RISC-KIT

Resilience-Increasing Strategies for Coasts – Toolkit

www.risckit.eu

D1.3 WEB-GIS impact-oriented database for the case study sites

Description and user guide

Deliverable No: D.1.3 – WEB-GIS impact-oriented database for the case study sites

Ref.: WP1 - Task 1.3

Date: October 2014

Grant Agreement No. 603458

DG Research –FP7-ENV-2013-two-stage

This project has received funding from the European Union's Seventh Programme for Research, Technological Development and Demonstration under Grant Agreement n° [603458]. This publication reflects the views only of the author's, and the European Union cannot be considered liable for any use that may be made of the information contained therein.

Deliverable Title	D.1.3 – WEB-GIS impact oriented database for the case study sites
Filename	RISCKIT_Deliverable_D.1.3 _v2.1
Authors	Mitchell Harley (Consorzio Ferrara Ricerche)
Contributors	Paolo Ciavola (Consorzio Ferrara Ricerche) Paolo Camponella (Fadeout)
Date	30/10/2014

Prepared under contract from the European Commission
Grant Agreement No. 603458
Directorate-General for Research & Innovation (DG Research), Collaborative project, FP7-ENV-2013-two-stage

Start of the project: 01/11/2013
Duration: 42 months
Project coordinator: Stichting Deltares, NL

Dissemination level

X	PU	Public
	PP	Restricted to other programme participants (including the Commission Services)
	RE	Restricted to a group specified by the consortium (including the Commission Services)
	CO	Confidential, only for members of the consortium (including the Commission Services)

Deliverable status version control

Version	Date	Author	Review
1.0	26/10/2014	Mitchell Harley (Consorzio Ferrara Ricerche)	Ap van Dongeren (Deltares) Kees den Heijer (Deltares) Paolo Ciavola (CFR)
2.0	30/10/2014	Mitchell Harley (Consorzio Ferrara Ricerche)	Ap van Dongeren (Deltares) Kees den Heijer (Deltares) Paolo Ciavola (CFR)
2.1	30/10/2014	Mitchell Harley (Consorzio Ferrara Ricerche)	

Table of Contents

List of Figures

1 Introduction

Recent and historic low-frequency, high-impact events such as Xynthia (impacting France in 2010), the 2011 Liguria (Italy) Flash Floods and the 1953 North Sea storm surge which inundated parts of the Netherlands, Belgium and the UK have demonstrated the flood risks faced by exposed coastal areas in Europe. Typhoons in Asia (such as Typhoon Haiyan in the Philippines in November 2013), hurricanes in the Caribbean and Gulf of Mexico, and Superstorm Sandy, impacting the northeastern U.S.A. in October 2012, have demonstrated how even larger flooding events pose a significant risk and can devastate and immobilize large cities and countries.

These coastal zone risks are likely to increase in the future (IPCC, AR5) which requires a re-evaluation of coastal disaster risk reduction (DRR) strategies and a new mix of prevention (e.g. dike protection), mitigation (e.g. limiting construction in flood-prone areas; eco-system based solutions) and preparedness (e.g. Early Warning Systems, EWS) (PMP) measures. Even without a change in risk due to climate or socio-economic changes, a re-evaluation is necessary in the light of a growing appreciation of ecological and natural values which drive ecosystem-based or Nature-based flood defense approaches. In addition, as free space is becoming sparse, coastal DRR plans need to be spatially efficient, allowing for multi-functionality.

1.1 Project objectives

In response to these challenges, the RISC-KIT project aims to deliver a set of open-source and open-access methods, tools and management approaches to reduce risk and increase resilience to low-frequency, high-impact hydro-meteorological events in the coastal zone. These products will enhance forecasting, prediction and early warning capabilities, improve the assessment of long-term coastal risk and optimise the mix of PMP-measures. Specific objectives are:

1. Review and analysis of current-practice coastal risk management plans and lessons-learned of historical large-scale events;
2. Collection of local socio-cultural-economic and physical data at case study sites through end-user and stakeholder consultation to be stored in an impact-oriented coastal risk database (the present deliverable);
3. Development of a regional-scale coastal risk assessment framework (CRAF) to assess present and future risk due to multi-hazards (**Figure 1.1**, top panel);
4. Development of an impact-oriented Early Warning and Decision Support System (EWS/DSS) for hot spot areas consisting of: i) a free-ware system to predict hazard intensities using coupled hydro-meteo and morphological models and ii) a Bayesian-based Decision Support System which integrates hazards and socio-economic, cultural and environmental consequences (**Figure 1.1**, centre panel);
5. Development of potential DRR measures and the design of ecosystem-based and cost-effective, (non-)technological DRR plans in close cooperation with end-users for a diverse set of case study sites on all European regional seas and on one tropical coast (**Figure 1.1**; bottom panel);

6. Application of CRAF and EWS/DSS tools at the case study sites to test the DRR plans for a combination of scenarios of climate-related hazard and socio-economic vulnerability change and demonstration of the operational mode;
7. Development of a web-based management guide for developing integrated DRR plans along Europe's coasts and beyond and provide a synthesis of lessons learned in RISC-KIT in the form of policy guidance and recommendations at the national and EU level.

The tools are to be demonstrated on case study sites on a range of EU coasts in the North- and Baltic Sea Region, Atlantic Ocean, Black Sea and Mediterranean Sea, and one site in Bangladesh, see Figure 1.2. These sites constitute diverse geomorphic settings, land use, forcing, hazard types and socio-economic, cultural and environmental characteristics. All selected regions are most frequently affected by storm surges and coastal erosion. A management guide of PMP measures and management approaches will be developed. The toolkit will benefit forecasting and civil protection agencies, coastal managers, local government, community members, NGOs, the general public and scientists.

1.2 Project structure

The project is structured into seven Work Packages (WP) starting with WP1 on 'Data collection, review and historical analysis'.; WP2–4 will create the components of the RISC-toolKIT containing an 'Improved method for regional scale vulnerability and risk assessment' (WP2), 'Enhanced early warning and scenario evaluation capabilities for hot spots' (WP3) as well as 'New management and policy approaches to increase coastal resilience' (WP4). The toolkit will be tested through 'Application at case study sites' (WP5). WP6 will be responsible for 'Dissemination, knowledge transfer and exploitation' and 'Coordination and Management' are handled in WP7.

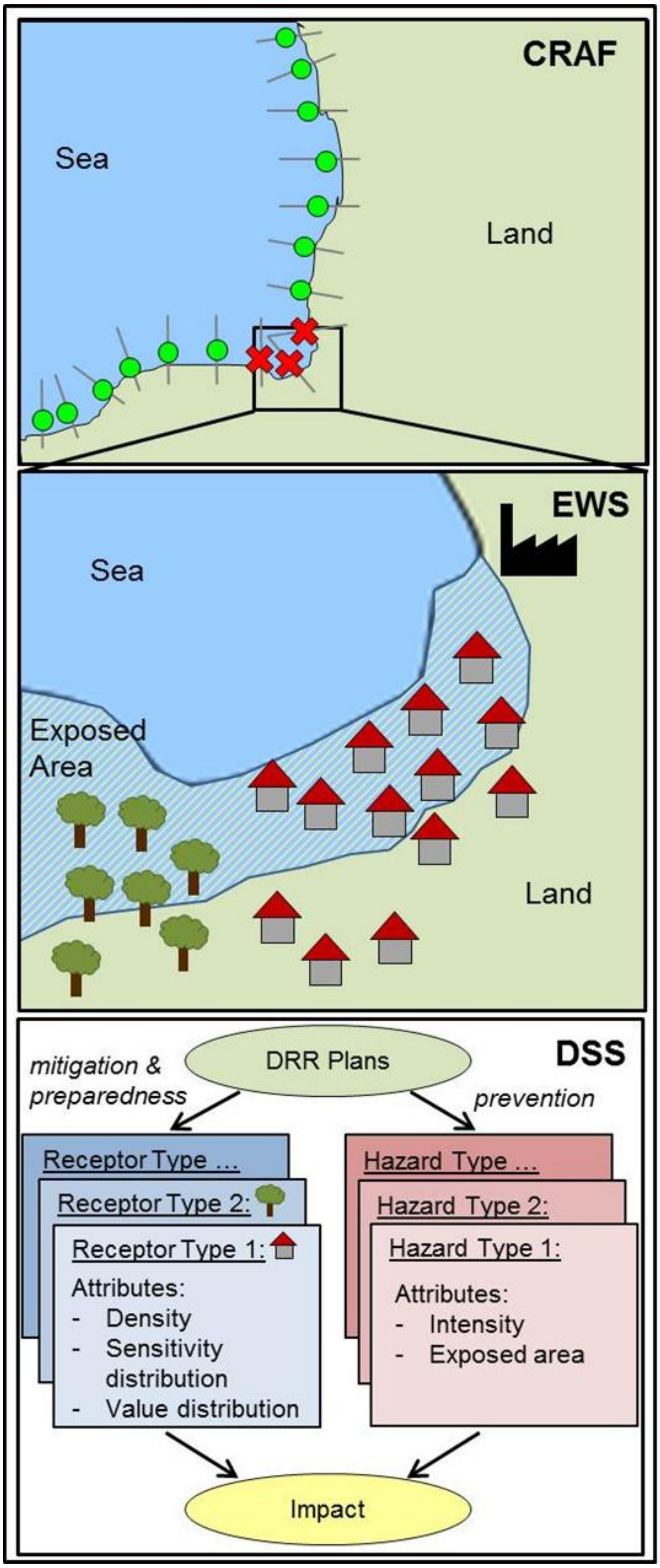

Figure 1.1: Conceptual drawing of the CRAF (top panel), the EWS (middle panel) and the DSS (bottom panel)

Figure 1.2: Case study sites (stars), RISC-KIT case study site partners (blue solid dots) and non-case study site partners (red open circles).

1.3 Deliverable context and objective

The current deliverable 1.3 is part of WP1. The objective of WP1 is to establish a starting position for potential advances in DRR strategies through review, data collection and historical analysis. In particular, WP1 will:

- Review (supra-)national DRR management plans and analysis of large-scale historical events to derive lessons-learned (Task 1.1)
- Review current-practice coastal risk management plans at the case study sites (Task 1.2)
- Collect socio-economic, cultural and physical data through end-users and stakeholders consultations at the case study sites (Task 1.2)
- Develop a WEB-GIS impact-oriented database for the case study sites (Task 1.3)

An interdisciplinary approach drawing on the physical, economic, social and historical sciences will be used to ensure that all aspects relevant to the project are considered. The WP deliverables will be used in WP4 and WP5.

This deliverable addresses the objective of WP1 and Project Objective 2. It is a WEB-GIS database containing information related to events at the case-study sites. The relevant text from the Description of Work describing this deliverable is:

"RISC-KIT will develop a webGIS interface to manage the data that will be made publicly available at the end of the project. The database will be kept live after the project conclusion as part of the OpenEarth system maintained by Deltares. The database will build on the metadata catalogue developed during the MICORE Project[1] and will now be embedded in the OpenEarth database. The database will contain forcing factors (waves, tides, winds, rainfall), observations and hindcast data (from existing ERA-40 and HIPOCAS databases), IPCC climate scenarios, observed impacts and quantitative and qualitative socio-economic, cultural and environmental data. Sources of data include the data obtained in Task 1.2, deliverables from FP6 and FP7 projects, scientific publications, data contained in the Marine Knowledge Gate and media analysis performed by the case study site partners. The database will provide WP5 with the information to test the potential DRR solutions formulated in WP4. To ensure the long-term continuity of the database, the link with continuing efforts like the ISDR-GAR databases, CRED Database[2] and EEA-Clearing House will be pursued."

The deliverable presented here matches the above description in that a WEB-GIS interface has been developed to upload impact-oriented event data at each of the RISC-KIT case study sites. All data uploaded through this WEB-GIS interface is stored in the OpenEarth system maintained by Deltares and will be made publicly available upon completion of the project. The metadata catalogue developed during the MICORE Project has also been embedded in the OpenEarth system and hence this deliverable merges the efforts of the MICORE and RISC-KIT projects into one common database. The database contains forcing factors, observations and hindcast data, observed impacts and quantitative and qualitative socio-economic, cultural and environmental data. Links are provided on the database website to the latest IPCC climate scenarios downloadable from the IPCC website[3]. Sources of data stored in the database include data obtained in Task 1.2, deliverables from the FP7 MICORE project, scientific publications, data contained in the Marine Knowledge Gate and media analysis performed by the case study partners. Data from other FP6 and FP7 projects were pursued but no relevant information with regards to marine events at the case study sites were found. The database will provide WP5 with the information to test the potential DRR solutions formulated in WP4. To ensure its long-term continuity, the database has been designed with common data fields to those of the EU Floods Directive as well as the more-general ISDR-GAR and CRED databases, meaning that there is potential for these database efforts to be merged in the future. Links have also been provided to the EEA-Clearing Houses although no specific event-based information was found.

[1] http://geo.regione.emilia-romagna.it/geonetwork/srv/en/main.home

[2] http://www.emdat.be/

[3] http://www.ipcc-data.org/sim/

1.4 Outline of the report

This report presents a description and user guide to the RISC-KIT WEB-GIS impact-oriented database. The following section summarises the database design and presents a step-by-step guide to the data upload process as well as visualization tools. An example of an automatically-generated Event Fact Sheet from a major marine storm in Emilia-Romagna is then presented in Section 3. Troubleshooting questions are then provided to assist users of the database. Finally, Section 5 presents some conclusions

2 WEB-GIS impact-oriented database

2.1 Background

A key first step in the DRR chain is the understanding of the present and historic context of an area in terms of past and current hazards and their associated impacts. With regards to extreme hydro-meteorological events, information about the location, timing and severity of the event and how this impacts society and the environment as a whole are crucial to decision makers and coastal managers alike, enabling them (among other things) to raise risk awareness, identify trends, locate critical hot-spot areas and uncover common issues between regions. This information can in turn be used to assess coastal risk for present and future hazard probabilities and ultimately lead to better-designed DRR plans.

A large amount (> terabytes) of observational (e.g. tides, waves, winds) and hindcast (e.g. ERA-40, NCEP and HIPOCAS reanalyses) data of marine events are available but to varying degrees of applicability in terms of ease of data-extraction on various local databases and online repositories. Likewise information with regards to event impacts are often routinely collected (but stored locally) by government agencies such as local geological services, reinsurers, in media reports and academic studies. Currently however there are very few tools available to provide detailed and readily-available information relating the environmental forcing conditions of a marine event to their impacts. Furthermore, impacts have mostly been assessed in terms of economic losses and loss of life without taking into account the broader social, cultural and environmental aspects that are critical to DRR considerations.

Several EU-funded projects have made inroads into the development of an impact-oriented marine storm database for the European coastline. The FP4 project CODECS provided a database of instrumental records for the last 300 years, and qualitative information for the last 1000 years, but was restricted to the European Atlantic coast. In the FP7 project MICORE, a database of marine storms and their impacts was assembled for nine case study sites across Europe and hosted on the open-source OpenEarth repository at Deltares, The Netherlands. No specific criteria in terms of the number and types of data fields to be collected were however adopted over the course of the MICORE project, meaning that the data is often site-specific, not geo-referenced and lacks homogeneity between sites. This therefore limits the ability to perform database queries and inter-site comparisons through a simple WEB-GIS interface, restricting its broader use amongst decision makers and coastal managers.

With these considerations in mind, RISC-KIT has deemed it a matter of urgency that a new WEB-GIS tool be developed that facilitates the standard upload of impact-oriented data of marine events collected for each of the eleven RISC-KIT case study sites. This tool has the following goals:

- To collect physical, geographical and impact information about events through a standard web interface
- To integrate any related existing stored data at the case study sites, such as those collected in site-specific format during the MICORE database
- To incorporate historical and stakeholder interview data collected as part of WP1
- To promote use of collected data by the research community
- To give users access to collected data through a web user interface

- To give users access to collected data through open-source protocols
- To promote adoption of a European standard to collect likewise information

The database design and user guide to this website is presented below.

2.2 Database design

The WEB-GIS impact-oriented database has been designed using so-called 2.0 web standards with the following components:

1) A central database
2) A web application
3) A GeoServer installation

These three components are all hosted on a RISC-KIT server. The Database Management System adopted for the database is PostgreSQL with PostGIS adopted for geographic objects. On the server side, Apache has been adopted for the web server and Tomcat as the application server.

In order to maintain database transparency, raw data collected via the web application is transferred and stored onto the OpenEarth repository (https://svn.oss.deltares.nl/repos/openearthrawdata/). This repository uses svn protocol and is accessible to the public upon request. OpenEarth already hosts a broad range of data and analysis tools collected from previous and ongoing projects, including the MICORE database of marine storms. Data generated from the RISC-KIT database are assigned the following OpenEarth file structure:

Openearth_trunk/institution/risckit/raw/Event_ID/

Where:

Openearth_trunk	= https://svn.oss.deltares.nl/repos/openearthrawdata/trunk
institution	= institution name
Event_ID	= event ID according to Country, Region and event start date

Metadata associated with raw data (data ownership, data quality, instrument location, etc.), is managed in the database using the INSPIRE metadata standard (http://inspire.ec.europa.eu/). For every raw file, an INSPIRE metadata file (in xml format) is encouraged to be uploaded. This can be undertaken using the INSPIRE metadata editor available from the INSPIRE website.

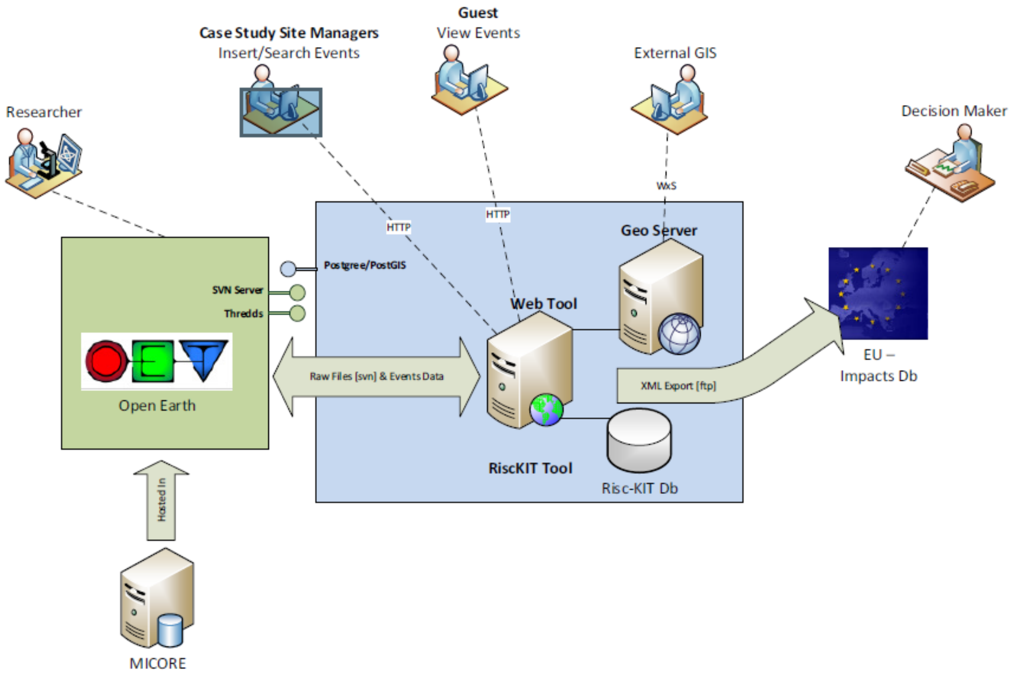

Figure 2.1: Schematic of the RISC-KIT database design

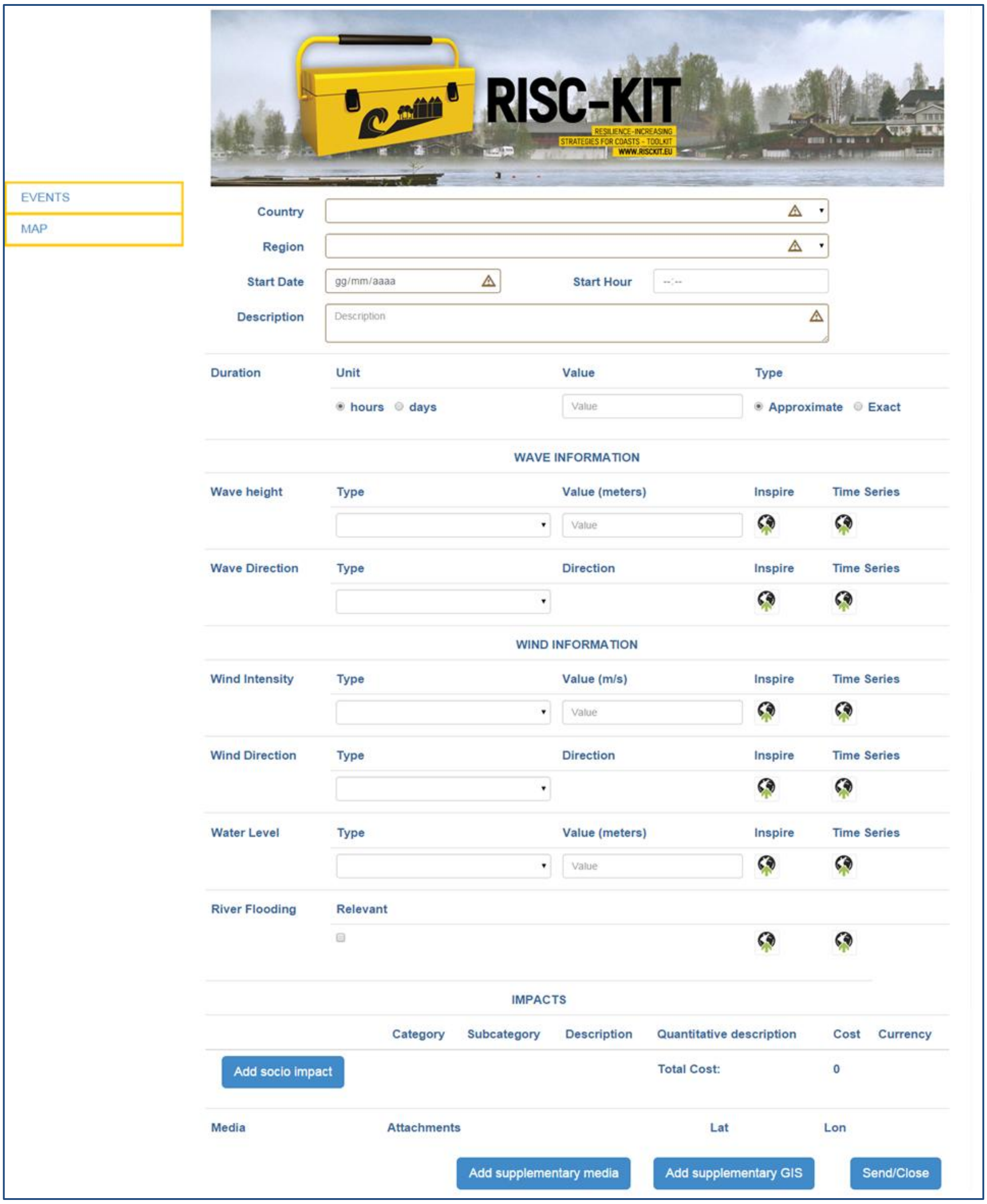

Figure 2.2: The event upload interface

2.3 Website user guide

The following section presents a user guide to the WEB-GIS impact-oriented database. A temporary website url has been assigned (http://risckit.cloudapp.net/risckit/#/), with a more permanent url address to be provided to the public at the end of the project. Note that a link to this user guide has also been provided on the website.

The website is partitioned into two areas:

1) An event upload interface (physical data, impact data and supplementary data); and
2) An event visualisation interface

Designated data managers for each case study site have been provided with an access username and password to enter the event upload interface section, where they can insert into the database and edit it as desired. Guests to the website (i.e. coastal managers, decision makers etc.) can subsequently use the event visualisation interface to filter, view and export any relevant information as desired.

2.3.1 Event upload interface

A snapshot of the event upload interface is presented in Figure 2.2. Data upload is undertaken by the designated case study data managers on an event-by-event basis for each site by filling in a number of standard data fields. This process thereby ensures that data is stored in a uniform way and facilitates inter-comparisons between sites and database queries of various parameters. A minimum amount of mandatory information is required for each event to be stored in the database, namely the country and region of the storm event, the event start date and a brief description of the event.

Event data is divided into physical data, impact data and supplementary data. A description of each data field is presented below.

<u>Physical data</u>

1) **Country (mandatory):** The country where the storm event occurred (according to Eurostat NUTS nomenclature and Bangladesh for the Bangladesh site)
2) **Region (mandatory):** Region where storm event occurred (according to Eurostat NUTS nomenclature for European countries and Sandwip Island for the Bangladesh site)
3) **Start date (mandatory):** Date (in GMT timezone) when the event started (usually defined by the date when a certain site-specific threshold was exceeded).
4) **Start hour:** Hour (in GMT timezone) when the event started (usually defined by the hour when a certain site-specific threshold was exceeded)
5) **Description:** A description of the event. What type of meteorological event was it? Which regions were most affected? Were there any peculiarities about this event? Etc.
6) **Duration:** Duration of the event in days or hours. If this duration is only a rough estimate, select “Approximate”, otherwise if this duration is calculated from an analysis of the event time-series (i.e. time above a certain site-specific threshold), select “Exact”
7) **Wave height:** Wave height information about the event. This can either be represented by ”Mean significant wave height”, “Peak significant wave height”, or “Maximum wave height”. Sources for this can be wave buoy data, wave hindcast data, or visual estimates. The INSPIRE metadata that describes the

source of this information should be attached here. The raw time-series of this data should also be attached here.

8) **Wave direction:** Wave direction information about the event. This can either be as "degrees from N" or "Compass". If "degrees from N" is selected, the user will be asked input a value. If "Compass" is selected, the user will be prompted to select a compass sector (i.e. N,NE,E,SE,). Sources for this can be wave buoy data, wave hindcast data, or visual estimates. The INSPIRE metadata that describes the source of this information should be attached here. The raw time-series of this data should if possible also be attached here.

9) **Wind intensity:** Wind intensity information about the event. This can either be as "Mean wind speed", "Maximum wind speed", or "Maximum wind gust". Sources for this can be anemometer data, or visual estimates. The INSPIRE metadata that describes the source of this information should be attached here. The raw time-series of this data should if possible also be attached here.

10) **Wind direction:** Wind direction information about the event. This can either be as "degrees from N" or "Compass". If "degrees from N" is selected, the user will be asked input a value. If "Compass" is selected, the user will be prompted to select a compass sector (i.e. N,NE,E,SE,..). Sources for this can be anemometer data, or visual estimates. The INSPIRE metadata that describes the source of this information should be attached here. The raw time-series of this data should if possible also be attached here.

11) **Water level:** Water level information about the event. This can either be as "Maximum total water level", from a tide gauge and including therefore surge effects, or "Maximum astronomical tide", taken from theoretical tide predictions (for example, the XTide software).

12) **River flooding:** If river flooding is appropriate for your site, then select the checkbox "Relevant". You will then be prompted to insert information about the amount of river flooding, namely "Peak discharge" and "Flood height". Sources for this can be stream gauges or visual estimates. The INSPIRE metadata that describes the source of this information should be attached here. The raw time-series of this data should if possible also be attached here.

Impact data

Impact data is uploaded by clicking on the "Add impact data" button. Similar to the reporting format adopted by the EU Floods Directive, six different impact categories are used to classify impact data. These impact categories are: Economy; Population; Buildings and private property; Environment; Infrastructure; and Cultural heritage (Figure 2.3). Upon selecting a category to characterise the impact, the user is then prompted to select a sub-category. These sub-categories are as follows:

Economy – Manufacturing, Government, Retail and services, Tourism, Construction, Fishing, Mining and Other

Population – Deaths during event; Total deaths (including long-term); Evacuated during event; Missing; Permanently relocated; Injured; Loss of employment; and Other

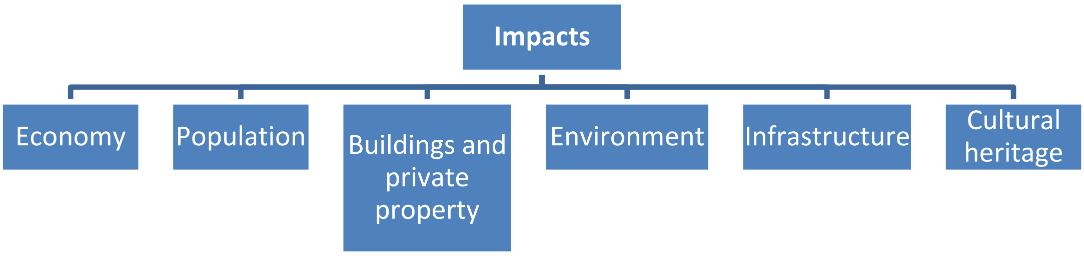

Figure 2.3: The six impact categories used to classify impact data

Buildings and private property – Residential houses; Apartment blocks; Farm houses; Shops/restaurants/tourist buildings; Hotels/hostels; Boats and other watercraft; Camping sites; and Other

Environment – Habitats; Pollution; Protected areas; Water quality for drinking or irrigation; Water quality for bathing; Biodiversity; Flora and Fauna; and Other

Infrastructure – Coastal and hydraulic structures; Ports and harbours; Hospitals and aged care facilities; Road networks; Train networks; Public administration; Schools; Utilities (Electricity, gas, water supply, telecommunications); and Other

Cultural heritage – Art works; Museums; Monuments and memorials; Historical and architectural heritage sites; Religious/spiritual places; Archaeological sites; Libraries and archives; and Other

Once the category and sub-category have been selected, the user is then prompted to insert a number of fields to further characterise the impact:

1) **Qualitative description:** A qualitative description of the impact
2) **Quantitative description:** A quantitative description of the impact involving some unit of impact measure (e.g. number of building damaged, number of hours out of service, number of victims, hectares flooded)
3) **Cost:** the total cost (where applicable) of the impact
4) **Currency:** the currency used for the above cost (e.g. Euros, Pound Sterling, Lire, Taka)

An unlimited amount of impacts can be added to the database for each event. Based on all impacts added, a total impact cost is subsequently calculated using a simple summation.

Supplementary information

Supplementary information for each event can be added by clicking on either the "Add supplementary media" or the "Add supplementary GIS" buttons. Examples of supplementary media include archival photos, newspaper reports, stakeholder interviews (e.g. those obtained from Task 1,2), data figures, IPCC climate scenarios and historical sources. All supplementary information is required to be geo-referenced, date stamped and described in a text field. Supplementary GIS information can be uploaded as standard shapefiles.

2.3.2 Visualisation interface

A screenshot of the visualisation interface is displayed in Figure 2.4. The visualisation interface enables users to quickly view all the events stored in the database and undertake database queries. Events are first clustered by country and presented on a Google Maps WEB-GIS layout. The default zoom level that the user sees upon entering the website contains both Europe and Bangladesh and hence all 11 case study sites. When zooming into a certain level, the events change from being clustered by country to a regional clustering level. Upon clicking on the balloon icon, a list of all events associated with that region appears in a panel on the right hand side of the screen. The user can then select a storm event from that list.

<u>Filter tool</u>

While the default view is set to display all events stored in the database, the filter tool can be used to sort events between certain time periods or impact categories. Upon entering values into the filter fields, a subset of the event database is displayed accordingly so that users can extract particular information as desired.

<u>Event fact sheet export</u>

Another feature of the WEB-GIS is the ability to export an Event Fact Sheet as a pdf file suitable for printing and archiving. This automatically-generated fact sheet displays all the data for a particular event entered by the user in a standard template. Photos uploaded to the website for that particular event are also displayed. An example of this fact sheet is displayed in the following section.

Figure 2.4: The visualisation interface of the website, indicating storm events for the Emilia-Romagna region, Italy

3 Event example: 31/10/2012 storm in Emilia-Romagna, Italy

An example of the Event Fact Sheet is provided below for a particular storm event that struck the case study site of Porto Garibaldi- Bellocchio (Emilia-Romagna) in 2012.

Event Fact Sheet

RISC-KIT

EVENT:	31-10-2012

Country: Region:	Italy Emilia-Romagna

Description

On the night of the 31 December 2012, a storm characterized by moderate waves (max Hsig = 2.43, less than a 1 in 1 year event) but extreme water levels (max water level = 1.16 m at Ravenna, between a 1 in 20 and 1 in 50 year event) hit the coastline of Emilia-Romagna. It caused widespread flooding and erosion across the entire Emilia-Romagna coastline and resulted in several structures being undermined.

Physical Data

General information	
Start date:	31-10-2012
Start hour:	20:00
Duration:	15 hours
Wave information	
Wave height:	2.43 m (Peak significant wave height)
Wave direction:	87 degrees from north
Wind information	
Wind intensity:	15.5 m/s (Maximum wind speed)
Wind direction:	143 degrees from north
Water level information	
Value:	1.16 m (Maximum total water level)
River flooding information	
Peak water discharge:	Not relevant
Flood height:	Not relevant

Impacts

Category:	Buildings and private property
Sub category:	Shops/restaurants/tourist structures
Description (qualitative):	Bagno Patti at Milano Marittima damaged beyond repair

Event Fact Sheet Page **1** of **5**

Figure 3.1: Automatically-generated event fact sheet for the 31/20/2012 storm in Emilia-Romagna, Italy (Page 1 of 5)

Description (quantitative):	1 tourist structure destroyed
Cost:	80 000 Euro
Category:	Environment
Sub category:	Habitats
Description (qualitative):	Overwash of the dunes along the coastal stretch between Bellocchio and the Reno River mouth.
Description (quantitative):	45 m of dune retreat
Cost:	Unknown/not relevant
Category:	Infrastructure
Sub category:	Coastal and hydraulic structures
Description (qualitative):	Structures protecting the Gorino lighthouse are damaged, 30 000 euro in intervention requested
Description (quantitative):	2 structures damaged
Cost:	30 000 Euro
Category:	Infrastructure
Sub category:	Road networks
Description (qualitative):	In the centre of Lido di Savio, marine water floods roads for up to 1 km inland, causing road closures and sand deposits
Description (quantitative):	24 hours of road disruption in the centre of Lido di Savio
Cost:	
Total cost:	110 000 Euro

Photos

Figure 1: Flood barrier at Lido di Savio (Date: 01/11/2012)

Event Fact Sheet Page **2** of **5**

Figure 3.2: Automatically-generated event fact sheet for the 31/20/2012 storm in Emilia-Romagna, Italy (Page 2 of 5)

Figure 2: Damage to Bagno Patti at Milano Marittima (Date: 01/11/2012)

Figure 3: Winter dune at Lido di Dante (Date: 01/11/2012)

Event Fact Sheet

Page **3** of **5**

Figure 3.3: Automatically-generated event fact sheet for the 31/20/2012 storm in Emilia-Romagna, Italy (Page 3 of 5)

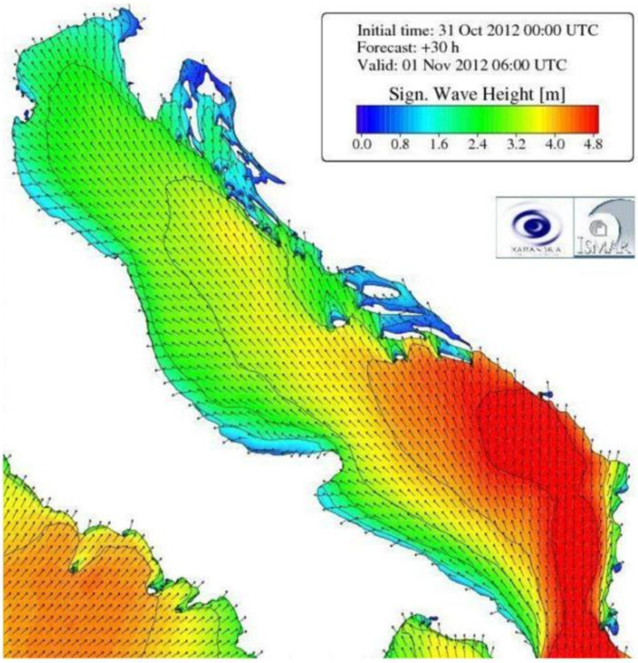

Figure 4: Kassandra model forecast of significant wave heights for 31/10/2012 + 21h (Date: 31/10/2012)

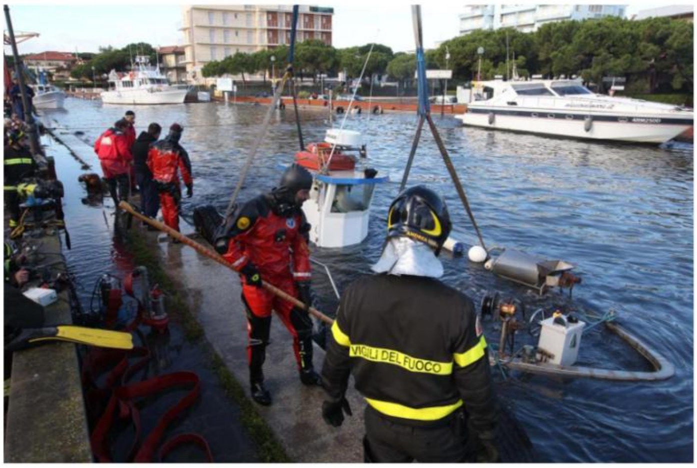

Figure 5: Sunken fishing boat being refloated in the Cervia Canal. Photo by Argani Fiorentini (Date: 31/10/2012)

Event Fact Sheet Page **4** of **5**

Figure 3.4: Automatically-generated event fact sheet for the 31/20/2012 storm in Emilia-Romagna, Italy (Page 4 of 5)

Other supplementary media

Filename:	Regional_report.pdf
Description:	"Report mareggiata 31 ottobre-1 novembre 2012". Authors: SGSS Emilia-Romagna
Date:	01/06/2013
Filename:	Storm_damage.avi
Description:	Video of storm aftermath taken at Lido di Volano (3 mins 26s)
Date	01/11/2012
Filename:	Stakeholder_interview.doc
Description:	Interview with stakeholder discussing impact of storm on his property
	13/04/2014

Supplementary GIS files

Filename:	Flooded_areas.shp
Description:	Areas flooded by the storm

This fact sheet is automatically-generated by the WEB-GIS impact-oriented database, developed as part of the RISC-KIT project (grant agreement 603458). RISC-KIT is supported by the European Commission under the Environment (including climate change) Theme of the 7th Framework Programme for Research and Technological Development. The information contained in this fact sheet reflects the views of the author(s) and the European Union cannot be held responsible for any use which may be made of the information contained therein. For more information, please contact RISC-Kit project coordinator Ap Van Dongeren (ap.vandongeren@deltares.nl) of work package leader Paolo Ciavola (cvp@unife.it).

Event Fact Sheet Page **5** of **5**

Figure 3.5: Automatically-generated event fact sheet for the 31/20/2012 storm in Emilia-Romagna, Italy (Page 5 of 5)

4 Troubleshooting questions

How do I create an INSPIRE metadata file?

To create an INSPIRE metadata file, you should go to the website http://inspire-geoportal.ec.europa.eu/editor/. On this website you are able to fill in all the fields related to that specific dataset and then click Save. This will then create an XML file that can then be uploaded in the event upload interface.

Do I need to create an INSPIRE metadata file for each event dataset?

No. You can re-use the same metadata file according to the source of the data. For instance, if a large number of storm events are measured by the same wave buoy, you can re-use the metadata file for that particular wave buoy.

What format should my data be uploaded in?

Keeping with OpenEarth protocol, data should be stored preferably in its raw format collected by the instrument. There is no prescribed format, but text files are preferred. Usually the format is related to the source instrument. If the most raw format is not available, also aggregated data is acceptable.

What if data is not publicly available?

If you cannot upload the raw data due to ownership issues, you could perhaps upload a JPG figure of the data in the "Add Supplementary Media" Section. If this is also not possible, you could opt to upload the INSPIRE metadata file on its own, which would at least inform others as to the existence of the data and who they could contact in order to obtain it.

5 Conclusions

This report has provided a description and user guide to the newly-developed WEB-GIS database that links physical data of marine events with their impacts in a standard, exportable database format. This database tool can be used by coastal managers and decision makers to perform database queries, undertake inter-site comparisons and download event fact sheets for a quick representation of particular events of interest. Sources of data stored in the database include observation and hindcast data, data obtained in Task 1.2, deliverables from the FP7 MICORE project, scientific publications, data contained in the Marine Knowledge Gate and media analysis performed by the case study partners. Similar to the MICORE project database, all data is stored in the OpenEarth system managed by Deltares and hence the efforts between the two projects are merged into one common database that will be made publicly available upon completion of the project.