

ACTION PLAN FOR CIVIL PROTECTION FOR THE REGION OF IONIAN ISLANDS

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Abstract

The Region of the Ionian Islands, on an initiative by the Regional Governor, collaborated in 2015 with the national Earthquake Planning and Protection Organization (OASP), in order to organise an annually driven Pan-Ionian Earthquake Drill. The drill takes place on a different island of the region each year.

The first drill, code named "Telemachos 2015", took place in Zakynthos, the second in Lefkada, named "Lefkadios 2016", while last year's drill with the Homeric name "Alkinoos", was held in Corfu and was remarkably successful.

P.I.N.'s initiatives have now been integrated into 2 innovative programs, co-funded by the EU (NSRF 2014-2020), named "TELEMACHOS" and "LAERTIS", which are run by the Civil Protection Department.

The "Telemachos" program focused on the creation of an innovative system for seismic risk management in the Ionian Islands and includes:

The elaboration of thematic maps (geological, geotechnical, seismic etc) and soil and vulnerability measurements of buildings, networks and infrastructures, as well as the development of a system to support the exchange of data between stakeholders and their processing in real time.

The "Laertis" program includes the risk assessment of fires, floods, erosion as well as the risk of landslides and the analysis of vulnerability for all the above risks using satellite images.

In the meantime, an Emergency Management System based on Wireless Sensor Network technologies is foreseen to provide emergency information to operators, as well as the production of special information material and the provision of the necessary equipment for the prevention and suppression of risks in natural disasters.

MASS NOTIFICATION SYSTEMS FOR LOCAL GOVERNMENT

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Abstract

One of the challenges public authorities face during a natural disaster is communication with the citizens of the affected area. Undoubtedly, establishing a direct, trusted and reliable communication channel between public authorities and citizens, may significantly limit the consequences. The purpose of this study is to highlight the application of mass notification technology in coordinating an emergency response during natural disasters. Mass notification systems allow to create predetermined contact lists and pre-defined messages for efficient communications throughout a crisis. The dissemination of messages is achieved through multiple channels (voice calls, SMS, email, social media etc) within seconds, to alert recipients with actionable information. GIS targeting can also be used to alert the residents of a specific geographic area. Similarly, public authorities can enhance the coordination of their ground teams in the affected area by providing them with mission critical messages as information comes in. Finally, the use of mass notifications systems can also include 'Safety Drills' to provide public safety personnel with emergency response practice, and to give citizens the instruction and education they need in order to take effective and immediate safety precautions in the event of a local emergency. The application of mass notification systems before, during and after a natural disaster will be presented through real world case studies and their impact will be analyzed.

EMERGENCY PREPAREDNESS AND RESPONSE TO HAZARDS: THE CASE OF THE 2017 CATASTROPHIC FLOOD IN MANDRA, WESTERN ATTICA

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Abstract

This paper describes the emergency and early recovery phases of the flash flood that struck the Greek city of Mandra on 15 November 2017, turning urban roads into fast-flowing rivers, killing 24 people and caused economic damages.

Mass emergencies and major calamities are therefore characterized by the need for outside assistance, state and local assets are sent to the affected area to assess damages, explain national relief programs, and provide financial assistance, among other things. Dozens government and local agencies converged in Mandra. Among these individuals and organizations from the public sector were search and rescue teams, law enforcement personnel, environmental enforcement officials, the General Secretariat for Civil Protection. Emergent groups, religious organizations, businesses and non profit agencies are also arrived at the scene from distant locations to provide various kinds of disaster assistance.

Nonetheless, the bulk of responsibility in disasters typically falls on local jurisdictions. For this reason, it is imperative to understand local emergency management organizations.

This research focuses on two aspects of flood-related emergency governance and management: (i) the functions and effectiveness of control structures, and (ii) the roles, responsibilities and effectiveness of legislative and other operational measures. The study concludes that the flood-loss mitigation measures, both in terms of effects of control structures and institutional interventions for emergency, were not fully effective for ensuring the well-being and satisfaction of floodplain inhabitants.

THE TRIANGLE OF THE TRAGEDY AND THE NECESSARY LEGISLATIVE INTERVENTIONS: THE CASE OF THE 2018 WILDFIRE IN MATI, EASTERN ATTICA, GREECE

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Abstract

A series of wildfires in Greece burned in coastal areas of Attica in July 2018, where 99 people were confirmed dead. Over 700 residents have been evacuated or rescued, mainly from the seaside town of Mati. The fires were the second-deadliest wildfire in the 21st century worldwide, after the 2009 Black Saturday fires in Australia that killed 180 people.

The crisis and emergency management of the event are discussed in depth, highlighting potential gaps and possibilities for future improvement. Coordination between civilian agencies has been previously found to be a significant issue that affects the efficiency of multi-agency system responses to large-scale emergencies.

This paper presents the findings derived from a case study focusing on the problems that arise between responding agencies. The study further considers policy and legislative interventions necessary in such circumstances and outlines proposed strategies to address them. Three fundamental factors that hinder coordination and effective response between agencies during multi-agency emergency responses were identified: - the lack of culture, the organizational deficiency and the “labyrinth” of the Greek legislative framework, -are discussed-, in terms of recovery plans, national efforts on risk prevention programs and risk management.

CIVIL PROTECTION FOR THE NEXT DAY

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Abstract

The goal of this project is to contribute with recommendations, in assembling the new institutional context for Civil Protection.

The problems have been observed and documented during all the phases (planning, prevention, readiness, handling, recuperating) of destructive incidents that have taken place in our country.

My experience from my 17 year involvement and a Civil Protection Administrator for the Decentralized Administration for Madeconia – Thrace, but also Central Macedonia Precinct in large-scale natural and technological disasters, with the problems that have been created by mutual coverage of responsibilities from the various bearers, which resulted from our labyrinthine legislation, are recorded reporting real-time events, controversial legislations and comprise the source for my claims.

The results of the total analysis lead to the necessity for the reconstruction of Civil Protection with a new institutional framework, new organization and operation.

I believe that this project will help the committee for the new institutional framework, in the legislative representation kai in the establishment of a system that is more functional and more efficient by:

- Improving the institutional framework-Analyzing the Risks, Vulnerabilities, and Danger Levels of each region, with the cooperation of universities and technological institutions, bearing also in mind the evidence of climate change.
- Creation of Operational Action-Plans for each danger in each region.
- Improving the Ability and Readiness of all bearers involved.
- Educating, Training, and Briefing operational executives as well as citizens.

The next day for Civil Protection should be signaling a society armored in all aspects, with the participation of State, Self-Government, Volunteers and Citizens as well.

IMPLEMENTATION OF CONTINGENCY PLANS AND BUSINESS CONTINUITY PLANS AT PPC's LIGNITE MINES

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Abstract

For the Public Power Corporation S.A (PPC), its Human Resources is its most valuable asset. Within the frames of protection of employees, visitors and infrastructure, PPC has developed and maintains plans and procedures to identify the potential for, and responses to, incidents and emergency situations for its Mines and Power Plants. Especially for Mines, it is in progress the development and implementation of Business Continuity Plans having as ultimate goal the recovery of operation of its critical activities after a disruption. Environmental Emergency Preparedness Plans are also developed and implemented. Through the implementation of Health & Safety Management System, Business Continuity Management System and Environmental Management System a common platform is formulated for the identification and assessment of risks and for the management of emergency situations. The development, implementation and certification of these Plans shows the respect of PPC Group to its employees, the society and the environment as well as the interest and respect to its customers and its commitment to continuous and uninterrupted provision of high level services to them.

EPICURO

EUROPEAN PARTNERSHIP FOR INNOVATIVE CITIES WITHIN AN URBAN RESILIENCE OUTLOOK

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Abstract

EPICURO project is funded by DG ECHO, aiming to improve resilience at city level, through key stakeholders' partnerships and creation of Urban Resilience Strategic Teams that will facilitate embedment of resilience related activities into cities' agendas. Through SWOT analyses and identification collection and analyses of best practices, the European cities mapped the existing situation regarding resilience and set priorities on the activities and measures to improve it. The 100 resilient cities Rockefeller initiative as well as UNISDR on resilient cities are being represented in the EPICURO consortium, assisting cities to establish a strategy for resilience and a supporting action plan. International Training Event was organized in Vejle, Denmark, linking resilience with innovation, followed by a series of local training events in specific topics of resilience, as they were prioritized by the cities. Raising awareness campaigns and pilot activities are in progress to diffuse benefits of EPICURO project activities to key stakeholders and citizens and to mainstream project results into regular cities' policies. Synergies with other projects -financed by other European initiatives- have been established and a focused conference will be held in London at December 5th and 6th 2018. Resilience is a dynamic process at city level and creation of partnerships to improve it is necessary to exploit all various initiatives, projects and activities that are in place in the cities, they are linked to resilience, yet do not cooperate. EPICURO projects incorporate resilience in all key activities of a city in a dynamic process with feedback loops.

ACTIONS TO PROTECT CHILDREN AND YOUNG PEOPLE DURING EMERGENCIES: INSIGHTS FROM 2016/2017 CENTRAL ITALY EARTHQUAKES

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Abstract

In April 2016, Lazio Civil Protection Agency and Save the Children Italia Onlus (STC) ratified a three-years Agreement for the protection and assistance of the young population in emergency.

The two main goals of the Agreement are: **a)** Definition of child-friendly approaches and methodologies for the protection of children in emergency addressed to the Volunteers and aimed at designing a preparedness and response mechanism around the rights of the youngest; **b)** Updating of the Regional Civil Protection guidelines for Municipal Emergency Plan to include specific child centred measures.

Between Aug 2016/Jan 2017 three strong seismic events ($M_W=6.0$ 24/08/2016; $M_W=6.5$ 30/10/2016; $M_L=5.5$ 18/01/2017) hit Central Italy. The sequence produced a strong destructions and loss of lives (299 deaths, 388 injured). During the first emergency days, one of the primary efforts was to secure and to assist young people, above all youth population that suffered serious losses during the earthquake of August 24th (33 children dead).

Following the first event, two White Child Friendly Spaces set up within the Regional Civil Protection tent camps in Amatrice and Grisciano villages, both managed by STC personnel. These White Child Friendly Spaces provided children with a protected environment in which they could learn, socialize, play, and express themselves.

The affected population, the volunteers and operators who managed emergency appreciated this synergy and this new approach to the emergency management. The objective of the paper is to present the results of the agreement on Local Emergency Plan and the actions to face next emergencies.

THE ROLE OF MASS MEDIA IN CRISIS MANAGEMENT

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Abstract

Introduction

The dissertation aims to enable civil protection to manage public information and psychological support for those affected by general state paralysis or in situations of widespread and prolonged destruction. Keeping people connected is keeping people safe.

Purpose

The aim of the research is to help all those who are interested in developing the necessary skills to be able to deal effectively with critical situations. Our research has the sole purpose of optimizing existing logical practices and tactics to address and respond.

Method

As a method, design-based research and approach to living labs are adopted.

Material

It builds on the existing knowledge of the International Telecommunications Union and the European Broadcasting Union.

Results

It is useful for national and regional authorities to develop communication strategies and be prepared to implement their communication design through different channels where multiple actors seek information.

Conclusions

Communication in a crisis should begin immediately. Failure to secure a constructive relationship during a crisis maximizes journalists' mistrust of misconceptions. The state should ensure that journalists are kept up to date as well as the logistical support of the media. The confrontation with the media at any point leads to the wrong conclusions that color the evolution of later events. Communication policy should aim at providing information in a clear and honest way to the public.

RISK FOR CULTURAL HERITAGE FROM CLIMATE CHANGE. THE CASE STUDY OF BOION STONE BRIDGES

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Abstract

The key role of cultural heritage in promoting social cohesion and sustainable development has been identified worldwide and its preservation has become a policy priority. Analyzing risk is crucial for cultural heritage monuments since irreplaceable and irreversible losses can occur when they are exposed to natural or man-made hazards. Climate change accelerates even more their natural decay and deterioration due to increased extreme weather events. The present study focuses on a mapping approach for cultural heritage risk assessment. In the first stage, a geodatabase of cultural heritage in a study area is developed including technical characteristics. Secondly, historical disasters are recorded and possible natural hazards (natural decay, seismic hazard, flood etc.) and impact of climate change are identified to generate hazard maps for the study area. In the third step, vulnerability assessment with a simplified approach for different levels of damage is incorporated in the geodatabase. Then the restoring ability and the potential loss of value are explored. Finally, the level of vulnerability is combined with the likelihood of each hazard and risk maps are developed. Herein, the Stone Bridges of Boion of Kozani are used as the case study area. The Stone Bridges are of high historical and architectural value and have been often the object of study and admiration. Therefore, the rising threats that jeopardise their survival should be investigated. In this respect, risk estimation for the Stone Bridges could be a primary tool for authorities to perform efficient decision making for their conservation, a critical aim for Western Macedonia Region.

REHABILITATION COST FOR 3 LISTED BUILDINGS IN THESSALONIKI

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Abstract

In Greece, the protection of the listed buildings is a very complex issue, subjecting to a complicated legislative framework, to frequently overlapping competences between different Public Services, to unclear ownership and to the facing of the significant financial cost needed for their restoration and reinforcement.

A “listed” building may not be demolished, extended or altered without special permission from the local planning authority. Detailed technical and economic studies will specify the interventions needed to carry out. Several factors must be considered, such as the clarification of the legislative framework, the analysis of the static entity, the identification of the pathology of the building, the building usage, the economic incentives and funding etc.

This research analyzes three listed buildings in Thessaloniki. These were selected in order to satisfy a number of criteria: they are supervised by different Public Services, are built with different construction techniques and materials, and their pathology was treated differently. According to the data collected, the economic cost for the restoration of these buildings range from 314 to 973 €/m².

The study presented herein provides only a first-level techno-economic analysis of the interventions in listed buildings in Thessaloniki, as the results are limited to only three. Nevertheless, it is essential for Civil Protection Services to enhance public safety, for individual owners and Greek Government to estimate the cost of the preservation of listed buildings. Future research based on the analysis of interventions carried out on a much larger number of listed buildings will provide more accurate restoration costs.

THE PRESENTATION OF THE SEMINAR ENTITLED "DISASTER MANAGEMENT IN CULTURAL INSTITUTIONS" AND ITS RESULTS

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Abstract

The purpose of this presentation is to introduce the audience the educational program of the seminar entitled "Disaster Management in Cultural Institutions" and its results. The seminar was held on September of 2017 and organized by the Institute of Lifelong Education of the Technological Educational Institute (TEI) of Athens and the Department of Conservation of Antiquities and Works of Art, TEI of Athens.

The seminar intended to improve the knowledge of the professionals of cultural institutions (conservators, museologists, archeologists, librarians, etc.), on the development and implementation of disaster management strategies. The seminar included:

- a. Lectures:
 - 1. Identification & risk assessments in sites, buildings, and collections
 - 2. Disaster planning and protective measures for safety of collections and people
 - 3. Disaster response actions, including collections salvage, treatment options, and long-term recovery
- b. Classroom team exercises and individual written exams.
- c. Hands-on simulations to fire and flood disaster responses, including handling and packing of affected objects.

The educational program was successful since participants are able to identify the unique vulnerabilities in their institutions and capable to deal successfully with minor or major disasters. The strength of this project-seminar lies in the fact that the participants acquired theoretical background and practical skills at managing disasters within their own cultural institutions.

- 1. it introduced international systems for disaster response
- 2. it can be adopted by all Greek Cultural Institutions offering solutions tailored to the specific of each

3. it was the starting point for establishing a dialogue and mutual understanding among Greek organizations.

DISABILITY AND CIVIL PROTECTION

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Abstract

Introduction

In the Greek Constitution, constitutional ensurance (Article 4) of the principle of equality against the law is the cornerstone of the regulatory framework for people with disabilities and their treatment by the state, while the principle of gender equality ensures that women with disabilities are equal members of society and are protected by the state as well as men with disabilities. Although people with disabilities, while they are a significant part of the world population (about 15% according to the World Health Organization) and although they belong to the most vulnerable population groups, are often overlooked in the various disaster management phases, the percentage of people with disabilities they are losing their lives far higher than those of people without disabilities. Indeed, the United Nations (UNISDR, 2015) points out that the fact that people with disabilities are disproportionately affected "is due to a number of factors including exclusion from decision-making processes, often poor living conditions, inadequate infrastructure, income inequality and limited access to essential services, in particular education and information".

Purpose

It is therefore necessary

- the development of integrated business planning frameworks that will include all groups of the population even the most vulnerable such as the Disabled, inclusive,
- engaging in information - training of people with disabilities in order to be aware of the protection measures before, during and after a natural disaster as well as
- the organization of informative talks and readiness exercises for staffing institutions, trainers, parents and guardians of people with disabilities.

NATURAL DISASTER INFORMATION DISSEMINATION ON TWITTER: TESTING AGAINST MAINSTREAM MEDIA COVERAGE

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Abstract

Twitter, a rich source of social data is a great starting point for social web mining because of its inherent openness for public consumption. In this work, we examine the relationship between mainstream media and Twitter agendas.

While collecting Twitter data, we focus on the prominent hashtags during natural disasters in Greece. The paper also traces media coverage during the same period to test the hypothesis that the mainstream media agenda has an influence on the social media discussion. It aims to answer a series of research questions about information dissemination and the role of social media.

Keywords: Social media, Twitter, communications, natural disasters, data analysis

ROAD ACCIDENTS BLACK SPOTS ASSESSMENT WITH A RECENTLY DEVELOPED GIS BASED METHODOLOGY

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Abstract

In the scope of this paper, a recently developed GIS based methodology for the road accidents black spots assessment is described, which was developed by the Technical Chamber of Greece/Department of Western Macedonia (TCG/DWM) and was included in the Best Practices Guide of the Interreg Europe Project “Interregional Learning towards Sustainable Mobility in Europe: the REGIO-MOB Experience”, in which the Region of Western Macedonia is a partner and the TCG/DWM is a stakeholder.

The aim of the methodology was the assessment of 700 km of the national road network of the Region of Western Macedonia with regard to road safety. The study included: identification of the dangerous road locations (black spots) based both on the data provided by the Traffic Police and on on-site inspections. With regard to the on-site inspections, 183 black spots were identified with their geographical coordinates, photographic documentation and an outline of the problem described. Thus they were all recorded digitally with the use of ArcGIS software.

The methodology presented and the GIS application produced can become a very useful tool for public authorities responsible for road safety, by adding black spots or maintenance updates of the existing ones and targeting measures ensuring road safety of the users. The application could be upgraded by its integration into vehicle safety systems in order to provide real time information to the road user. The added value of the application presented is high with regard to the relatively low overall cost and the immediate and future benefits in the health, socio-economic and environmental sectors, since the methodology can be easily adapted and adjusted by other regions.

DISASTER AS A WINDOW OF OPPORTUNITY FOR TOURISM: THE CASES OF NEW ORLEANS, USA AND SICHUAN, CHINA

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Abstract

Tourist development based on tragic situations such as disasters is perceived as shocking and/or impossible. However tourism in places of war, torture, accidents, crime etc. is not uncommon. The current discourse on tourism employs terms such as dark tourism, thanatourism and dissonance tourism to refer to tourism in places, monuments and exhibitions associated with pain, death and the macabre.

The present paper discusses disaster tourism based on two cases: the destruction of New Orleans in 2005 and the Sichuan mega-disaster in 2008.

Wenchuan earthquake in 2008 devastated Sichuan province. Sichuan was already a tourist destination due to its rich natural resources. Tourism bounced back not long after the disaster. Besides marketing, this was an outcome of the reconstruction strategy which set tourism as a pillar of development. Accordingly, memorial parks, museums, monuments and other infrastructure relating to the disaster were constructed. Research findings indicate that Chinese visitors visited the area driven by an obligation to pay their respects to the victims, together with curiosity, whilst they obtained knowledge and experiences.

Hurricane Katrina fell on New Orleans in August 2005 causing enormous and uneven consequences. In December 2005, Gray Line launched bus tours in the city ("Katrina tours"). In addition to commercial profit, this practice contributed to handling the national grief; the opportunity customers had to visit the area enhanced solidarity and involvement.

In conclusion, beyond dark tourism and despite the moral questions it arises, disaster tourism deserves a second look as a reconstruction instrument and/or a tourist practice.

RADIO-COMMUNICATIONS AT THE HELLENIC FIRESERVICE AND THE ROAD AHEAD TO DIGITAL ERA

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Abstract

FireService is a Public Safety (PS) service that has a very important role to society by creating a stable and secure life environment. It is a common fact that the lives of firefighters and the quality of service that they provide, depend a lot on communications . Radio communications or also called Professional Mobile Radio (PMR) used by firefighters are critical in the field operations to support the mobility of these first responders. In this study, aiming in the improvement of the communication in the digital era we provide with a review of the recent situation of analog radio-communications system that is used by the Hellenic Fire Service. Furthermore, we study the ever-changing needs of radio-communication systems on Fire Service and we also provide a brief overview of communication technologies that used by others Fire Authorities in Europe. We conclude, focusing on the available digital technologies on the market and its pros and cons for the case of Hellenic fireservice ,

Keywords: Fire Service, Radio Communications, Public Safety, VHF, analog PMR, dPMR, DMR, TETRA, Tetrapol

FIRES IN SOLAR POWER SYSTEMS AND FIREFIGHTER SAFETY – A REVIEW

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Abstract

The purpose of this study is to review the risks imposed at firefighters' safety when engaged on incidents of fires in photovoltaic systems, and the suggested firefighting methods according to international standards and guidelines. The vast development of solar power applications in last decades has led nowadays into an increasing number of buildings incorporating photovoltaics which produce electricity, contributing to the electrical power supply. It is a fact, however, that many solar power units installed lots of years ago are now aging, and many of the installed applications could lead to fire development, due to their potentially improper installation, and lack of maintenance. On the other hand, until recently little was known about the dangers imposed in fires involving photovoltaic systems, with firefighters worldwide having a scarce knowledge of proper ways to manage such fire safely and effectively. To this purpose, a number of guidelines both in Greece and other countries have been developed aiming at the protection of firefighters from the risks associated with fires in solar power units, and also at the proper procedures to be followed for their successful fire suppression. This paper focuses on the analysis of these guidelines, under a literature review methodology, also highlighting the most common causes of fires in photovoltaics, and the risks imposed regarding the firefighters' operational safety. The study's results can be a useful resource tool aimed at enriching firefighters' knowledge, both in fire suppression techniques, as well as in safety concerns about the health hazards linked to such fires.

Keywords: photovoltaics, firefighters, electric shock, accident prevention, safety, fire risk.

FOREST FIRES MANAGEMENT: A NEW PROPOSAL TO FACE NEXT FIRE SEASONS IN ITALY

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Abstract

The National Law on Forest Fires (n. 353/2000) gave the basic rules to face these emergencies and established that Regions are responsible for the response in forest fires in Italy. At the end of 2017, after the closure of the Forestry Corps and a very difficult forest fire season, both National Department of Civil Protection and Regions started thinking about new strategies in forest fire management.

The aim of this paper is to present the results of the Inter-institutional Group that worked, and is still working, on new definitions, functions, training and qualifications to support Regions for the next forest fire seasons.

In particular, the paper analyzes the role of the Director of Operations and the process to have, in the next years, Regional Directors in place of the current Firemen Directors, focusing on their functions and a detailed and specialized training. The main objectives are a greater dissemination in the regional territory and a cost reduction to thus have more investments in prevention projects and actions.

AN INNOVATIVE STRATEGY OF EMERGENCY TRANSPORTATION IN MASS CASUALTY INCIDENTS

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Over the last decades, mass casualty incidents (MCIs) from catastrophic natural and man-made disasters have caused an overwhelming effect to the emergency medical service (EMS) system. Smoothing the patient flow in both pre- and post-hospital stages is really attractive to researchers and practitioners in civil protection. In this article, we apply an innovative design in the current EMS system not only to accelerate the EMS transportation, but also to release the pressure of emergency departments (EDs) in the response hospitals.

Two ideas, the sequential-conveyance method and emergency medical regulation center (EMRC) are introduced in this research. The sequential-conveyance method allocates the ambulances into two lines. The first-line ambulances are shuttled between the disaster sites and EMRCs, while the second-line ambulances are highly regulated between the EMRCs and requested hospitals. The sequential-conveyance method provides an efficient EMS transportation strategy; whereas, the EMRC generates a buffer zone for alleviating the overcrowding pressure in the EDs. Furthermore, the EMRC that is a mobile ED provides emergency treatment and capacity to the moderate and mild patients. The EMRC, along with the sequential-conveyance method of EMS transportation were evaluated in a real case study for the Typhoon Morakot that occurred on August 8th, 2009 in Taiwan.

According to the results of this study, the EMS transportation time and distance efficiency were improved by 52.15% and 56.02%, respectively. One of the purposes of civil protection is to save the human life; therefore, modifications in the EMS system should be further explored for future MCI adaptation.

OCCUPATIONAL SAFETY AND HEALTH AS A TOOL FOR EFFECTIVE PREVENTION AND EMERGENCY RESPONSE POLICIES FOR NATURAL AND TECHNOLOGICAL DISASTERS

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Abstract

In this paper the contribution of occupational safety and health (OSH) procedures for establishing effective prevention and emergency response policies for civil protection in case of natural or technological disasters, is discussed. In this context research priorities and the need of constitutional changes are analyzed.

Some important aspects for preventing natural or technological disasters are the following:

- prevention of accidents which could lead to a major technological accident (e.g. prevention of a domino effect in areas where Seveso and non-Seveso establishments are operate)
- prevention of unsafe conditions and accidents which could lead to a major land fire (especially in case of wild land urban interface fire)
- preparation of the public for emergency response in case of a major accident or natural disasters
- preparation of emergency services for an effective emergency response plan for different cases of natural and technological disasters.

Occupational safety and health procedures can contribute to the above mentioned aspects, for example by:

- strengthening prevention policies in every workplace
- promoting education, training and safety culture policies for workers and the public
- taking into consideration the changes of the work environment which may contribute to accidents
- supporting decision makers in all levels for effective emergency response procedures in urban areas which may be at risk of a hazardous materials major accident or a major land fire
- supporting emergency services by analysing occupational risks and proposing relevant preventive measures (e.g. personal protective equipment, ergonomic hazards assessment, occupational health surveillance).

A holistic approach for procedures and legislation regarding OSH, Seveso directive, ADR, civil protection etc, results in an effective decision making and management of all risks.

THE USE OF UAV IN SEARCH & RESCUE. A USEFUL TOOL FOR CIVIL PROTECTION IN GREECE

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Abstract

The purpose of the study is to research the capabilities and benefits that UAVs' offer in a SAR operation as also how all those benefits can be inserted into the Hellenic Civil Protection mechanism and organizational structure.

The majority of Search and Rescue operations are multi-complex and many organizations/authorities are involved. Operation Center and Decision Makers want to have the "eye above", live video of all the area, potential dangers, where SAR teams are, victim area and many more. It is important to note down that in many SAR operations in difficult terrains, like mountain Olympus or at open sea a short drone flight gave useful information about the position of the person in need.

Unfortunately, many drones fly illegally and create problems during SAR and other operations, like the Fires in the area of Mati and many problems to the airplanes and helicopters dedicated fighting the fire were caused and this need to be settled.

This project proposes an holistic and methodological approach for the Hellenic Civil Protection in order to create a database with all the registered and certified operators and available drones from SAR teams, Universities, organizations and individual ones in all municipalities which can help from forest protection to a rescue operation. Moreover, skilled SAR drone operators can train other ones in general or more specific SAR operations (mountain, sea, urban, floods, earthquakes etc).

To sum up, this study will research the benefits and the usability of inserting UAVs' in Civil Protection mechanism for SAR operations.

BEAWARE -ENHANCING DECISION SUPPORT AND MANAGEMENT SERVICES IN EXTREME WEATHER CLIMATE EVENTS

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Abstract

As climate conditions are expected to change in the foreseeable future, this will lead to an increase of extreme weather events. Therefore, floods, droughts, fires, heatwaves, etc. are also expected to become more common and frequent in the future. Nevertheless, despite the nature of the cause, all major disasters and crisis require an immediate, comprehensive, and professional response. Today, the emergency management landscape is characterized by a splintered structure that leaves each community or county responsible for preparing for the disasters. This fragmented system often creates significant risk exposures to communities, and limited resources result in significant loss of life and property. The wide variety of technologies and tools should be used by disaster planners and responders in order to assist them during an incident.

Instead of focusing on a specific part of the crisis management problem (e.g. information routing), beAWARE proposes a holistic approach to the realization of crisis management framework that it will support all the phases in an emergency call sequence. The overall objective of beAWARE is to provide an integrated solution for new decision support services based on aggregated analysis of multimodal data and previous crisis management records. beAWARE will address the needs of the main sectors of the security emergency procedure, namely first responder and PSAP. Moreover, beAWARE aims to bring first responders, PSAP centres and forecast services to collaborate together in order to explore new ways of working and delivering more effective outcomes

IN-PREP: EMPOWERING PREPARADNESS OF CIVIL PROTECTION AUTHORITIES THROUGH INTEGRATED TOOLS FOR SCENARIO BUILDING, TRAINING AND COLLABORATIVE RESPONSE PLANNING

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Abstract

(Key words: collaborative response planning; training; scenario building)

IN-PREP is a 3-year EU funded Innovation Action, implemented by 20 organisations from 7 MS, addressing the overarching challenge of helping emergency managers to prepare, plan and train for transboundary crises.

Planning for crises has never been an easy task. Who is responsible for what, who do we need for an organised response, and when do we initiate certain measures? Planning becomes even harder when a crisis stretches over borders and/or policy domains (we refer to a transboundary crisis, TBC). In TBCs, multiple actors, (national) policies and crisis frameworks have to be connected. IN-PREP Action is established to give member states tools to prepare for TBCs.

At the technology front, IN-PREP will design and develop the Mixed-Reality Preparedness Platform (MRPP), an IT Tool that allows practitioners to train and prepare for transboundary crises using new and existing scenarios, in a virtual environment. The MRPP exploits modeling tools (evacuation, propagation of hazards, risk and impact assessment), training tools (scenario building and execution in a virtual environment) and response tools (incident and resources management) in an integrated manner, boosting realism during training and facilitating collaborative response planning. At the organisational and policy front, IN-PREP will deliver a Handbook addressing operational and procedural best practices and technical recommendations for further development of relevant systems.

IN-PREP envisions to demonstrate a step-change to joint response planning in a rich Training Programme of table-top exercises and field demonstrations addressing multiple hazards with the participation of all types of Civil Protection authorities at all levels of command.



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CORRELATION OF THE 2018 HUALIEN (EASTERN TAIWAN) EARTHQUAKE EFFECTS WITH THE GEOLOGICAL STRUCTURE OF THE AFFECTED AREA

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Abstract

On February 6, 2018, an Mw 6.4 earthquake hit Eastern Taiwan with epicenter close to the coastal area north of Hualien city and focal depth around 10 km. The most affected area was Hualien city with VII maximum intensity. The main shock caused 17 casualties and 285 injured.

The earthquake caused almost identical structural damage (collapse of the ground floors and tilting) to 6 multistory buildings in Hualien city, as a result of the synergy of several factors including the prevailing special ground conditions at each site, the effects of the vertical component of the earthquake ground motion on the performance of concrete and reinforcement of damaged buildings, the parameters of the ground shaking as well as the type, design and construction characteristics of the affected buildings.

As regards the earthquake environmental effects (EEE), ground cracks, liquefaction phenomena and slope movements were generated. Ground cracks accompanied by ejection of sand-water mixture that covered parts of the asphalt pavement were observed east of the Hualien airport and outside of the perimeter wall of the military base. Ground cracks were formed in several sites in Hualien city, especially close to damaged buildings and slope movements in the Taroko Gorge north of Hualien City.

Based on the distribution of building damage and EEE in Hualien City, it is concluded that the majority of the observed effects were generated close to or along the Meilun fault, which is one of the major active structures in Eastern Taiwan and runs right underneath Hualien city.

RESILIENCE OF INFRASTRUCTURE IN THE ENERGY SECTOR TO NATURAL HAZARDS AND CLIMATE CHANGE

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Abstract

Providing reliable energy services in societies and keeping energy systems up and running at all times is integral to economic and societal success. Yet, energy sector infrastructure faces an increasing number of natural hazards due to climate change that makes it difficult to keep up with these goals. Knowing the resilience of infrastructure components and systems is a pathway to help propose efficient adaptation strategies. Risk assessment has a key role in measuring resilience. In this context, the present study aims at highlighting methodologies for risk assessment of infrastructure in the energy sector. Possible hazards are identified and their interaction and connection to climate change is discussed. A critical review on available frameworks for qualitative and quantitative risk assessment to estimate resilience of infrastructure in a systemic level is provided. More specifically methods for hazard analysis, vulnerability and loss assessment are reviewed. A power generation station is used as a case study for estimating resilience. Based on a selected methodology for risk assessment and for different hazards scenarios (seismic and sea level rise) resilience is discussed and possible interactions are identified. In the conclusions derived the impact of these hazards on the resilience of critical infrastructure of the energy sector is demonstrated and how it is affected depending on the nature of the hazard. Resilience measurement indicates also that it can be a useful tool for stakeholders and decision makers to explore alternative pathways for energy supply.

VULNERABILITY OF TRANSMISSION PIPELINE. THE CASE OF FLORINA

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Abstract

This study concerns Florina district and its water transmission pipe. The area under investigation is a mountainous terrain with heavy snowy winters and high rain precipitation combined with gneisses and schists which are the primary reasons for the slope failures. Florina water transmission pipeline is constructed mainly of cast iron, with a length about 20km, dated back to 1960, with diameters till 300mm that supplies the city with water.

The purpose of this research is to assess the vulnerability of Florina water transmission pipeline taking into account earthquakes, changes in watertables and rapid snowfalls or rainfalls. Different scenarios were produced as the prediction of the exact time, location or magnitude of landslide is not feasible because of the complex synergy of geologic, geomorphology, tectonic, hydrologic conditions and soil formations.

A probabilistic seismic hazard analyses was implemented taking into account the geology, the geotechnical characterization and the seismicity of the area. Three seismic scenarios with different earthquake recurrence period (50, 100, 475 years) were produced. Peak Ground Acceleration (PGA) and Peak Ground Velocity (PGV) were estimated according to Ambrasey's et al (1996) and Skarlatoudis et al (2003) attenuation relation, relatively. Permanent Ground Displacements (PGD) as result of landslide's hazard was estimated using HAZUS methodology for 3 seismic scenarios and for "dry" and "wet" conditions. Appropriate empirical vulnerability relations for pipelines were applied, to estimate the number and the type of the expected failures. GIS capabilities were used to identify the areas with the more "vulnerable" parts of water transmission pipe.

Concluding, this study can be used by Florina Water Company to minimize the consequences and possible losses for Florina citizens and enhance water transmission pipe reliability.

PRIVATE – PUBLIC SECTORS PARTNERSHIP FOR DISASTER RISK REDUCTION IN ARMENIA: THE CASE OF ALTER PROJECT

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Abstract

Alliance for Disaster Risk Reduction (ALTER) project has been financed by European Commission (DG ECHO) 2018 – 2020, to formulate private – public sectors partnership for disaster risk reduction in Armenia. Focus is on increasing resilience in areas of Armenia that face floods risks originating in dams' failure due to earthquakes. Such alliances will be founded on transfer of good practices, methods, tools, knowhow and experience from Union Civil Protection Mechanism countries to Armenian government and key stakeholders. A study visit took place in June (17-23.06.2018), during which the Partnership visited the pilot areas where the foreseen activities will take place:

- Project Area 1: Kapan and Kajaran in the southern Armenian region of Syunik, near the Iran – Armenian borders
- Project Area 2: Vorotan Cascade hydroelectric infrastructure
- Project Area 3: Akhtala in the northern region of Lori near the borders with Georgia.

Joint preparatory work with private sector, foreign and Armenian companies that manage the hydro and tailing dams led to plan of three on field exercises coupled with capacity building trainings, at pilot areas, for 2019. Efforts capitalize on Armenian and international initiatives and projects as well as on work done by companies to comply with international standards of safety and security. The agreements between public and private sector on disaster risk reduction, can become a cooperation model for the whole area of Caucasus for all major risks. ALTER activities work on capacity building of local communities and regional / local operational authorities and key stakeholders to build long term fruitful cooperation.

THE 21 JULY 2017, KOS-BODRUM TSUNAMI INTENSITY MAPPING: APPLYING THE INTEGRATED TSUNAMI INTENSITY SCALE (ITIS²⁰¹²)

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Abstract

On July 21, 2017 (22:31 UTC), a Mw 6.6 earthquake occurred off-shore the Kos Island, Greece. The epicenter is located in the marine area between Kos Island and Turkey's coasts in Gokova Bay. Shortly after the earthquake, tsunami waves hit the south-east coast of Kos and the coast of Mugla province in the Gokova Bay area.

In order to assess the tsunami intensity, data regarding the tsunami impact and gathered from multiple sources on both the coastal zone of Kos and the eastern coast of Turkey, have been recorded, assigned against the ITIS₂₀₁₂, and mapped using ArcGIS. Interpolation methods have been used in order to display the impact zoning in the inundated areas.

The results show limited, yet notable impact on each one of the ITIS₂₀₁₂ categories, escalating among the middle grades of the Scale, and classifying the event as a middle-intensity tsunami.

Applying the ITI Scale to a middle-intensity event for the first time, showed that the individual ITIS₂₀₁₂ criteria successfully complemented each other creating an excellent zoned map.

DETECTING AND MAPPING SPATIAL RISK DISTRIBUTION OF GROUND DEFORMATION INDUCED BY URBAN HIDDEN STREAMS: A CASE STUDY FROM ATHENS CITY CENTRE

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Abstract

The purpose of this study is to introduce specific areas around the riverbeds of the urban hidden streams in the city of Athens presenting high risk in terms of ground subsidence. The study area comprises the centre of Athens and more specifically the Municipalities of Athens, Tavros, Kallithea, Daphne, Hymettus and Ilisia where the ancient rivers of Ilissos and Eridanos naturally flow through a heavily populated city. It wasn't until the early 1960s that the two rivers were completely channeled and partly covered along their course during the urbanization process which allowed the construction of the modern boulevards, roads, recreation and open space areas as long as parking areas. The route of today's concealed rivers and streams poses a serious risk of potential ground subsidence concerning the erosion of streams' bank permeable soil formations. Following this approach, areas of influence (buffer zones) were determined on each side of the subterranean urban rivers Ilissos and Eridanos. In particular, an inventory of literature and references such as, historical maps and drawings, technical studies as well as modern topographic and geological maps, land use / land cover maps was created and collected in a geospatial database. It is worth mentioning that a main part of this study was the utilization and analysis of satellite radar data of the time period 2012-2016, in order to detect vertical displacements (mm/year) and correlate these with the above-mentioned spatial data of Athens city.

HIGH SPATIAL AND TEMPORAL RESOLUTION OPERATIONAL FLOOD MONITORING: EVROS RIVERFLOOD (MARCH-APRIL 2018)

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Abstract

Flood management is complicated enough in river basins controlled by a single - national authority (several at ministerial and/or regional level) in the prevention, response and recovery phase, and becomes even more challenging when dealing with transboundary floods. Flood monitoring and mapping is of great importance because it represents a significant contribution to risk management. Mapping flooded areas can be a very useful and important task after flooding has occurred. Not only can it help to map the spatiotemporal expansion of flooded areas, which can be critical in the emergency response phase, but it can also assist with long-term planning and protection against future flooding. The aim of this research is the operability assessment of high spatial and temporal resolution optical images in flood monitoring. In this study the case of the last severe flood event (March–April 2018) occurred in the Transboundary Evros River is presented. In addition, the close cooperation of civil protection agencies with research institutions in Greece is highlighted, which is an important step in the effective management of risks. For this research, flood extent maps are created, using a big dataset of micro-satellite system - PlanetScopeScenes (3m/pixel, daily temporal resolution) in order to contribute to flood hazard knowledge. Cloud coverage was the main restriction in using daily the above optical data. The revisit frequency and systematic acquisition of new Earth Observation EO data and the continued development of novel platforms will lead to further advances in Space-based EO applications for a more successful Transboundary flood risk management.

THE EXTREME FLASH FLOOD OF MANDRA, GREECE.

DESCRIPTION OF IMPACTS AND FLOOD CHARACTERISTICS

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Abstract

On November 15 2017, a high intensity storm, reaching locally almost 300mm in 13hours hit the western part of the region of Attica region in Greece, causing flash floods in the town of Mandra that lead to the tragic loss of 24 people and catastrophic damages in property and infrastructure, making it the most deadly and one of the most catastrophic floods in Greece, in a period of 40 years. A novel combination of ground and aerial observations (derived by a UAV), during and after the flood was used to reconstruct the basic physical and hydrological characteristics of the flood and its impacts.

The analysis produced an accurate flood extent and depth map across the inundated area. Peak discharge was estimated at two locations using the slope-conveyance method in combination with an accurate UAV-derived digital surface model and indicated an impressive hydrological response, close to $10\text{m}^3/\text{s}/\text{km}^2$.

Impact analysis on the basis of these observations showed an extensive diversity, with variations depending on landuse, including effects in geomorphology, vegetation, transportation, buildings, infrastructure and human population. The combination of aerial and ground observations allowed an accurate reconstruction of the flash flood and its impacts, showing significant advantages in dealing with the opportunistic nature of post-flash flood investigations.

DETECTION OF AIRBORNE CHEMICAL & BIOLOGICAL THREATS IN ENCLOSED SPACES

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Abstract

Within the European Reference Network for Critical Infrastructure Protection (ERNICIP), a thematic group (TG) on 'Detection of Indoor Airborne Chemical & Biological Agents' has been formed. This thematic group investigates issues regarding Detection, Identification and Monitoring (DIM) of airborne, chemical and biological threats in enclosed spaces. Towards this aim, three main activities were implemented for accomplishing the TG objectives. In order to evaluate the applicability of the current sensor technologies and what had to be done, it was critical to evaluate what were the actual needs that had to be addressed i.e. what do we expect from the sensors against CB threats in enclosed spaces. Thus, a critical starting point of the overall approach was the definition of relevant scenarios of indoor airborne threats (chemical and biological) in critical infrastructures. The specific needs that had to be addressed set up the criteria for performing a critical review on the existing sensors available in the EU and used either for chemical or for biological agents. Computational simulations provided the spatial and temporal gradients contamination within indoor critical infrastructures. Finally, evaluation of capabilities of existing sensors based on the capability to perform early warning, allow the TG to identify the gaps and to define requirements for next generation detectors in the EU.

RISK ASSESSMENT FOR FLOOD HAZARD, IN THE CASE OF GREVENIOTIKOS RIVER BASIN (GREVENA – WESTERN MACEDONIA - GREECE)

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Abstract

Floods could cause such devastating disasters that anyone and anytime could be affected. Floods can be modeled and maps can be formed to determine the extent of possible flooding when it occurs in the future. Floods hazards management is one of the main factors connected to the management of the water resources project of the European Union. Management maps of flood risks can be created for all areas.

The aim of this project is estimating flood risk as well as the social-economical impacts of the floods born into the hydrological basin of Greveniotikos river, tributary of Aliakmonasriver which is mostly extended mostly west of Grevena city.

Flood hazard mapping is used to determine the areas susceptible to flooding when discharge of a stream exceeds the bank-full stage. The flood risk estimation is accomplished by pointing the positions that are more possible to be damaged in flood, by using parametric maps with the appropriate weights in case of heavy rainfalls. The study and the estimation of the economical impacts is done by suing Floreto software in the areas resulted by a gis analysis.

Keywords: flood hazard, economical impact, Greveniwtikos basin, GIS, FLORETO

CONTRIBUTION TO LANDSLIDE HAZARD ASSESSMENT.THE CASE OF FLORINA-KASTORIA ROAD

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Abstract

Landslides pose important danger to residential areas and to infrastructures that are located very close to unstable slopes. Landslides can provoke lifeline's performance malfunction, injuries or fatalities and may diminish accessibility to critical facilities. They can be triggered by natural phenomena (earthquakes, changes in watertable, rapid snowfalls or rainfalls) or by human activities.

The prediction of the exact time, location or magnitude of landslide is not feasible because of the complex synergy of geologic, geomorphology, tectonic, hydrologic conditions and soil formations. The occurrence of slope failures in the area of Vitsi nearby Drosopigi village (20km from Florina –Greece) mainly in the form of rockfalls and debris flow, as result of its mountainous terrain with the heavy snowy winters and high rain precipitation and low seismicity in the previous years, lead to further investigations. A probabilistic seismic hazard analyses was implemented taking into account three seismic scenarios with different earthquake recurrence period (50, 100, 475 years). Peak Ground Acceleration (PGA) was estimated according to Ambrasey's et al (1996) attenuation relation. Rain precipitations and terrain inclination were necessary input to classify the landslide's susceptibility of the area according to Mora & Vahrson (1994) methodology for the case of 100y earthquake return period. Furthermore, landslide's hazard was estimated using HAZUS methodology for static and seismic conditions for the 3 seismic scenarios for different soil moisture conditions ("dry" and "wet").

Concluding, this study provides Civil Protection Services of the Municipality of Eastern Macedonia (Greek) with empirical first-level identification of the areas in Florinas – Kastoria roadline with "high landslide's risk" via GIS maps.

INACHUS: TECHNOLOGICAL AND METHODOLOGICAL SOLUTIONS FOR INTEGRATED WIDE AREA SITUATION AWARENESS AND SURVIVOR LOCALISATION TO SUPPORT SEARCH AND RESCUE

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Abstract

(Key words: Wide-area situational awareness, victim detection and localization, structural failures prediction, search and rescue)

INACHUS is a 4-year FP7 project, implemented by 20 organisations from 10 MS, aiming to achieve a significant time reduction related to Urban Search and Rescue (USaR) phase.

A major activity within INACHUS is the development of building collapse simulation techniques, allowing rescuers to better understand the structure of the rubble pile and potential survival spaces within collapsed structures.

On the deployed tools front, the INACHUS robot snake acts as a mobile sensor platform able to penetrate debris while carrying a) the e-nose sensor array detecting gases that indicate human presence; b) the robot radar detecting movement; c) the LWIR camera for the detection of human presence; and d) microphone and speakers for the two-way communication between the trapped victims and the rescuers. Moreover, INACHUS offers sensors that can be deployed in the surface: a) a mobile phone detector used to locate any active mobile phones in the vicinity of the worksite (indication of human presence); b) surface radar able to penetrate the rubble pile and detect movement; and c) ground based seismic sensors detecting noises coming from inside the debris.

The sensorial information are fused in order to provide a more accurate picture to the rescuers enabling informed decisions regarding search & rescue of the trapped victims. To facilitate this, the INACHUS portal and the common operational picture tool (COP/C2) are accessible by the rescuers and crisis managers across the command chain.



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FIRST DEGREE PRE – EARTHQUAKE INSPECTION: E.P.P.O.'S TRAINING PROGRAM FOR ENGINEERS.

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Abstract

The goal of this paper is to present the First Degree Pre-Earthquake Inspection Training Program for Engineers initiated by the Earthquake Planning and Protection Organization. E.P.P.O. is responsible for planning and implementing earthquake policies in Greece. The first degree inspection of buildings of public use was initiated in Greece in 2001. The purpose of the inspection is a first estimation of the bearing capacity of buildings in order to identify priorities at national level to further inspection and measures.

From 2001 till 2018, E.P.P.O. has received 15,500 Forms. Since more than 50% of the Forms are not properly or correctly compiled, the Organization decided that a relative Training Program is totally necessary. The Training Program was firstly introduced in 2015 aiming to a) inform the Technical and Civil Protection Departments of Local Authorities for the necessity of the Program and b) train the engineers on how to enforce and carry-out the First Degree Pre-Earthquake Inspection. The Training Program is organized and conducted by E.P.P.O.'s Earthquake Engineering Department by request from the Local Authorities or the Local Offices of the Technical Chamber of Greece. It is still in progress and has definite positive results. There is an increase of the rate of incoming correct Forms and the ultimate goal is to improve the credibility of the conclusions derived from the statistical analysis of the data throughout the increase of the data reliability level.

FIRE-INDUCED BUILDING DAMAGE IN WILDLAND URBAN INTERFACE AREAS: THE CASE OF THE 2018 EASTERN ATTICA (GREECE) FIRE

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Abstract

On July 23, 2018, one of the deadliest wildfires of the last century, devastated the small towns of Neos Voutzas and Mati in Eastern Attica (Greece) causing 97 fatalities and destruction of buildings and infrastructures. Based on building-by-building inspection and Unmanned Aircraft Vehicle (UAV) survey shortly after the fire in this wildland urban interface area, it is concluded that the dominant building types are: (a) reinforced-concrete (R/C) buildings with R/C frame and infill-partition brick walls, (b) buildings with light timber framing system and plasterboards and (c) masonry buildings with stone load-bearing walls.

The fire-induced damage on R/C buildings varied from cosmetic damage to external surfaces of buildings including soot deposits and discoloration of plasters to heavy damage comprising deterioration of brick infill walls and concrete spalling resulting in exposed reinforcement.

The second category suffered the most. The most observed damage included collapse of burnt wooden roofs, decomposition of exterior and interior wall materials almost into powder due to extreme temperatures, melting and buckling of galvanized light polygonal wire mesh resulting in extensive cracking and collapse of load-bearing walls and subsequent near total or total collapse of the structure due to the failure of the structural elements. These buildings mainly comprise inadequate or non-fire resistant materials. On the contrary, the fire resistant elements (fireplace and chimney systems) remained intact by the fire.

The masonry buildings were the least observed in the affected area. They suffered damage varied from destruction of external and internal combustible elements to partial collapse.

FOREST FIRES, ONE SIMPLISTIC APPROACH

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Abstract

It is a fact that the occurrence of a forest fire is one of the most frequent incidents in the news agenda, especially during the summer period. The scope of this work is to study the problem of forest fires through literature research. Firstly, we are defining the forest fire; record of the causes of the forest fires and the consequences thereof is made. Secondly, after mentioning the types of forest fires, the factors that affect the start and spread of forest fires as well as the measures required to deal with them are studied. In conclusion, forest fires, with the exception of those due to natural causes and aiming at the regeneration of nature, are almost the same disastrous for both the forest and the human being. Concluding, the forest fires are an issue with enormous consequences in both the structured and the natural environment, so through this work an attempt is made to inform and understand this phenomenon, which sometimes proves to be disastrous.

BUILDING DAMAGE INDUCED BY THE SEPTEMBER 2017 MEXICO EARTHQUAKES AND FACTORS CONTROLLING THEIR DISTRIBUTION

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Abstract

On September 7, 2017, an M 8.2 earthquake struck Southern Mexico with epicenter located offshore in Tehuantepec Gulf, almost 750 km southeast of Mexico City. It caused 98 fatalities. On September 19, 2017, an M 7.1 earthquake struck Central Mexico with epicenter determined onshore, about 130 km south of Mexico City. This earthquake claimed the life of 370 people in Central Mexico.

The dominant building types are reinforced concrete (R/C) buildings with R/C frame and infill-partition walls, masonry structures with masonry load-bearing walls, adobe structures and mixed types.

The first earthquake caused damage to Chiapas and Oaxaca states (Southern Mexico). All the aforementioned building types suffered damage varying from negligible to slight non-structural damage comprising hair-line cracks in very few walls and fall of small plaster pieces to heavy structural damage including partial or total collapse. The second earthquake caused damage to Mexico City and Puebla and Morelos states (Central Mexico). About 40 buildings collapsed in Mexico City, while hundreds of others suffered considerable non-structural and structural damage forcing residents to evacuate.

Damage is attributed to the violent and prolonged shaking due to extreme amplification of seismic waves and the duration of intense ground motion within the Mexico basin, the differential settlement of buildings under the earthquake loads, the building pounding, the effect of the horizontal component of the earthquake ground motion especially in Mexico City and the effect of the vertical component in the majority of the affected areas in Puebla and Morelos states.

ASBESTOS – ONE MORE PROBLEM AFTER THE DEVASTATING FIRES OF JULY 23 AND 24

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Abstract

The purpose of this paper is to highlight the problem of the presence of asbestos in construction, the estimation of the impact from its burning on the environment and people, as well as its management and disposal.

An important problem that arose after the devastating fires of July 23 and 24 in Attica and Corinthia was the asbestos that was crushed on most of the plots after the disaster, as it was a common building component in many constructions. The problem was first faced by the engineers who were doing autopsies, without being informed of the dangers involved, in order to take the necessary measures.

As soon as the problem was reported, the Ministry proceeded directly to the provision of appropriate masks for engineers, while procedures for the asbestos removal from the affected areas were immediately launched to prevent further environmental damage.

This paper presents both the risks of crushed asbestos materials, referring to the international and Greek bibliography, as well as the way of managing and removing existing waste in accordance with international regulations and standards. The procedure followed for the collection, dismantling and disposal of asbestos waste is presented until the cleanliness of the site is certified.

The use of asbestos has been forbidden for years, but the population is not aware of the dangers of its destruction and disposal. This work attempts to highlight the problem and disseminate information on the risk of broken asbestos in order to protect public health public and the environment

ATMOSPHERIC DISPERSION OF HAZARDOUS SUBSTANCES

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Abstract

Computational tools for simulating the atmospheric dispersion of hazardous substances (e.g., toxic, radioactive) in complex built-up environments (e.g., urban areas) or in larger spatial scales are presented. Hazardous substances may be released due to accidents, natural phenomena or intentional / malevolent actions. The complex flow patterns within urban areas necessitate the usage of mass-consistent diagnostic flow models or computational fluid dynamics codes. In larger spatial scales (e.g., regional) prognostic meteorological data from numerical weather prediction models are combined with Eulerian or Lagrangian dispersion models. Such modelling tools are often integrated within comprehensive decision support systems and are connected to modules that calculate exposure or dosages, depending on the substance type (e.g., gamma radiation doses due to the radioactive cloud and the material deposited on the ground). Dispersion models can be used either for forward-in-time or for backward / inverse computations. The latter are employed when a hazardous substance has been detected but its origin is unknown at the time of detection. These might be cases of un-announced technological accidents or covert malevolent releases. In such cases the results of inverse dispersion modelling simulations are combined with the existing measurements through statistical methods to estimate the location of the release and the quantity of the released material. The presentation shows application examples of different computational tools, discusses their exploitation potential and difficulties and suggests approaches for their operational applicability in emergency response and recovery situations.

NATIONAL CIVIL PROTECTION TRAINING CENTER

REGION OF WESTERN MACEDONIA

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Abstract

The project concerns the establishment of a National Center for Civil Protection at the premises of the former AEVAL Industry. In the proposed facilities, they will be able to serve the training and practical needs of civil protection officers, security staff, members of voluntary organizations and elected local government officials.

The National Civil Protection Center will be the place where the theory will meet the practice. By classifying the sub-training specialists' skills, the creation of the largest changing battlefield is planned, both in a variety of engagement scenarios and in the simulation of natural, technological and man-made disasters.

The geographic targeting of the project will be extended to the Balkans and Southeastern Europe, aspiring to become a center of excellence in the field of civil protection education across Europe.

Purpose / Beneficiaries

The purpose of the National Civil Protection Center is to provide the necessary resources to individuals who wish to acquire documented and exploitable knowledge of the species, characteristics, impact and methodologies of addressing Natural and Technological Disasters and Crises that threaten modern societies.

The creation of this center is the result of the continuous upgrading and training of the relevant Civil Protection Authorities of the Region of Western Macedonia that make new interdisciplinary scientific approaches necessary to bridge the cooperation of the scientific research community with that of the Civil Protection of the Region of Western Macedonia.

The institutional framework of the Center will be a Legal Entity and will belong to the Department of Civil Protection of the Region of Western Macedonia. Registration and follow-up will be made by paying tuition fees, which may also be covered by the trainee's service. Guests will pay a fee.

There will be 4 separate departments:

- a. Particle Training Department (provision of specialized services)
- b. Department of Hospitality and Nutrition (hotel - catering)
- c. Children's Department - Information and Entertainment Section (Services)
- d. National School of Civil Protection (Education)

PRACTICAL GUIDE OF CRISIS MANAGEMENT IN SCHOOL UNITS

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Abstract

Introduction: The school system must be prepared to respond immediately, anytime you are a student have entered a crisis situation. Everything else increases its negative outcome and this is dangerous.

Purpose: The objectives of the intervention are:

- a. to protect the victims from anyone, in addition, stressful factor.
- b. to help the victims to organize and mobilize the network support (family and community).
- c. to bring the victim back to a pre-crisis, operating level.

Method: As a method we use the design-based research and literature research

Material: It builds on the existing knowledge of the Secondary education agency of the Prefecture of Western Macedonia and the Civil protection office of Western Macedonia

Results: Creating a Practical Guide to Crisis Management in School Units

1. We learn about concepts, types of crises, ways response to the early signs before the outbreak of the crisis ways of prevention, the consequences of crisis situations (theoretical / research background).
2. Prepare and know the Action Plan (SD).
3. We are preparing an Action Plan based on bibliographical indications: stages / measures of prevention, treatment, management.
4. We present the CC to the CC and give copies to everyone.
5. We are trained in the Action Plan and are on hand (frequency of training).
6. Follow the instructions carefully.
7. The staff shall be trained annually in the AB, which, if necessary, updated

USING INFORMATION MANAGEMENT TO LEARN FROM MIGRANT ENGAGEMENT

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Abstract

In 2018, there remains many migrants living in Greece, some with accommodation support from humanitarian agencies and others living in irregular conditions. The Hellenic Red Cross (HRC) provides holistic support to the migrants living in urban areas through Multi Functional Centers (MFCs) in Athens and Thessaloniki. The MFCs establish a system to listen, collect, analyse, respond to and act on feedback to understand better aspects of the challenges that migrants and refugees face in their daily lives. This is designed with input from the community, staff and volunteers appropriately trained to support. To achieve the above mentioned, the MFCs are supported by a set of activities that help put migrant communities at the heart of what they do. By integrating opportunities for two-way communication between the MFCs and migrants, and creating opportunities for the active participation of migrants in service development, the MFCs aim to ensure the support they provide are based on real needs, and delivered in the most appropriate way. Some examples of the tools used by the MFC in Thessaloniki are ‘focus group discussions’, ‘individual feedback discussions’ and ‘suggestion boxes’. A large amount of data has been collated to-date including different suggestions, complaints and information requests linked to different actors and services. Information management underpins this entire process and helps the MFC design new services, improve current services and make decisions taking on consideration the community’s opinion.

DISASTER MANAGEMENT IN GREECE: SHORTCOMINGS OF THE INSTITUTIONAL FRAMEWORK AND CORRECTIVE MEASURES BASED ON GOOD INTERNATIONAL PRACTICES

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Abstract

Disaster management is a factor of outmost importance towards effective mitigation of catastrophic impacts. As the recent fire tragedy in Eastern Attica most evidently accentuated, serious shortcomings of the regulatory framework combined with overt malfunctions in the operational field led to insufficient coordination of the available resources and ultimately to significant casualties of lives and properties. Hence good legislation in civil protection is a prerequisite to efficient delivery in situ, constituting simultaneously an interconnected quality circle. An effort to remedy the deficiencies of the regulatory framework is underway on the initiative of the Greek government with the establishment of a reviewed organisational both scientific and operational structure along with the main civil protection reform guidelines already being presented. In this context, the aforementioned deficiencies of the regulatory framework are highlighted extensively, with the root cause of the observed dysfunctions being the overregulation and legal fragmentation, the overlapping of competences, the existence of numerous fragmentary structures and last but not least the development of multiple informal and conjunctural structures and decision-making centers. Furthermore, with the contribution of acknowledged good practices worldwide, proposals aiming at the formulation of a knowledge basis oriented legislative framework are being elaborated. The utterly urgent amendments to the disaster management concept scheme include inter alia the introduction of the incident commander, as well as the prediction for the setup of regional operational centers, in which the situation awareness through the common operational picture would be facilitated, contributing substantially to the decision process, a crucial parameter on the coordination of the disaster management actions at a local level. With this essay, a technocratic input to the open dialogue concerning the civil protection organisational model in Greece is endeavored, serving the objective of enhancing the *modus operandi* of the civil protection system, capitalizing on the valuable expertise obtained from the lessons learnt.

CELL BROADCAST EMERGENCY'S ALERTS IN GREECE

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Abstract

The goal of this paper is to propose a safe and effective way to inform citizens of an emergency case in Greece, a country where hundreds of situation happen every year, such as, forest fires, earthquakes and floods.

The new technologies allow people communicate through a variety of ways such as SMS, e-mails, social networks etc. The most popular device for citizens' communication is mobile phone. Consequently, researchers and safety stakeholders tend to use these technologies for public's warning system where more likely use mobile short messages and the cell broadcasting method which predominates in many places. However, Greece is still lagging at the section of the public warning system, where media, most of the times, take this responsibility.

This paper proposes a new method for the Greece public warning system, aiming to instantly inform the citizens that are in a place of disaster with a simple and informative way. The proposed methodology was evaluated by 100 citizens and the results were very encouraging, indicating that citizens found it easy, useful and effective for public warning.

Keywords: cell broadcast (CB), civil protection, public warning system (PWS), cell broadcast worldwide, cell broadcast standardization

DEVELOPING A SOCIETAL PREVENTIVE CULTURE THROUGH A LIFE-LONG LEARNING STRATEGY

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Abstract

The scope of this paper is to present an approach to achieve the development of a preventive culture through a life-long learning strategy for the benefit of the society at large.

The author's 30-year experience and his relevant studies in assessing risks and managing crises show that prevention is not part of societal culture especially in Greece but in the EU as well, resulting in a chaotic response in case of extreme events that usually result in large-scale crises at a price of multiple life losses as well as asset degradation.

This paper presents an overall specific tri-fold strategy of systems-communication-enforcement that has been successfully employed in high-risk workplace environments and achieved impressive results. This strategy is supported by a six-pillar approach that was successfully implemented in the abovementioned workplace environments.

Then, the paper focuses and presents a life-long learning strategy that can gradually lift the barriers that shape the culture of larger than the workplace populations by proportionally implementing this approach through the involvement of larger-scale educational structures from schools to universities as well as the corresponding institutional support. Some time scale, though definitely culture-dependent, is also proposed.

Using the recommended approach as a backbone, states can start building or enhancing their preventive culture at a larger scale that will activate collective reflexes in emergency or even extreme situations to minimize human and asset loss, a cultural index representative of a civilized societal environment.

LIFE TRIANGLE

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Abstract

The goal of the project is to evaluate the suggestions of the American Doug Copp (Captain of Rescue and Manager of Disasters from the American Team of International Rescue), that have been published in the internet, as to how one should react to an earthquake, in accordance with the corresponding instructions by the General Committee of Civil Protection, and by the Organization of Counter-Earthquake Planning and Protection.

D.C. considers that the collapse of a building is to be taken for granted, which is not valid.

These suggestions have created a problem concerning the “accurate” briefing of citizens and what their actions should be, during the manifestation of an earthquake.

This project using data (imagery, movies and observations) evaluates the suggestions, bearing in mind the risk included in each case.

From that evaluation of the parallel and in many places controversial views, they lead to conclusions opposite to the ones of Doug Copp for the most part.

The importance of this project lies in helping representatives of bearers for informing citizens, as to properly inform them for both the positive and the negative aspects of Doug Copp’s suggestions, which in turn will help in reducing human casualties in the event of an earthquake, because Knowledge is Protection!

SUPPORTING SEARCH AND RESCUE OPERATIONS WITH UAVS

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Abstract

The technology of small unmanned aerial vehicles, also known as UAVs, are currently on the up rise. This research wants to evaluate if the capabilities of UAVs could be exploited to provide valuable contributions in search and rescue efforts – and if so – what challenges would arise. The research will serve as a suggestion for what benefits the UAV platform can provide, as well as considering the challenges for implementation.

Through a thorough literature review, state-of-the-art for search and rescue, UAV platforms and sensor technology is investigated to establish a theoretical frame of reference. This framework is the foundation for evaluating how to improve the current search and rescue efforts, what capabilities current UAV and sensor technology has, and how to best apply UAVs to satisfy the needs of a rescue. The subject of UAVs in search and rescue is still in its initial stages, and the amount of research and knowledge is therefore limited.

The main challenges identified and discussed in this research is under the categories of adverse meteorological conditions and technological challenges. There were also identified some challenges regarding compliance to regulations and in relation to human and organization, however these were less precarious for the implementation. Furthermore, it was established that UAVs are not yet capable of replacing manned aircrafts, but could still be a unique and valuable asset to a rescue operation. There were identified some hazards due to implementation of UAVs, none of which were believed to pose and excessive risk, especially when considering the expected benefit for the rescuers.

EDUCATION OF STUDENTS IN NATURAL DISASTERS USING NEW TECHNOLOGIES

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Abstract

The priorities set by the Sendai Framework 2015-2030 include 1: Understanding disaster risk, and 3: Investing in disaster risk reduction for resilience. In order to achieve these goals, education systems all over the world have implemented alternative methodologies incorporating new technologies into the classroom, no longer relying solely on books. Research has been undertaken here in Greece in an attempt to help students understand natural disasters through the use of new technologies. These include comics, augmented reality, dynamic maps, and supportive online tools such as videos, image tutorials and a website (<http://yorgossotiriadis.wixsite.com/learndisasters>). In action, this research gives the necessary tools for the curriculum of natural disasters to be enriched. Moreover the produced educational material is appropriate for children and can constitute a powerful tool for teachers to help educate students about the prevention of natural disasters and measures to be taken in case of such an emergency. This in turn, is also teaching students how to respond more effectively during a disaster. In this research, the developed educational materials explore different types of natural disasters such as earthquakes, floods, wildfires, extreme temperature and emergency calls. These educational materials, as well as training scenarios, were introduced to students of secondary education as a pilot project. The conclusion showed that the educational materials were comprehensible, user friendly and the students showed great interest in making their own creations.

PREPARING FOR EARTHQUAKE AT PRESCHOOLS: THE ROLE OF EARTHQUAKE PLANNING AND PROTECTION ORGANIZATION

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Abstract

Nowadays, communities around the world are faced with natural disasters such as earthquakes. In order to build an earthquake resistant community, preventive planning is vital in mitigating impacts, and protecting and increasing the degree of resilience of population as well.

Since pre-primary schools and childcare centers are an integral part of any community, it is important to ensure their safety in case of earthquake. It is more than evident that preparedness will be increased through awareness and education of childcare providers.

The aim of this study is to present a holistic overview of the earthquake preparedness issues of pre-primary schools in Greece. More specifically, this paper focuses on two topics: the assessment of earthquake awareness and preparedness status of the Greek pre-primary schools' staff, and the presentation of the relevant national policy.

In this framework, specific questionnaire was developed and filled in by the abovementioned target group that worked in 32 Municipalities of 11 Regions of the country during 2014 to 2017. Results were analyzed to identify the facilitating factors that contribute to effective disaster management. Overall, findings supported the idea that EPPO's Pre-Primary Schools Earthquake Safety Initiative provides one gateway, through which preschool environments can increase their preparedness and foster their culture of safety. Findings also provided an initial foundation for further research and development in this emerging area.

EDUCATION AS A PARAMETER IN THE ORGANIZATION OF CIVIL PROTECTION

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Abstract

In a world where the organization of civil protection is now an important factor in dealing with crises from natural disasters, such as floods, earthquakes, volcanic eruptions, fires, landslides, cyclones, but also contemporary phenomena such as refugee flows, one of the primary issues, is the development of the educational process in this direction.

The importance of education at all stages of the management and organization of civil protection lies in the fact that it ensures not only the safety of the persons involved but also the smooth running of the processes with the direct consequence of the minimization of the risk for both the human factor and the environment.

Particular emphasis is placed on the different forms of education that must be provided to all involved, and may be described by a series of programs such as Civil Protection Training, Membership Programs of Volunteer.

The program is based on experiential meetings. in the classroom, brainstorming, viewing and using the latest Virtual Reality technology on civil protection issues, which is a major innovation, role-play, question-answers and evaluation questionnaires, and is thus differentiated from the conventional teaching and information methods used. The program will be aimed at primary and secondary school students.

The organization of the educational process can be relied on the university institutions in cooperation with civil society organizations related to civil protection issues. With the proposed educational process all stakeholders and ordinary citizen will understand the importance of safe crisis management.

“PLAY AND LEARN ABOUT NATURAL DISASTERS”: AN IMPLEMENTATION OF A RESILIENCE ENHANCEMENT PSYCHOEDUCATIONAL PROGRAM IN VULNERABLE CHILDREN

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Abstract

The purpose of this project is to investigate the relationship between socioeconomic status and resilience in the face of risk, the prior knowledge and perceptions about natural disasters of vulnerable children and how they can tackle a bad event, like a natural disaster. The researching question is how vulnerable children from various socioeconomic background react in a risk situation, and what their perceptions about their impacts in their resilience are. Taking into consideration their socioeconomic background, these children feel insecurity and fear, due to the limited access to information and to their socioeconomic districts. The children learn about natural disasters in a game-based and interactive context through multi- modal and psychoeducational methods. The implementation of the project took place in the Daily Care Center “A hug for children” of the Volunteer Organization “Keletron Love for Children” in Kastoria and lasted for 6 weeks. 15 students, aged 6- 12 years old, from vulnerable families participated in this project. Through 10 interventions the students learned about natural disasters, how to tackle a risk situation through experimental games, they developed their problem-solving skills and their citizenship awareness. Findings suggest that vulnerable children need intervention programmes to enhance resilience, and learn to cope with risk conditions.

EUROPEAN VOLCANOES' NIGHT: A CHALLENGE FOR GREECE

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Abstract

The European Volcanoes 'Night is an event that takes place in some European countries the last years. Italy, Portugal, UK, France, Hungary and Cape Verde celebrate with several activities the beauty of their volcanoes. It is a fest where volcanoes can meet the science, the local gastronomy, the tourism and all kinds of art. This event is a unique chance to bring together scientists, public - local residents, tourists and especially young people - local authorities as well as civil protection members.

However, Greece doesn't participate in that event, at least not yet. Greek Volcanic Arc-Methana, Milos, Santorini, Nisyros - has a lot to offer in the field of the geosciences, geotourism, agriculture and mining productivity. Santorini volcano, one of the most spectacular volcanoes in the world, since the recent volcanic unrest of 2011-2012, is constantly and well monitored by several scientists. A fest for that night will not include just impressive fireworks, but simple questions and answers about the volcanism on the islands, self-protection measures, films, speeches, VR tours, school activities, benefits from volcanism such as hot springs, exploitation of rocks and minerals, accompanied with local cuisine and art.

It is a great opportunity to raise the public awareness, to contribute to the volcanic risk perception, to disseminate the knowledge of the Greek volcanism and enhance the preparedness of the local authorities.

JOINT CROSS BORDER COOPERATION FOR SECURING SOCIETIES AGAINST NATURAL AND MAN MADE DISASTERS: J-CROSS PROJECT AT REGIONS OF WESTERN MACEDONIA AND PELAGONIA

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Abstract

J-CROSS project supports long-standing cooperation between the Regions of Western Macedonia and Pelagonia. Financed by Interreg Greece – FYROM, it aims secure existing and future development initiatives and opportunities, against risks from natural and manmade disasters, in the cross-border area. Both countries, European Union and International Organizations invest in infrastructures in the broader area to achieve and maintain sustainable development and promote stability and social cohesion. Disaster risks, climate change and refugees flow put further pressures to societies' resilience and call for joint actions.

J-CROSS tackles the challenge to minimize increased frequency and severity of risks in both regions by jointly planned, developed and implemented effective actions. The overall project objective is to elaborate

joint cross border action plan that will lead to joint risk assessment, joint prioritization of risks and financing of counter measures, joint exercises and training activities.

Such approach is novel and optimizes overall available resources. A Cross Border Action Plan will be developed, including Joint Risk Assessment, establishment of Early Warning Systems in critical Infrastructures addressing common floods, earthquakes and landslides risks. Decision Support and Training System for professionals and volunteers, will increase capacity building of key stakeholders and citizens through focused training and field exercises, while an official agreement between both regions will mainstream J-CROSS results in Regional Operational Programmes and Joint Financing Mechanisms to implement the Action Plan. J-CROSS supports preparation for establishment of National Civil Protection Center and the role it can claim in the broader area of Western Balkans and cross border areas.

NSEA – NETWORK FOR THE OPERATIONAL SUPPORT AND EDUCATION OF THE VOLUNTEERS’ ASSOCIATIONS IN THE FIELD OF CIVIL PROTECTION AGAINST NATURAL DISASTERS

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Abstract

NSEA was founded on February 3rd, 2014, by 5 Municipalities located around Thessaloniki’s “Seih-Sou” peri-urban Forest (Municipalities of Thessaloniki, Thermi, Neapoli – Sykies, Pylaia – Chortiatis, Oreokastro) and the Municipality of Komotini. Under the supervision of the Municipality of Thermi, NSEA was formed as an outcome of the “OUTLAND” INTERREG Cross-Border Cooperation Programme between Greece and Bulgaria.

According to NSEA’s Statute, the members of the Network can be either Local Government bodies, Educational and Research Institutions, or social organizations of relevant mission. Among others, NSEA’s strategic goals include:

- Continuous support of Civil Protection Volunteers through certified training and education, standardized equipment and evolving networking.
- Promotion of technological innovation against Natural Disasters.
- Enhancement of public awareness in relevant safety and environmental issues.

NSEA’s flexible schema allows the fundraising from multiple sources, from Private Sector and Local Governance to EU funding, thus investing in updated equipment, high-end technology and Research and Development in Civil Protection is easier. “eOUTLAND” INTERREG Programme stands as an example since October 2017, when NSEA was set as the Leader Partner with 1,2Mil€ budget. One of the Programme’s goals is the establishment of a fully automated wildfire detection network, designed to function in synergy with the Member-Municipalities’ Civil Protection Forces.

In the near future, it is highly expected that NSEA will be established as a body of support of multiple Civil Protection Volunteer Associations, by increasing the number of its members and continuously providing up to date tradecraft and expertise.

INTERACTIVE TRAINING ON EARTHQUAKES: CONSTRUCTION OF A PROTOTYPE SEISMOGRAPH

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Abstract

An original environmental education program on earthquakes, 'Karditsa Earthquake Project - Schools in Action', started during the school year 2016-17 from the 1st EPAL in Karditsa and continued the following year. During its design, an effort was made to apply a variety of modern teaching methods so that students discover their different abilities and exploit them to the fullest extent. Since the volume of knowledge is growing, it is imperative to cultivate other skills, especially in EPAL, which are designed to successfully prepare students for the social and working environment. The actions and collaborations of the Program were many and expanded beyond the restrictive framework of the classroom. In this paper we will analyze the construction of a seismograph with which the project team participated in the competition "Make your own seismograph" in 2018 of the Hellenic-German Education and the Geodynamic Institute of the Athens Observatory, where they were awarded by the President of the Hellenic Republic Mr Prokopios Pavlopoulos.

The main objective of the Program, and the specific project, is to inform and educate the students and the local community in general on earthquakes and has been developed in five main pillars: environmental education, experiential learning, co-operation, socialization, Information and Communication Technologies and hands-on approach. Participating students had the opportunity to take on specific roles during the project, which succeeded in achieving its original goals. Above all, it created a different learning environment that favors exploration and discovery beyond traditional information-gathering practices.

RESPONSES TO THE IMPACT OF EARTHQUAKES AT THE BUILDING INFRASTRUCTURE OF GREECE – RICOMEX CASE

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Abstract

The research deals with the responsibilities of the most important actors, in the technical constructions, in the event of a failure, and even of violent incidents such as the devastating seismic events. Obligations and rights apply to employers, engineers, security technicians, workers, etc. Engineers apply Instructions to perform their duties at Primary - Secondary Building Inspections, under particular circumstances. Special reference is made to the Health and Safety Law. The responsibilities of engineers according to the Law (Labor, Criminal, Civil Code) as well as the Case-Law and the Limitation of Liability, are highlighted.

Justice seeks the responsibilities involved in the consequences of heavy building damage, whether human injuries and deaths, after seismic catastrophic events. A review of the period's publications from the Daily press is being attempted for the most catastrophic event in the Greek area, ie the earthquake that hit Athens in 1999. The choice was made due to the special characteristics of this earthquake (the country's capital is affected, there have been significant collapses, injuries and deaths, judicial adventure of involved parties etc). More specifically, the review concerns the case of the collapse of the Ricomex building.

The timeliness of the Judicial Decisions is documented and the final Decision on Responsibility is highlighted. Conclusions are drawn, and changes are proposed, so as the situation to be managed, better.

DYNAMIC DETERMINATION AND CALCULATION OF THE SAFETY LEVEL IN MAJOR-HAZARD ACCIDENTSYSTEMS: A PROPOSED MATHEMATICAL MODEL

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Abstract

Maintaining safety at acceptable levels is among the major managerial concerns in many industries. To address this, several safety indicators are utilized to monitor safety drifts in relation to major hazards. Typically, these indicators are important elements of the safety management systems and emergency management plans that EU and National regulations enforce to all major-hazard industries. The problem with existing safety level indicators is that they cannot determine dynamically what the safety level is at a certain moment in time and how much time is left for an accident to happen. To address this problem, we propose the **Real-Time Safety Level (RealTSL)**, a mathematical model for systems' safety level determination and its dynamic calculation based on the STAMP accident model. The proposed model utilizes the outcomes of STPA and EWaSAP analyses to: a) Construct Directed Acyclic Graphs (DAG) where each node depicts a safety constraint of the STPA analysis, and each path of the graph depicts a possible scenario of safety constraints violations that can lead to accidents. b) Identify which nodes can dynamically change their state in real time from "no violation of safety constraint occurred" to "safety constraint violation occurred" based on the sensor data which are perceived by the controllers in the system during its operations phase. In this work, the RealTSL model will be presented, and it will be demonstrated on a fictitious system. The limitations of the model together with future research directions is also discussed.

THE BOILOVER EFFECT: REQUIREMENTS FOR THE BEGINNING OF THE EFFECT, CALCULATION OF MANIFESTATION TIME AND WAYS OF FIGHTING IT

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Abstract

Boilover is a violent ejection of certain liquid hydrocarbons due to prolonged burning during a storage tank fire. It happens due to vaporization of the water sub-layer that commonly resides at the base of a storage tank, resulting in the ejection of hot fuel from the tank, enormous fire enlargement, formation of a fireball and an extensive ground fire. Boilover is a very dangerous accidental phenomenon, which can lead to serious injuries especially to emergency responders. The boilover can occur several hours after the fuel in a storage tank caught fire. The delayed boilover occurrence is an unknown strong parameter when managing the emergency response operations. The purpose of this paper is the analysis of the circumstances in the creation of this catastrophic effect and the estimate of the time the effect needs to be manifested, through the use of a simple mathematical model. The importance of this assignment lies in the empirical calculation of the time needed for the manifestation of the effect in Greek refinery tanks. The information of the imminent manifestation of this effect is a crucial factor for the firefighting operation since the first concern in such a kind of technological accident is the safety of the firefighting personnel as well as the protection of the surrounding tanks and the timely evacuation of the neighboring area in order to minimize the casualties. Through the use of a semi empirical model, we are trying quantitatively to make a prediction of the final phase of the Boilover effect.

Key Words: Boilover, tank fire, crude oil, hot zone

ISSUES OF GENDER DIVERSITY IN HUMANITARIAN CRISES.

DIFFERENT NEEDS - EQUAL OPPORTUNITIES

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Abstract

Purpose and problem: When a disaster hits or a conflict erupts, humanitarian actors move quickly to save lives, meet basic needs and protect survivors. In the rush to save lives and meet the emergency needs of people affected, the special and distinct needs of those with less power or greater vulnerability may be overlooked or put “on hold” to be addressed later by the development agenda. The “tyranny of the urgent” often leads to “gender by chance”. “Paying attention to gender issues” or putting on a “gender lens” quite simply means recognizing the different needs, capacities and contributions of women, girls, boys and men. Typically, women and girls are unable to compete with men for scarce resources during crises. Pre-existing gender inequalities deepen the vulnerability facing women who are old, have disabilities, live with HIV-AIDS or are marginalized in other ways. At times, men and boys are the acutely disadvantaged. Without a solid gender analysis, that should be integrated into the humanitarian needs assessment, the specific vulnerabilities of women, men, girls and boys hide under a cloak of invisibility.

Methods: study of bibliography, lessons that have been made and new trends and analytical and comparative study

Conclusions: Factors such as gender, ethnicity, social class, poverty, belonging to minority groups or not and the age of a person in a particular society define their rights and access to resources, goods, information and services, whether he has a voice and can participate in political affairs. The interaction of these factors within a society defines the way women, men, boys and girls are affected, prevented, treated and emerging from an emergency. Typically, women and girls can not compete with men to obtain resources that are in short supply during a crisis. Pre-existing racial inequalities and discrimination, as well as the lower social status of women in many societies, increase their vulnerability to the crisis, face different risks and can thus be victimized in different ways.

Significance: The aim of this work is to present these risks and how to deal with them.

OPERETIONAL USE OF EARTH OBSERVATION DATA IN THE CASE OF KINETA FOREST FIRE

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Abstract

The present study deals with the detection and mapping of damage that caused by fire in the area of Kineta on 23 July 2018 . The problem of fires is an often phenomenon that take place in Greece every summer and cause critical damages in human and natural environment. For this research were used optical satellite images from Sentinel-2 and Cub Sat images of Planetscope covering the period of July. The processing of images based on free and open source QGIS and the ENVI software. The main objectives of the study in the emergency phase are:

- to define time and starting location
- mapping and calculate the acres of burned area in order to provide knowledge of the situation and lead to decision making for the restoration of the environment.

The results of this research show us the magnitude of the damage that caused by the fire for the area of Kineta as well as the wider region.

SOCIAL RESEARCH ON WILDFIRE RISK GOVERNANCE IN GREECE

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Abstract

The need for sophisticated approaches to manage wildfire risk has become critical, as catastrophic wildfires in Greece and elsewhere overwhelm government capacities for fire control and civil protection. The growing wildfire losses suggest that existing risk governance policies are inadequate as currently implemented including fire suppression, vegetation/fuel management strategies, community protection efforts and education. Wildfire mitigation planning needs to define and understand the mechanisms through which humans and nature interact to create and govern wildfire risks. This research study highlights the views of different social groups related to wildfires (i.e. citizens, forestry and fire suppression agency professionals, and researchers/academia) to inform policy makers and propose changes to wildfire risk governance. We used an on-line questionnaire to query more than 100 engaged stakeholders (mostly working on civil protection agencies and research organizations) that can potentially influence a possible legislation and fire management organization reform. We emphasized on the importance of different wildfire effects to understand what is considered negative or unacceptable, indifferent, or positive. For fire prevention, we examined the range of acceptance and views on fire use and fuel management activities that are applied elsewhere but are limited or not allowed in Greece. We also examined the beliefs regarding ignition causes and responsibility, in addition to how different policies might reduce wildfire-related problems. Analysis of questionnaire responses revealed several obstacles on improving wildfire risk governance in Greece. The challenge of confronting wildland-urban-interface and large wildfire events in Greece will require the adoption of holistic approaches that consider the new socioeconomic and operational circumstances and incorporate recent advancements in wildfire science, targeted at preventing and reducing the wildfire spread rate and intensity by modifying the fuel patterns at a landscape level. Negative views on some policy change reforms (e.g. fire use) can be dealt with improved education and campaigns that will showcase success stories of implementation. Training of Forest Service personnel on the results of successful fuel management projects in Europe and elsewhere may help lead to the decision to implement more spatially targeted fuel management in places and scales that can create a change in Greece's future wildfire trajectory and effects. Survey results may help understand current wildfire perceptions, identify feasible proposed policy changes, promote and apply more effective risk management programs, and guide post-fire management and mitigation measures.

ELABORATING METHODS AND TOOLS IN A NATIONAL OBSERVATORY OF FOREST FIRES (NOFFI)

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Abstract

The National Observatory of Forest Fires (NOFFi) aims to develop a series of modern products and services for supporting the efficient forest fire prevention management in Greece and the Balkan region, as well as to stimulate the development of transnational fire prevention and impacts mitigation policies.

In this paper we describe the methods and the tools used by NOFFi in order to provide the three main fire-related products and services:

1. a remote sensing-based fuel type mapping (NOFFi-FTM) methodology
2. a semi-automatic burned area mapping (NOFFi-OBAM) service
3. a dynamically updatable fire danger index (NOFFi-MFDI) providing mid-term predictions.

IMPLEMENTATION OF EMERGENCY RESPONSE PLAN AT PPC'S GROUP INFRASTRUCTURE

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Abstract

For the Public Power Corporation S.A. (PPC S.A.), its Human Resources is its most valuable asset.

PPC'S major goal is always the protection of employees, visitors and customers, as well as their security. Within this frame, PPC develops emergency response Plans continuously, depending on the type of installation in urban and non-urban environment (Thermal Power Plants, Independent & Local Production Stations, Office Buildings, Retail Departments, Warehouses etc). The Emergency Response Plan is a systematic preparation and response plan in the event of an emergency, to protect the human life and the property of the Company.

The Emergency Response Plan in its basic structure includes:

- Compliance with basic legal obligations.
- Prevention of employees, visitors and customers accidents.
- Extensive damage prevention in the workplace and surroundings.
- Optimal management of important events and coordination with the external assistance services (e.g. National Emergency Aid Center, Fire Service, Police).
- Optimum treatment of the consequences of significant events, through the provision of social workers advisory support.
- Strengthening of employees' sense of safety and of their commitment to the company.
- Provision of knowledge in response to emergencies, for use even out of workplaces (e.g. in family life).
- Indication of corporate responsibility towards employees, customers, third parties and shareholders of the Company.

Emergency Response Plans are included in the certified Health & Safety Management Systems as well as in the certified Environmental Management Systems that are applied at PPC's infrastructure.

THE IMPACT OF CLIMATE CHANGE ON PUBLIC HEALTH IN THE MEDITERRANEAN BASIN

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Abstract

There are serious indications that human activities affect the climate of the planet. Climate change is an important and emerging threat to public health and is one of the greatest environmental, social and economic threats. According to the World Health Organization, health risks related to climate change may be significant and different depending on the geographical area and are often irreversible. Risk factors related to climate change and diseases are among the major contributors to the global health burden, including malnutrition - estimated to kill 3.7 million people per year), diarrhea (1, 9 million) and malaria (0.9 million people per year). Such situations as well as other health impacts will be increasingly affected as climate change accelerates due to their negative effects on food production, water supplies and human resistance to hosts and pathogenic microorganisms.

The **aim** of this work is to critically study and present the impacts of climate change on public health, the vulnerability of populations to climate change and the presentation of trends and policies developed to mitigate these impacts in the Mediterranean basin indirectly through dealing with natural disasters or directly.

In this research, the available literature, including scientific research, lessons learned, and decisions at international level, is critically reviewed. Public health data from the Mediterranean region associated with the impacts of climate change is being processed, and evaluated.

Significance: Global warming is set to cause serious health threats, mainly through storms, floods, droughts and heatwaves, fires, with consequences for water scarcity, food supply and sanitation, while high temperatures will change the distribution and increase the overall burden of certain host, food and waterborne diseases.

Importance: Protecting human health is the cornerstone of climate change strategies, which can no longer be regarded as an environmental or developmental issue, because it compromises the protection and improvement of human health and well-being. It is now necessary to have a greater appreciation of the dimension of climate change affecting human health, both for the development of effective policies and for the mobilization of public participation.

EXPLORING THE METEOROLOGICAL IDENTITY OF MANDRA'S 2017 FLOOD EPISODE

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Abstract

The aim of this paper is focused on a descriptive outline of Mandra's 2017 flood episode. The episode was extreme in accumulated precipitation patterns (about 280mm in 6 hours, while the area receives 400mm per year). The amount of rain only, can not explain the disasters and changes in the local environment. The episode itself has shown some specific meteorological characteristics. Those characteristics are typical marks of a wet microburst event, as this is defined by American National Weather Service. Microbursts can cause extensive damage at the surface, and in some instances, can be life-threatening (Mandra's 2017 flood episode case). All quantity and quality criteria required to characterize an event like wet microburst, are fulfilled. The use of all available data (radar images, radiosondes data, meteorological observations, etc) from Hellenic National Meteorological Service, National Observatory of Athens and model results and products from free web sources as the Giovanni database and ARL/NOAA, support this finding.

EVALUATION OF GEOTECHNICAL PROPERTY VARIABILITY: THE CASE OF SPOIL MATERIAL FROM SURFACE LIGNITE MINES

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Abstract

Soil is a complex material whose properties often vary in the vertical and horizontal direction. From a geotechnical perspective, quantification of soil's variability is important, because it allows for computation of a geo-structure's reliability and for implementation within risk analyses. In this context, the present work deals with the variability of geotechnical properties of a large spoil heap in northern Greece. The examined spoil heap has been constructed from waste ground material from two nearby surface lignite mines. In the first part of the paper, a brief literature review on the variability of in situ soil properties is provided, and the principles of major statistical parameters, often used in geotechnical literature, are briefly presented. In the second part of the paper, results of statistical analysis of a large database are presented. The database contains data from lab testing of 100 samples from 10 boreholes, each about 40 m deep, drilled in the spoil heap's body. Index properties, physical properties, and shear strength and compressibility parameters are statistically treated and relevant parameters (mean, median and characteristic values, as well as coefficients of variation, skewness, and linear correlation) are revealed. Results are critically discussed and compared with data previously published in the literature. A major conclusion drawn from this work is that the spoil heap's body is highly heterogeneous, and a significant outcome from the work is the quantification of this variability. It will be shown that the variability of spoil properties exceeds the usual variability from in situ ground material. This is anticipated to be due to man-made reasons related to the construction of the dump.

CLASSIFICATION OF WEST ATTICA SECONDARY EDUCATION SCHOOL UNITS CONCERNING NATURAL AND TECHNOLOGICAL RISKS

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Abstract

At the Secondary Education Directorate of Western Attica, there are 50 high schools, involving approximately 1000 teachers and 10000 students. Most of the above school units are within walking distance of some of about 30 SEVEZO-type facilities located in the region. In this paper we make a distance based classification of school units concerning SEVESO-type industries. Also we comment on some major industrial accidents (non SEVESO type) in neighboring industries which could cause a domino effect. Additionally we draw earthquakes (>4R) epicenters in West Attica prefecture in order to have a descriptive tool of risk assessment of schools units.

THE IMPACT OF NATURAL AND MAN-MADE DISASTERS ON PUBLIC HEALTH

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Abstract

Purpose and problem: Global population growth, poverty, land scarcity and urbanization in many countries have increased the number of people living in areas prone to natural disasters and multiplied the impact on public health. In recent decades, the prevalence and significance of natural disasters has increased, causing millions of people to be affected and killed and causing considerable economic damages.

Public health emergencies can be defined as those situations which have an adverse effect on the public health system and / or protective infrastructures and related services (such as water or sanitation, food, shelters, fuels and health) that lead to both direct and indirect effects on the health of the population and occur when these protective infrastructures are absent, damaged, under-exploited or unavailable to the population. Urgent public health emergencies following a disaster are more common in developing countries where basic public health and care services are already deficient or absent. However, all countries are at risk, especially where the population density in urban-prone areas is increased, urban or suburban infrastructure is outdated or inconsistent with the rapid urbanization of the population and therefore increases its vulnerability or finally, where extensive ecological and environmental degradation has limited the ecosystem's ability to absorb the shock.

The main factors that promote, accelerate, or induce a catastrophic event to turn into a public health crisis with regard to the possibility of injuries and illnesses are the following:

- Developing countries, where public health infrastructure and systems have failed or are absent
- Deficiency and / or inefficiency of existing infrastructure capacity and / or public health system to respond to crises. If the capacity and efficiency of public health services in general has been damaged (destroyed, degraded, questioned, ineffectively maintained, or if there is still a refusal to provide services to the population) as a result of the disaster

- Geographically extensive destruction
- Population size, distribution and density
- Prolonged time / report of the disaster
- Existing environmental and ecological decline or an environment that is adversely affected by the disaster.

This is the field of study of this paper, the presentation of the effects of natural and man-made disasters on public health and the critical approach to the issue.

Methods: study of bibliography, lessons that have been made and new trends and analytical and comparative study

Conclusions: This paper presents the direct and indirect impacts of natural and man-made disasters on public health, and then refers to ways of dealing with natural disasters and presenting interventions across the spectrum and public health sectors - safe drinking water, control of rodents and insects, housing, feeding, control of communicable diseases, immunization of the affected population, management of corpses, mental health services, and public health surveillance mechanisms needed to mitigate the consequences of the disaster and support the victim

Significance: This work contributes to the linkage of natural and man-made disasters to public health and proposes critical measures that should be applied in emergency situations

BERTISS:BALKAN-MEDITERRANEAN REAL TIME SEVERE WEATHER SERVICE. THE CASE OF GREECE

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Abstract

Water vapour plays a key role in some of the most important weather phenomena. It is obviously related to precipitation, but also provides about half the energy to the atmosphere, contributing to atmospheric dynamics, and it is the dominant greenhouse gas. The project BeRTISS (Balkan-Mediterranean Real Time Severe weather Service) was launched in September 2017 of the European Territorial Cooperation Programme "Interreg V-B Balkan-Mediterranean 2014-2020" and is co-funded by the European Regional Development Fund (ERDF) and National Funds of the participating countries (Greece, Cyprus, Bulgaria). The main objective of BeRTISS is to develop and establish a pilot transnational severe weather service by exploiting Global Navigation Satellite Systems (GNSS) tropospheric products to enhance the safety, the quality of life and environmental protection in the Balkan-Mediterranean region. GNSS-Meteorology is one of the most interesting and useful scientific topics over the last years as assimilating GNSS tropospheric products into weather models enhances their prediction capabilities. The near real time GNSS delay data contain information about the amount of water vapour above and in vicinity of GNSS sites. Therefore, it is a very useful tool for climate change monitoring and geo-hazards in general. The project aims to provide timely information and warning regarding severe weather events as well as long-term monitoring of weather and climate change in the region. A dedicated website (<http://bertiss.topo.auth.gr/bertiss>) has been developed and is currently operated at Auth Analysis Center. For the first time, mapping and visualization of integrated water vapor (iwv) in real time as well as associated results are provided in real-time to the National Meteorological Services and to the public featuring IWV data and warnings of severe weather events over the Greek area. Moreover, the site presents the methodology and the schema of the derivation of GNSS tropospheric products (e.g. ZTD, IWV and Tropospheric Gradients) that is carried out hourly window for over 90 permanent sites in the Hellenic area. The automated GNSS processing performed employing the Bernese v.5.2 software package and several algorithms have been developed and installed in a local processing data server.

ARTIFICIAL INTELLIGENCE IN CIVIL PROTECTION: USAGE & ETHICAL ISSUES

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Abstract

The increasing rate of technology evolution and usage wideness is affecting every aspect of the contemporary life. Networks expansion on the one hand, and processing speed increasing on the other, led to conditions matured for the Artificial Intelligence (AI) development. Obviously easier, faster and in many cases full-automated procedures of AI usage give a plenty of advantages to every human activity. AI already has a profound impact on society and economy, as well as the sectors of disasters prevention and management and Civil Protection. Early Warning Systems (EWS) based on neural networks, Decision Making/Support System (DSS) and Smart Cities are already parts of the contemporary Civil Protection Mechanisms.

However, there are serious ethical considerations to any technology affecting society so profoundly. Is AI reliable enough to be used –in some cases exclusively- in decision making or rescue?

This work summarizes the ethical questions in AI in general and focuses on the possible vulnerabilities, non-reliability or disadvantages of the uncontrolled usage of AI tools on Civil Protection applications,undertaking indicative case studies. Cybersecurity vulnerabilities, privacy issues, input bias, possible inequality in criteria and usage, hidden algorithms, liability issues are the most highlighted topics. Based on these topics,researchers, legislators, and society face the challenge to conclude to an Ethical Code in order to achieve success and fairness on AI usage over the coming years.

DEVELOPMENT OF A LOW COST EARLY WARNING SYSTEM FOR EARTHQUAKE-INDUCED LANDSLIDES

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Abstract

This work introduces the development of a low cost monitoring network focusing on earthquake-induced landslides. Emergency Planning and Disaster Risk Management are emerging fields of research in the field of Informatics. The decision making process for all stakeholders involved in emergency situations is demanding and requires a huge amount of information and complex methodology in order to make informed decisions. A significant interest of international research is therefore to deeply comprehend potential landslide triggering factors, through deployment of early warning systems. Landslides can be characterized as multifactorial events, as instability and slide are usually due to a combination of factors (morphological, geological, geotechnical, environmental and human interventions). Apart from that, however, much emphasis should be placed on the instrumental monitoring of active landslides as well as on slopes that are prone to these phenomena to occur. It is obvious that there is a necessity to obtain a more complete understanding of the landslide triggering, so as to mitigate risk before failure, as well as after its occurrence, with management stages. The abovementioned can be accomplished by developing a landslide monitoring network for upcoming events, using MEMS (Microelectromechanical System) acceleration sensors. Main advantage of our proposed methodology is the extremely low cost and consequently the possibility of using a large number of units so that through efficient algorithm usage, signal denoising and double integration to calculate on-site displacements, estimate the slip rates as well as the landslide evolution.

Keywords: earthquake induced landslides, early warning system, low cost sensors, disaster risk management

NEXUS ROUTE: AMBULANCE DRONE NETWORK

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Abstract

The number of out-of hospital cardiac arrest incidents in Greece every year is high and the surviving rate is extremely low. When a cardiac arrest occurs, the patient must take CPR and the heart must be shocked within 4 to 6 minutes. If no help is given, surviving chances are from little to none. In several European countries, there is ongoing research on increasing the surviving rate. One solution –not yet officially applied- is the carriage of an automatic external defibrillator (AED) inside a drone. This drone should fly above the city delivering first aid to emergencies up to 10 times faster than an ambulance. Our purpose is the strategic placement of drones by a spatially motivated analysis, which applies to all cities. This analysis includes both theoretical and empirical approach, a GIS process and a field research respectively. The GIS tools, found the time distances from the ambulances' stations towards every point in the city. The empirical approach certified our theoretical results. The areas we marked as critical are places with long response-times by an ambulance that have a dense OHCA case history and high proportion of population aged 50 years or older. According to the literature, drones can reach 93% of the total patients in less than 5 minutes (Van der Voorde et al, 2017). The ambulance drones will not replace ambulances, but they will be used as subsidiary health service.

KEYWORDS: UAV, AED, Drone Network, Cardiovascular First-Aid

THESSALONIKI 2030 – THE CITY’S STRATEGY TO STRENGTHEN URBAN RESILIENCE

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Abstract

The Municipality of Thessaloniki created a resilience strategy, as part of the city’s participation in 100 Resilient Cities Network (100RC). The purpose of the strategy is to help the city address both shocks (earthquakes, fires, floods, accidents, etc.) but also the stresses that weaken the fabric of a city on a day-to-day or cyclical basis. The City first published a Preliminary Resilience Assessment in 2016, developed through extensive stakeholder engagement (40 organizations, 2,000 citizens engaged), the 100RC City Resilience Framework tool, and diagnostic analysis of the city. Building on this assessment, the City continued working with stakeholders and engaging citizens to develop the resilience strategy, published in 2017. The Municipality and other city stakeholders are currently implementing actions in the strategy. Actions related to risk data management and civil protection include: launch of a risk data portal; government continuity planning in the Municipality; incorporating resilience in a waterfront investment framework plan and transit development projects; and civil protection awareness and preparedness for communities, including resources for educators and schools.

PROGRAM TO ADDRESS NATURAL DISASTERS

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Abstract

The problem that motivated the project is the forest fires that afflict Greece, especially during the summer period. **The purpose** of the study is to create a database that through a program will indicate how to approach an area, terrestrially or aerially, taking into account parameters such as geographical, climatic and geo-environmental conditions. **The method** use Matlab software to indicate if an overhead force is needed to deal with an emergency situation, taking into account factors such as: altitude, proximity to a residential area, humidity, temperature, wind, tilt. The program is at a pilot stage, as the fields of the factors influencing the result, are completed manually by the user. **The first results** show that geographic, climatic conditions and factors such as the proximity of residential area and the density of vegetation, can influence the decision about terrestrial or aerial approach. **The importance** of this project is to create a tool that compares aerial or terrestrial operation to combat an emergency, by suggesting the most effective, efficient, fast and safe way to approach an area. However, this program can also be used in other rescue or even military operations. The innovative part of this program is the creation of an integrated database with continuous and then in real-time updates of geographical and environmental changes, that are key parameters for approaching an area in emergency. Finally, the program, as long with parameterizations, could be used as an emergency, preparedness and coordination tool, to face humanitarian and environmental crises in Global level.

OPERATIONAL FORECAST OF ATMOSPHERIC POLLUTION EPISODES THE Western Macedonia FOrcasting System (Wmac/ FOS)

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Abstract

It is possible for the concentration of pollutants in the atmosphere to reach such levels as to constitute the air quality hazardous to human health. Such an event, which may last from hours to days, is characterized as an Atmospheric Pollution Episode (APE). Its effects may vary, depending on its intensity and duration, from a mere breathing discomfort to death.

An APE may occur due to: α) major industrial accident, b) fire, e.g. in Collection Centres of Recycle Materials (Aspropyrgos, June 2015), materials storage (Drama June 20, 2010), landfills (Tagarades, June 15, 2006), c) the prevalence of specific meteorological conditions that favor the accumulation of atmospheric pollutants (Western Macedonia, November 15 – December 04, 2011). Civil protection measures need to be taken in order to avoid or mitigate the impact on areas affected either directly or indirectly.

The ability to predict the evolution of the phenomenon along with the existence of default scenarios to confront/ mitigate it are tools necessary for timely and effective decision making. Such a tool/Early Warning System and some evaluation results for the region of Western Macedonia, NW Greece (WMac) are presented here. It is an operational, high resolution, local scale, meteorological and air pollution forecasting system. This system, also known by the acronym **WMac/FOS** (**W**estern **M**acedonia **F**orecasting **S**ystem), is installed in the AirLab/TEIWM and runs every day in operational time. It produces seven day meteorological and air pollution forecasts. Some selected meteorological parameters for specific

regions of WMac, as well as the dispersion of air pollutants emitted from the lignite power plants operated in WM are presented in real time on the web-site of the AirLab, www.airlab.edu.gr.

The system, under specific configuration, can be a useful early warning tool for predicting the evolution, prevention and management of an APE in Western Macedonia, that could be caused by various factors such as those already mentioned above.

USING G.I.S. AND U.A.V. IN FOREST FIRES

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Abstract

In Greece, forest fires destroy around 250 thousand acres per year last fifteen years with 60% being mountains areas rendering the firefighting tasks challenging. The delay of forest fighting agencies to access the forest fire areas is one of the weakest aspects of the whole effort of forest fire suppression; consequently, small fires are not prevented from spreading which otherwise would be extinguished relatively easily. Due to the worldwide advance of technology, forest fire control systems are created via the improvement of tele-detection, focusing in this way on the time reduction of time tracking, in the estimation of the fire location, and on the quality notification improvement of the Joint Centers of the Fire Department. In this project our research area is Vrya –Ritini in Olympus Mountain. Having digitized provincial and forest road network under the guidance of the Fire Department's experienced staff, it is classified speed into different road categories, as well as it is managed to add the maneuver factor, which at times it can delay the track of vehicles. It is produced with GIS a map within an array of colors of the access time with regards to the Fire Department of Katerini. Having as a target the automation of the cluster's protection fire-guardhouses are recommended with UAV which will help in the visibility of the area. The transmission of the direction and the distance along with the supplementary footage to the central station is accomplished in real time for responsible analysis and decision making.

ROSEWATER: A PLATFORM FOR SECURING WATER CRITICAL INFRASTRUCTURE IN THE IOT ERA

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Abstract

Safe drinking water and properly treated wastewater are prerequisites for protecting public health and the environment. However, the Water Sector is vulnerable to a variety of hazards and physical and/or cyber-attacks. To enhance the security and resilience of the related water infrastructures against physical and cyber hazards, we design ROSEWATER, a platform based on open and standardized solutions that will allow efficient monitoring and data collection concerning water infrastructure and associated elements, data analysis and processing in order to detect and prioritize risks and identify potential cascading events and, finally, recommend appropriate response actions. ROSEWATER considers four dimensions that need to be protected: physical elements of critical infrastructure, cyber elements, human elements and the environment. Also, considers four categories of water sector risks: natural disasters, inadequate corporate culture, intentional malicious acts, and systemic security management issues. ROSEWATER functionality is separated into three layers: 1) DATA SOURCES layer, which is responsible for data collection and transmission, 2) INTELLIGENCE layer, where data management, correlation and analysis takes place and 3) RESPONSE layer, which provides a decision support mechanism for auto alerting the appropriate teams about hazards and an auto imitate module to decide the best reaction to prevent infection. In this way, ROSEWATER targets to reduce vulnerabilities, minimize consequences, identify threats, hasten response, recovery and mitigate threats caused by all

kind of possible attacks and hazards. The achieved security and resilience will increase the confidence of customer/public base to the water utilities, leading to better accomplishment of their role.

DECISION MAKING IN DISASTER RISK MANAGEMENT BASED ON THE DEVELOPMENT OF A LOW COST EARLY WARNING SYSTEM.

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Abstract

The decision making process for all stakeholders involved in disaster management is demanding and requires a huge amount of data and complex methodology in order to make informed decisions. Information is limited and when it does exist it is often either unused or underutilized.

In locations with high risk of hazards it seems more than necessary to invest more on emergency planning when the available finances are not sufficient in the field of civil protection. Local and regional authorities should have -and often renew- emergency plans by using effective and easy-to-use tools, taking into consideration that decision makers often do not have sufficient expertise on crisis management. In emergencies there is a need for large scale data management, since making the correct decision in a limited time with limited information is the ultimate challenge.

This research focuses on the development and use of a decision making tool at a low cost basis, resulting in gathering knowledge concerning past event records, hazard maps of current situation, as well as the associated risks at local level, based on a widespread network of sensors, created by CMOD lab (Ionian University). The purpose of this tool is to provide data that will lead to effective decision-making and consequently to direct actions and possible activation of existing emergency plans. Its novelty is based on its low cost that allows it to be widespread in various locations which gives us the advantage of gathering multiple data and significant information at a real time basis.