lands as carbon sink in Europe — workshop — 25-26 November 2021

Carbon sequestration potential of Marginal Lands in Europe — conference — 13 December 2021

MAIL - Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy

MAIL project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823805; [H2020 MSCA RISE 2018]

Secondments

1. Mr Fernardo Bezares (CESEFOR) has successfully finished his secondment to IABG working on T4.2 and 5.2

2. Ms Marta Milczarek (CBK PAN) has successfully finished her secondment to IABG working on T4.4

3. Ms Ashwini Trivedi (IABG) has successfully finished her secondment to AUTH working on T5.1

4. Ms Elisa Bender (IABG) has successfully finished her secondment to AUTH working on T4.1

5. Mr Francisco Gallego (CESEFOR) has successfully finished his secondment to HOMEOTECH working on T3.4

6. Ms Ino Vasileia Korompoki (HOMEOTECH) has successfully finished her secondment to CESEFOR working on Task 4.3

7. Mr Samuel Nyarko (IABG) has successfully finished his secondment to UPV working on task 3.1

8. Ms Eleni Loukaki Gkountara (HOMEOTECH) has successfully finished her secondment to CBK PAN working on Task 2.7

9. Ms Archontoula Sakellariou (HOMEOTECH) has successfully finished her secondment to CESEFOR working on Task 2.9

10. Mr Pablo Crespo Peremach (UPV) has successfully finished his secondment to IABG working on Task 4.2

My name is Fernando Bezares. I am an environmental engineer specialised in geographic information systems applied to the forestry sector working in Cesefor's IT department. I have worked at the United Nations FAO defining remote sensing based methodologies for the indicators associated with the UN Sustainability Goals. In previous projects, I collaborated with the University of Almeria in the recovery of Ecuador's soil database. I have also been involved in Spanish companies in the forestry sector (Agresta S.Coop.) where he developed the automation of processes in geographical information systems. Fernando is a graduate of the first promotion of the Data Forest Master (2017-2019, University of Valladolid). His Final Master's Work (Automatic forest mass segmentation tool from remote sensors: LiDAR and Sentinel-2) was awarded at the SECF 2019 awards

During my stay in IABG Dresden Geodata Factory from September 2020 to July 2021 I worked on task 4.2 together with Mr. Krupiński and Mr. Torralba. Calculating the potential carbon sequestration capacity of the marginal lands in the pilot sites. For that we used growth information from yield tables and estimated the carbon using biomass equations and biomass expansion factors. Additionally, I worked on task 5.2 analysing the spatial trend of sustainability indicators previously defined in the task using data from the Eurostat. In the last period of my secondment I worked in task 5.3 along with Ms. Toloudi defining strategies to integrate the CO2 absorbed in Marginal Lands in to the voluntary carbon market.

Watch video

My name is Marta Milczarek. I am geographer and work as a GIS and remote sensing specialist at the Space Research Centre of the Polish Academy of Sciences in Warsaw, Poland, since 2014. I gradu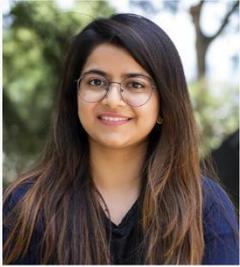ated from the University of Warsaw, Faculty of Geography and Regional Studies, specialising in two fields: Geoinformatics & Remote Sensing and Geomorphology.
I have worked in several projects dealing with satellite imagery processing and geospatial analysis for crisis management, public security units and development assistance.

During my stay in IABG Dresden Geodata Factory in August 2021 I worked on task 4.4. which is one of the pilot case studies and is focused on the development of a method for change detection and mapping in forest marginal lands. My goal was to detect afforestation and deforestation in areas identified as marginal lands. To do so, I searched for available algorithm which can be applied in the Google Earth Engine environment. LandTrendr occurred to be the best for this task and after minor modifications might be implemented in the MAIL web application.

Watch video

MAIL - Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy

MAIL project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823805; [H2020 MSCA RISE 2018]

My name is Ashwini Trivedi. I am an Environmental Engineer from Gujarat University of Technology, India (2018). I am pursuing MSc. Environmental Science with specialization in Remote Sensing and Modelling from University of Trier, Germany. I am employed as a master thesis student by IABG Geodatan Factory, Dresden. My area of interest includes satellite image classification, object based analysis and change detection, general spatial data processing, forest stress detection and mapping.

I was seconded at Aristotle University of Thessaloniki (AUTH), Greece. My secondment period lasted from June 15th to September 14th. I am responsible for task 5.1 which is entitled as "Guide on success stories for RS techniques and open source data / applications" in MAIL project. I have been working under supervision of Michał Krupiński (CBK PAN). At AUTH, I reviewed literature regarding available methodology for detection of marginal lands, biomass change and its mapping using remote sensing techniques. I have also analysed various projects in the same area briefly.

Watch video

My name is Elisa Bender, I am working in the MAIL Project at IABG Geodata Factory as a master thesis student. I am about to finish my study program Geoinformatics/ Management at the University of Applied Sciences in Dresden and hold a Bachelor degree in the same field. My experiences are focused on GIS and remote sensing and my interests lie in the fields of climate change and disaster risk management.

During my secondment at the Aristotle University of Thessaloniki from June to September 2021, I was working on task 4.1 of the MAIL project – "The use of open source platform and free satellite data to map and monitor Marginal Lands". The goal of this task was to transfer the developed workflows for marginal lands detection in an open source environment on national levels for the test sites and countries involved in the project. I was working alongside Laura Martin Collado, Alfonso Abad Gallego and Michal Krupiński, where I adapted the methodology to national regulations and data sets for Germany.

Watch video

My name is Francisco Gallego, I am Forestry Engineer from the University of Valladolid and specialised in Geographic Information Systems. Since 2007 I have been working at Cesefor in different projects related to forestry sector, first in the Forestry department and since 2014 in the ICT and knowledge management department, mainly focused on management, edition and analysis of spatial data. I have also worked in the design of IT tools for traceability of forest products such as resin o mycology. Currently I am coordinating some projects that implies the use of AI techniques, software development and data analysis such as the development of the afforestation analysis system for agricultural lands in Castilla y León, which includes a tool for the prediction of success of future afforestation or the prediction of all-terrain vehicles speed in forest roads applied in a specifically developed satellite navigation system. Apart from this, I have been involved in European cooperation projects since 2015.

During my secondment in HOMEOTECH, at Thessaloniki of Greece, which took place from the June 19th to September 18th, I was involved in the task 3.4 'Accompanying Software Systems' that aims to develop tools for mapping marginal lands. It also provides a Marginal Lands Toolbox and information about the project. In this task we applied the research carried out in Work Package 2 through the implementation of the algorithms for the identification of Marginal Lands and for the accounting of their potential carbon store capacity. The final tool has been implemented on Google Earth Engine platform for the advantages it offers for the project.

Watch video

MAIL - Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy

MAIL project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823805; [H2020 MSCA RISE 2018]

My name is Ino Vasileia Korompoki and I´m a Forester - Environentalist. I have graduated from the Aristotle University of Thessaloniki and I hold the intergraded master diploma of Forestry and Environmental Sciences and a master of Ecosystems. Over the last year I´ve been working in HOMEOTECH where I participate in projects that deal with the management of protected areas under the Natura 2000 network, Management of Ecosystems under Climate Change but also EU funded programs especially in the field of forestry and management of invasive alien species.

During my secondment in CESEFOR, at Soria of Spain, I worked on Task 4.3 "Pilot Case Study 3: estimation of carbon stock in forest products" (paper, wood panels and sawn wood). The structure of the task was set, in collaboration with Fernado Bezares (CESEFOR). Through my secondment I continued the work of the secondee Anna Argyroudi and in particular, I implemented the estimations for Spain and Greece. For each Member State and its pilot sites, different species were selected for future afforestation projects, based on ecologic criteria. Then, the carbon storage of these species was studied regarding the different categories of harvested wood products in specific time intervals and at the final clear cut. In addition, I had a small contribution at the Task 2.9 "Web application for the management of marginal lands biomass" while I helped the secondee Archontia Sakellariou.

Watch video

I am Samuel Nyarko, a master's student of Big Data and Artificial Intelligence at SRH Berlin University of Applied Science with 7 years of working experience in geospatial technology application on large-scale multinational projects. I have served on projects such as 100,000 hectares woodlot establishment for biofuel production with African plantation for sustainable development Ghana limited as a geospatial planner. I have also provided consultancy services on spatial financing towards a sustainable land use plan design and implementation optimization for food crop and organic herbal plants production at Quest farms and GreenGold Ghana. I am a co-founder and former CEO of Integrated Geospatial Intelligence Application Centre in Ghana. My research interest lies in the combined computer vision and remote sensing applications on mineral resource exploration in particular and also for any object identification, classification, and localization endeavors.

My secondment with the Polytechnic University of Valencia(UPV), in Spain, was a privilege to make my contribution to the ongoing MAIL project for task D3.1 which is a Report on Massive Online Open Course and accompanying software system. Specifically, my responsibilities included: Development of suitable MOOC design, content structure, define lectures, creation of tutorial materials for processing remote sensing data, classification/mapping, and monitoring of marginal lands based on the Mail project methodology, video production and postproduction.

Watch video

My name is Elena Loukaki and I am a forester. I graduated from the Aristotle University of Thessaloniki in 2013 and hold a master's degree in management of Water Resources and a master degree in Wildlife Management. I live in Thessaloniki and I work in HOMEOTECH since 2013.

My main scientific interests include wildlife management, climate change adaptation and mitigation, invasive alien species management, forest management and GIS applications.

My secondment in the Earth Observation department of Space Research Centre of the Polish Academy of Sciences in Warsaw took place from the 20th of September until 3rd of October 2021. At that time, I worked on the task 2.7- MLs classification in Carbon sequestration capacity groups. My engagement in this task allowed me to learn the fundamentals of Google Earth Engine cloud-based platform and to be introduced in functions for analyzing and visualizing geospatial data.

Watch video

MAIL - Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy

MAIL project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 823805; [H2020 MSCA RISE 2018]

My name is Archontia Sakellariou, I´m a Forester and a Landscape Architect. I've graduated from the Aristotle University of Thessaloniki and I hold the intergraded master diploma of Forestry and Environmental Sciences and the Master of Landscape Architecture

with a main focus in urban landscape, urban design and green. Over the last 1.5 year I´ve been working in HOMEOTECH where I participate in projects that deal with the management of urban green and peri urban forests, the landscape architecture and graphic design, but also in EU funded programs that deal with the adaptation and mitigation of climate change.

During my secondment in Cesefor in Soria of Spain, July and August 2021, I was given the great opportunity to be a part of the working team for the web application development for the management of marginal lands biomass (T2.9). The main objective of this task was the development of a web-GIS portal, which resides together with MAIL's website that will represent the marginal lands, as detected in T2.3. The platform is being developed in Google Earth Engine taking advantage of its capabilities such as dynamic access to remote sensed data, already developed algorithms and ultra-computational power. In this frame I was given the opportunity to learn new ways of GIS analysis and deal with new tools of novel -EU scale-cartography.

Watch video

My name is Pablo Crespo Peremarch. I am a Postdoc Remote Sensing Researcher at Universitat Politècnica de València (UPV). I defended my PhD in Geomatics Engineering in 2020, which was based on the use of airborne full-waveform laser scanning data to characterize the forest structure, especially the understory vegetation. In addition, I hold a master's degree in Software

Engineering, Formal Methods and Information Systems, and a Geodesy, Cartography and Surveyor Engineering, all from UPV. I consider myself a professional in geospatial data, remote sensing, machine and deep learning, and programming applied to forestry and agriculture.

During my secondment in IABG (Dresden, Germany) from June to August 2021, I was working on task 4.2, developing and implementing a tool in Google Earth Engine to (i) calculate the amount of carbon, and (ii) predict and plot the evolution of carbon growth; all for a given area and tree species selected by the user.

Watch video

About the Project

- Topic: MSCA-RISE-2018 Marie Skłodowska – Curie Research and Innovation Staff Exchange
- Title: Identifying Marginal Lands in Europe and strengthening their contribution potentialities in a CO2 sequestration strategy
- Project Duration: 36 months
- Official start of the project: 01/01/2019
- Total budget: 800,400.00 €
- EU funding: 800,400.00 €

Consortium