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South East European Multi-hazard Early Warning Platform Concept Note

(as of 2 October 2015)

1 Introduction

South East Europe (SEE) is highly diverse in terms of its government structures, economies, culture, and geography. During the past decade the countries in SEE have undergone dramatic transformations. The extent of progress made in economic development, democratic reforms, regional cooperation, and integration into global economic and financial markets would have been unthinkable to many 10 years ago.

However, this progress is vulnerable due to the exposure of SEE nations to a range of disasters caused by the impacts of natural hazards such as earthquakes, floods, forest fires, drought and landslides. The catastrophic floods in the Balkan Peninsula in May of 2014 illustrate the impacts such hazards can have on the SEE countries. In mid-May 2014, Bosnia and Herzegovina, Serbia and Croatia faced severe flooding, in some places the worst in 120 years. The floods killed

approximately 80 people and affected the lives of nearly three million others and caused an economic loss to the region estimated at EUR 3.3 billion[1].

A study of disasters in the SEE region from 1970 – 2012 reveal that floods account for 50% of all disasters, 30% of deaths and 58% of all economic losses. It is noteworthy that during the same period extreme temperature accounted 21% of disasters while causing 45% of the deaths and drought caused 4% of the disasters but accounted for 31% of the economic losses during the period (Figure 1)[2].

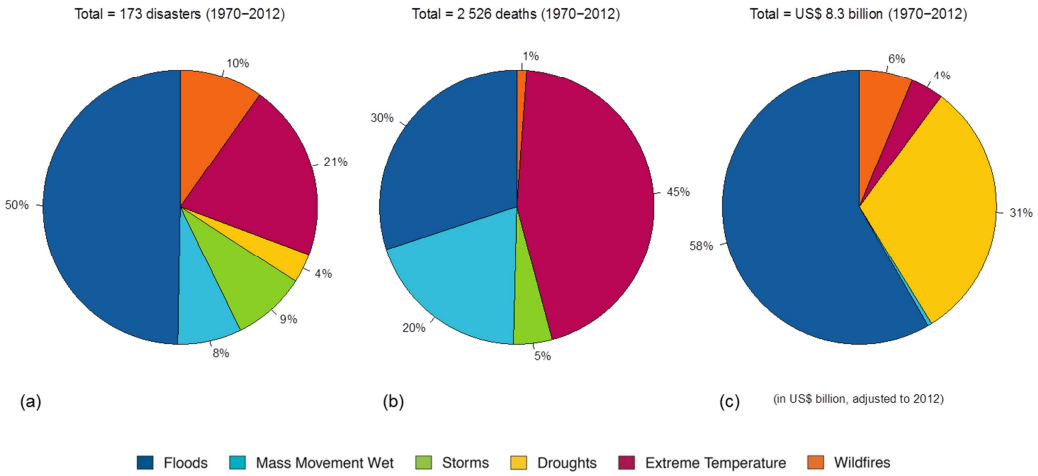

Figure 1: Distribution of (a) number of reported disasters, (b) reported deaths and (c) reported economic losses (1970–2012) in South East Europe

[1] Balkan floods of May 2014: challenges facing flood resilience in a former war zone, Zurich Insurance, 2015. Link: https://www.zurich.com/_/media/dbe/corporate/docs/corporate-responsibility/flood-resilience-balkan-may-2015.pdf

[2] Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2012), WMO- No. 1123, 2014.

The effect of climate change is a very important development issue for SEE countries, as the majority of human and economic losses are due to natural hazards in the region derive from the impacts of hydrometeorological events[3]. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) states that there will be a marked increase in these extremes, in particular in heat waves, droughts, and heavy precipitation events[4]. The impacts associated with climate change, accompanied by changes in land-use patterns and increased human settlements in areas that are prone to disasters increase the risk to the social and economic progress in the SEE countries to disaster events.

Understanding the risks that natural hazards pose to lives and livelihoods especially in a changing climate is essential to sustainable socio-economic development of all countries. The capability to observe, monitor, and accurately forecast and warn of hydrometeorological hazards is crucial to protecting the lives and livelihoods of people.

Through a regional approach, this project aims to address the risks hydrometeorological hazards pose to SEE countries through development of a: (a) common weather, water and climate information and tools platform to provide all countries with the latest tools and methodologies in observing, monitoring and forecasting of weather, water, marine and climate related hazards, and (b) communication mechanism to facilitate collaboration and coordination of advisories and warnings especially in transboundary areas as well as to facilitate feedback for improvement of the platform and system over time.

1.1 International frameworks for reducing disaster losses

The international community of nations have placed significant emphasis over the past decades on development of capacities for and implementation of disaster risk reduction (DRR) policies frameworks, capacities and operations at the national, regional and global levels. Two major framework international agreements provide a foundation for the protection of lives and livelihoods, including:

The Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters (HFA) adopted by 168 countries led to a paradigm shift in disaster risk management over the past decade from a post-disaster response to a comprehensive, proactive and strategic approach in disaster risk management focussing more on preparedness and prevention strategies. The second high priority area of the HFA stresses the need for “identifying, assessing and monitoring disaster risks and enhancing early warning”.

The Sendai Framework for Disaster Risk Reduction 2015-2030 (the successor to the HFA) adopted by 181 countries in March 2015, places increased focus on the reduction of existing risk and the prevention of the creation of new risks (as opposed to the focus on reducing disaster losses in the HFA) and on an all-of-society inclusive approach, as well as the stronger recognition of the need to integrate DRR into sectors (health especially). It also recognizes that States have the primary role to reduce disaster risk but that responsibility should be shared with other stakeholders including local governments, the private sector, academia, civil society, and other stakeholders. The Framework aims for the following outcome: *The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries.*

[3] South Eastern Europe Disaster Risk Mitigation and Adaptation Programme, The World Bank, Sustainable Development Department Europe and Central Asia Region and UN/ISDR secretariat Europe, The World Bank, 2008
[4] IPCC AR 5 Climate Change 2014: Impacts, Adaptation, and Vulnerability, pp 1276

1.2 WMO as a partner for capacity development

The vision of the World Meteorological Organization (WMO) is to provide world leadership in expertise and international cooperation in weather, climate, hydrology and water resources, and related environmental issues and thereby contribute to the safety and well-being of people throughout the world and to the economic benefit of all nations. WMO, through its coordinated network, thrives to facilitate access to various meteorological, hydrological, and climate-related products and services for its Member States, based on latest available technologies. This is particularly important to ensuring that developing and least developed countries can benefit from access to such capacities in a systematic and sustainable manner.

However, a key challenge is to ensure that such products and services are developed based on specific needs and requirements of the national governments and their disaster management authorities aligned with their national socio-economic development needs as well as humanitarian agencies.

Building on the extensive WMO operational and institutional network supporting SEE, WMO aims to facilitate increased application of meteorological, hydrological, and climate knowledge in the decision-making processes of governments such as national disaster risk management, including early warning systems (EWS), and for sectors such as agriculture and food security and transport.

1.3 The South Eastern Europe Disaster Risk Mitigation and Adaptation Programme (SEEDRMAP) (outcomes)

SEEDRMAP was a collaborative initiative developed by the World Bank and the secretariat of the United Nations International Strategy for Disaster Reduction (UNISDR), together with the European Commission, the Council of Europe, the Council of Europe Development Bank, the World Meteorological Organization, the Finnish Meteorological Institute and other partners. The objective of SEEDRMAP was to reduce the vulnerability of the countries of South Eastern Europe to the risks of disasters. It addressed the loss of life, property and economic productivity caused by weather extremes and other natural hazards. To that end, SEEDRMAP had three focus areas: (i) hydrometeorological forecasting, data sharing and early warning; (ii) coordination of disaster mitigation, preparedness and response; and (iii) financing of disaster losses, reconstruction and recovery, and of disaster risk transfer (disaster insurance)[5].

Several of the project activities were considered particularly important, including the: (a) design of a regional multi-hazard early warning system (MHEWS), (b) integration into Meteoalarm, development of a Knowledge Management System, (c) sharing of good practices in DRR among Beneficiaries, (d) MCR Campaign improving resilience at local level, development of tools to promote insurance and reinsurance products for disaster risk transfer, and (e) calibration and data management activities. The project activities built upon previously implemented regional initiatives and work of regional centres/networks (e.g. DPPI SEE, DMC/SEE, International Sava River Basin Commission (ISRBC)) and contributed to bringing institutional approaches closer to EU standards[6].

At the conclusion of the project in October of 2014, a number of recommendations were identified to build on the project achievements. Among these is the need to increase regional cooperation and

[5] Strengthening Multi-Hazard Early Warning Systems and Risk Assessment in the Western Balkans and Turkey: Assessment of Capacities, Gaps and Needs, WMO, DRR-SEE-1, 2012
[6] Ibid

address gaps in forecasting and warning for hydrometeorological hazards at the national and regional level particularly for transboundary areas[7].

2 Regional Early Warning Platform

The catastrophic floods in the Balkan Peninsula in May of 2014 exposed gaps in hydrometeorological warning development across the region especially in the transboundary areas where conflicting information and warnings from different NMHSs caused confusion in the local populations. These gaps were attributed to in large part to the varied capacities of NMHSs in the region along with inadequate operationally ready observing and monitoring capacities. In acknowledgment of these gaps the beneficiary countries of the SEE Project highlighted the need to promote regional cooperation in meteorology, hydrology and climate as a critical step toward improving DRR and EWS capacities in the region. A number of areas requiring regional cooperation were identified:

- Harmonization of risk assessment methodologies, tools, and capacities;
- Coordination and harmonization of EWS for cross-border hazards;
- Sharing of good practices in DRR;
- Regional Trainings and workshops;
- Development of regional project proposals and coordination with donors and funding agencies; and,
- Establishment and/or utilization of centres of excellence and cooperation mechanisms.

2.1 Proposed "Regional Early Warning Platform" Project

The goals of the regional early warning platform project are to:

1. Strengthen regional cooperation and leveraging of national, regional and global capacities for development of hydrometeorological forecasts, advisories and warnings;
2. Strengthen national EWS systems by making available regional and sub-regional observing, monitoring and forecasting tools to all participant countries;
3. Foster the development of impact-based forecasts and warnings that contribute to decision making by national government, disaster management authorities, humanitarian agencies, and NGOs
4. Contribute to the harmonization of forecasts and warnings among NMHSs especially in transboundary areas; and,
5. Increase the operational forecasting capabilities of NMHS staff.

The project will address gaps in hydrometeorological advisory and warning development across the region especially in the transboundary areas (Figure 2) through:

1) Development of a regional information platform

An information platform will be created whereby all participating NMHSs in the SEE region have access to common observation and monitoring data and extreme weather forecasting tools. The information platform will consist of existing tools from NMHSs and centres of excellence such as the South East European Virtual Climate Change Center (SEEVCCC), High Resolution Limited Area

[7] IPA 2012/290-552 Project Building Resilience to Disasters in Western Balkans and Turkey final meeting summary, 2014. Link: http://www.preventionweb.net/files/39202_3rdprojectscmfinalreport.pdf

Model (HIRLAM)[8], Aire Limitée Adaptation dynamique Développement InterNational (ALADiN)[9], Consortium for Small-scale Modeling (COSMO) as well as specialized tools developed through implementation a SEE SWFDP and experimental tools from various research centres which could be tested for viability in the SEE region.

2) Development of a regional collaboration and coordination mechanism

The platform will be complemented by a collaboration and coordination mechanism that enables operational forecasters from different NMHSs in the region to discuss and if necessary coordinate forecasts, advisories and warnings especially in transboundary areas.

3) Training of operational forecasters

Operational forecasters of the participating countries will be provided with training through training workshops that will provide training on the platform and related tools as well as forum for exchange of experiences and methodologies among forecasters. In this regard, the WMO SEE SWFDP and WMO Regional Training Centres will be utilized as resources.

4) Development of feedback mechanisms

Additionally, this project will facilitate the establishment of feedback mechanisms from the end users and an after event review process that will contribute to improvement of the platform and system over time.

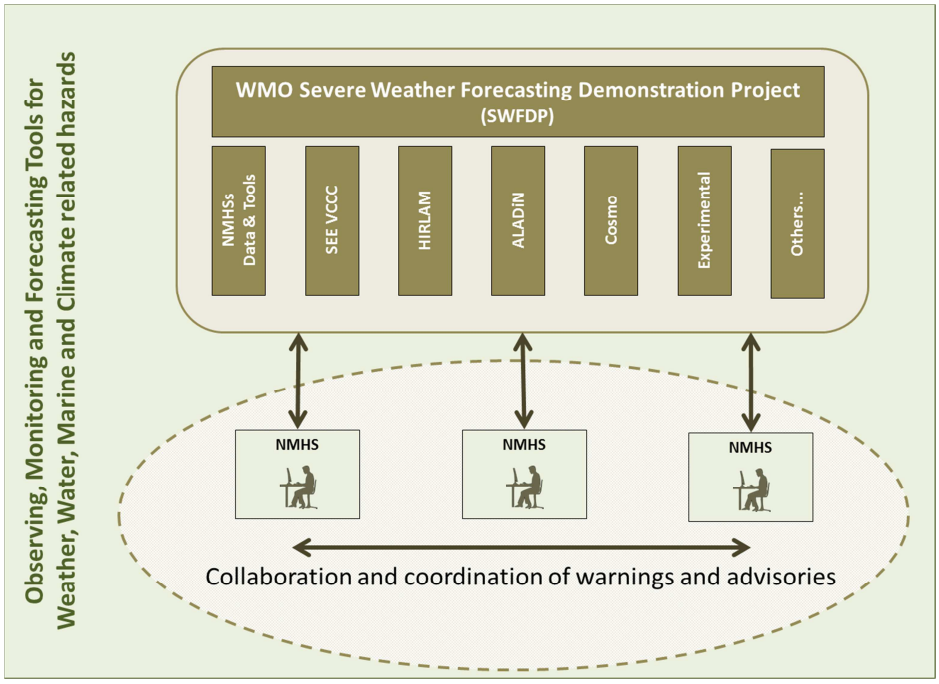

Figure 2: South East European Early Warning Platform Shared Tools for Observing, Monitoring and Forecasting

[8] HIgh Resolution Limited Area Model website: http://www.hirlam.org/index.php/hirlam-programme-53
[9] Aire Limitée Adaptation dynamique Développement InterNational. Website : http://www.cnrm.meteo.fr/aladin/spip.php?article259&lang=en

2.2 Enhancement of severe weather forecasting capacities

The outcomes of the SEE project included a call for additional capacity development for forecasting of hydrometeorological hazards especially for the extremes. WMO through its Severe Weather Forecasting Demonstration Project (SWFDP), has successfully demonstrated the strengthening capacity of NMHSs in developing and least developed countries including Small Island Developing States (SIDS) for delivery of improved forecasts and warnings of severe weather to save lives, livelihoods and property.

The project has improved the lead-time and reliability for alerts about high-impact events such as heavy precipitation, severe winds and high waves. It has strengthened interaction with disaster management and civil protection agencies, local communities and media. SWFDP is making a major contribution to DRR and is supporting the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDG) sustainable development, as well as climate change adaptation. It is benefiting socio-economic sectors, including agriculture, fisheries, aviation, and marine transportation.

Countries participating in the project are able to benefit from advances in the science of weather forecasting, especially the dramatic development in numerical weather prediction (NWP) systems, including ensemble prediction systems (EPS) which give guidance to weather forecasters in advance of potential hazardous weather conditions.

The SWFDP uses a “Cascading Forecasting Process” (global to regional, to national), including:

- Global NWP centres provide available NWP and EPS products, including in the form of probabilities for a specific time frame;
- Regional Specialized Meteorological Centres (RSMCs) interpret information received from global centres, prepare daily guidance products (1-5 day) for distribution to National Meteorological Centres (NMCs) and maintain the regional centre Web site;
- National Meteorological Centres (NMCs) issue alerts, advisories, severe weather warnings to public via the media and other dissemination channels; liaise with disaster management, and certain economic sectors, and contribute feedback and evaluation of the project.

The SWFDP is primarily built on the Global Data Processing and Forecasting System (GDPFS) Programme, in collaboration with Public Weather Services (PWS) Programme, and the Agricultural Meteorology (AgM) programme of WMO. It also engages other WMO programmes that concern the real-time prediction of hydro-meteorological hazards.

The SWFDP was started in Southern Africa in 2006 and has now been rolled out in Eastern Africa, Southwest Pacific Islands and Southeast Asia. Preparations are being made to implement the project in the Bay of Bengal (South Asia) region also. In future, depending upon the availability of resources, the project will be expanded to cover more areas in different regions of the world.

3 Project financials

3.1 Leveraging global, regional and national capacities

The project will leverage existing global regional and national capacities of WMO and its partners to develop the South East European Early Warning Platform.

3.2 Project timeline

The project will take two years to implement.

3.3 Areas where funding is needed

Funds required by activity area are indicated in Table 1.

Table 1	
Activity	**Amount**
1) Regional information platform	400,000
2) Regional collaboration and coordination mechanism	30,000
3) Trained operational forecasters	300,000
4) Feedback mechanisms	20,000
Total	**750,000**

Annex 1

WMO mission and institutional structure

WMO is the specialized agency of the United Nations responsible for (1) coordination of climate and weather research, (2) development of standards and technical developments, (3) operational cooperation and coordination among its Member States for observing, analysis, data exchange, and forecasting of weather, climate, water and related environmental conditions, and (4) capacity development at national and regional levels for the provision of meteorological, hydrological and climate services to support decision-making for safety of lives, livelihoods and property. This is achieved through (i) WMO's ten sponsored and four co-sponsored scientific and technical international programmes, (ii) eight technical commissions, composed of a network of over 1,500 leading research and operational experts designated by WMO Member States to establish methodologies, procedures and standards, (iii) a globally and regionally coordinated operational network, and (iv) a network of 30 Regional Training Centres.

As of 2015, WMO has 191 Member States and six Territories, who are represented in the Organization through their Permanent Representative, usually the Director of the National Meteorological and Hydrological Service (NMHS). WMO's institutional structure is comprised of (i) the World Meteorological Congress, the supreme body of the Organization which meets every 4 years, (ii) the Executive Council, the executive body of the Organization, which is responsible to Congress for the coordination and oversight of the programmes of the Organization, (iii) six Regional Associations, regional groupings of WMO Members, and related regional offices; (iv) and the WMO Secretariat, headed by the WMO Secretary-General with its headquarters in Geneva, Switzerland, where the offices of all the WMO sponsored and co-sponsored programmes are located.

WMO globally coordinated operational meteorological and climate network

Building on more than sixty years of international and regional cooperation facilitated through international programmes, WMO coordinates an operational network including (i) a coordinated network of the NMHSs of its 191 Member States and Territories, (ii) the WMO Global Telecommunication System (GTS) which connects all Member countries through their NMHSs, (iii) WMO Global Data Processing and Forecasting System (GDPFS) comprised of three World Meteorological Centres (WMCs) (Australia, USA and Russian Federation), over 50 accredited Global and Regional Specialized Meteorological Centres (RSMCs) with thematic or regional specialization, Regional Climate Centres (RCCs) and Drought Management Centres (DMCs), and (iv) a coordinated network of National Space Agencies and related centres (referred to as WMO-CGMS Virtual Centres).

During the 1990s as part of its mandate, WMO facilitated negotiations for data exchange among its Member States and Territories and reached two resolutions, WMO Congress XII Resolution 40 (WMO, 1995) and WMO Congress XIII Resolution 25 (WMO, 1999), for exchange of "essential" meteorological and hydrological data necessary for the provision of services in support of the protection of life, property and well-being of all nations.

The WMO global operational network has facilitated on-going and sustainable collection, exchange, analysis, forecasting and provision of regional products and services that support the NMHSs of WMO Members. Every day the different national agencies within the WMO network gather and transmit massive amounts of real-time and near real-time data through WMO GTS to the network of RSMCs, who are "mandated" to develop and make accessible various global and regional forecasts

and analysis products and outputs based on latest tools and technologies. These are provided to the NMHSs of the WMO Members for further processing, analysis and downscaling for national applications. However, this cooperation depends on the national capacities to provide data and to be able to receive and utilize the regional products in their operations.

With the goal to further leverage capacities and resources and improve this network, over the last decade, WMO has been working on the WMO Integrated Global Observing System (WIGOS) to address among many issues, interoperability of meteorological, hydrological, marine and climate related observing networks, which requires agreements on specifications, operational, technical, budgets and mandates of the various operators. Furthermore, given the importance of data availability, accessibility and exchanges within and among countries, WMO is working on the WMO Information System (WIS) (building on the WMO GTS) to address accessibility and availability of meteorological, hydrological, marine and climate data and information targeted at sectoral needs and applications. However, this also requires extensive consultations, technical and policy agreements among a large variety of stakeholders and network operators.

For example, the WMO global coordinated network has been the foundation of over 30 years of international and regional cooperation which has led to sustainable provision of regional tropical cyclone and storm surge products and services, based on latest technologies, through six RSMCs to at-risk WMO Members for development of their national warning and meteorological services. Furthermore, eight RSMCs provide operational meteorological services to WMO Members in case of nuclear and other technological accidents, wild fires and volcanic ash transport. This RSMC network is being further leveraged for provision of severe weather forecasts and related meteorological services.

WMO has been a leading agency in advancing research and applications in the area of climate variability and change, climate forecasting and modelling, development of the Global Climate Observing System. WMO has hosted the three World Climate Conferences (1979, 1991 and 2009). These have led to the: (i) establishment of the World Climate Research Programme (WCRP) which underpins the IPCC reports and is co-sponsored by WMO with UNESCO and ICSU; (ii) establishment of the Intergovernmental Panel for Climate Change (IPCC) by WMO and UNEP in 1988; (iii) establishment of the Global Climate Observing System (GCOS), which WMO co-sponsors with UNESCO and its IOC, ICSU, and UNEP; (iv) establishment of the UNFCCC in 1992; and (v) operationalization of climate information and service for sectoral applications through the Global Framework for Climate Services (GFCS) which was established in 2011.

Understanding the impacts of climate variability and climate change on the characteristics (frequency, severity, and location) of hydro-meteorological trends and extreme events is key for climate change adaptation and effective risk reduction strategies. The extraordinary progress in climate modelling and forecasting over the last decade provides unprecedented opportunities for the development of climate services that could support informed medium to long-term sectoral planning and risk management.

Over the years WMO has facilitated the establishment of the Regional Climate Outlook Forums (RCOF) as multi-stakeholder mechanisms engaging national, regional and international climate experts, sectoral practitioners and policy makers. Through an interactive process, RCOFs and associated Regional Climate User Forums (i) develop consensus regional climate outlooks; (ii) identify the requirements for regional climate information products and services; and (iii) foster multi-disciplinary sectoral cooperation to improve the quality of climate information products and services.

Furthermore, building upon the sustainable cooperation model of the WMO global operational network in recent years, WMO has initiated the designation of Regional Climate Centres (RCCs) as centres of excellence that are mandated to provide WMO Member States with regional tools, products and services to support their national development strategies (Annex 2 – Table 3a).

International cooperation with the space agencies for utilization of space-based products and services

WMO and the Coordination Group for Meteorological Satellites (CGMS) have established the Virtual Laboratory for Training and Education in Satellite Meteorology (VLab) as a global network of specialized training centres and meteorological satellite operators working together to improve the utilisation of data and products from meteorological and environmental satellites. Eight satellite operators are involved from China (CMA), Argentina (CONAE), Europe (EUMETSAT), Brazil (INPE), Japan (JMA), Republic of Korea (KMA), the United States of America (NOAA) and the Russian Federation (ROSHYDROMET), and twelve training centres – called Centres of Excellence (CoEs) – located in Argentina (Buenos Aires and Cordoba), Australia (Melbourne), Barbados (Bridgetown), Brazil (Cachoeira Paulista), China (Beijing and Nanjing), Costa Rica (San Jose), Kenya (Nairobi), Niger (Niamey), Oman (Muscat), Republic of Korea (Incheon), the Russian Federation (Moscow and St Petersburg) and South Africa (Pretoria). Three CoEs are linked to universities (Buenos Aires, St. Petersburg and Nanjing). The CoEs, working closely with one or more of the satellite operators and often co-located with WMO Regional Training Centres, are established in all WMO Regions to meet user needs for increased skills and knowledge in using satellite data within their Region.