Presentations at the LISA-GI Norden Conference in Reykjavik 12th October 2017

Opening Session
9:00-10:00

Opening of Conference — **Þórdís Sigurgestsdóttir, Chairman of LÍSA Organisation**

Opening Speech — **Björt Ólafsdóttir, Minister of Environment**

Key note presentation

Design and use of online geo-forms for public observations of natural hazards in Iceland

Speaker: Matthew Roberts, Icelandic Meteorological office
Authors: Matthew J. Roberts, IMO; Bogi Brynjar Björnsson, IMO; Hans Jørgen Henriksen GEUS; Peter van der Keur; GEUS; Davíð Egilson, IMO; Sara Barsotti, IMO; Sigrún Karlsdóttir, IMO

Iceland is affected by many types of natural hazards, ranging from severe weather to volcanic eruptions. Monitoring data and forecasting results provide the basis for most public warnings. However, warning accuracy is often difficult to assess, as the impact of the ongoing hazard may not be apparent immediately. For weather-related floods, the lag between rainfall and river-response could span several hours. In this presentation, we explore how public participation in key stages of the warning process can help to validate forecasts and provide early recognition of potentially harmful changes.

At the Icelandic Meteorological Office (IMO), GIS-based registration pages have been developed to allow the public to send photographs and descriptions of an evolving hazard. The design and use of these pages will be outlined, with a focus on floods and volcanic eruptions. Cloud-managed GIS services are used to provide an interactive map of Iceland, allowing users to mark their observation point via three alternative methods. The geo-form pages are designed to be used in real-time or retrospectively; this greatly expands the potential of crowd-sourced observations.

People involved in recreational activities such as jeep tours or snow-scooter trips can provide valuable on-site observations, especially in remote, highland regions where automated measurements are difficult.

Online notification pages help to fully engage the Icelandic public in the monitoring and assessment of natural hazards. Public reports of unusual or damaging natural events not only provide scientists and first-responders with value local information and context, they also increase public awareness of natural hazards.

Session A
Infrastructure
10:30-12:00

Pandemic GIS: Ensuring systemic ability to utilise GIS in major pandemic outbreaks

Author and Speaker: L. O. Grottenberg,

O. Njå University of Stavanger, Norway

Geographic information systems (GIS) makes up one of the key components of systems and processes relating to emergency management. Systems and processes relating to GIS were generally designed to support emergency management efforts in smaller incidents. There are few examples of how the various components of these systems perform in disasters and incidents of such a scale that system integrity is affected. We believe that it is necessary to apply concepts and theories from safety and systems safety research to the development processes of the next generation of SDIs and GIS.

This paper examines the role of GIS within Norwegian pandemic management, and presents the initial structure of a framework that manages the collection, application, and dissemination of spatial information throughout organisations in the disaster management hierarchy. The framework provides an example of how GIS can be applied as a fundamental information tool in pandemic disasters to effectively transfer information between stakeholders at all hierarchical levels.

The Swedish Civil Contingencies Agency use of map portal and Copernicus Mapping Services

Author and Speaker: Susanne Ingvander
The Swedish Civil Contingencies Agency, Sweden

The Swedish Civil Contingencies Agency (MSB) is ongoing working with providing and developing mapping services for the National fire and rescue service and to the public. Maps are provided using online solution via map portals. For external use, the mapping portal is free and open and for MSB users we have a local portal for distribution of maps and mapping tools for inside use within the agency. Furthermore,

MSB is the National focal point for the Copernicus Emergency Mapping Service (EMS). This means that if an event occur, we can enable satellite registration and analysis of its data to map affected areas for crisis management purposes. The service offers urgent mapping as well as risk and vulnerability analysis and is free for EU countries. In addition to the Emergency Mapping Service, early warning systems are published online in order to forecast and monitor forest fires and floods via remote sensing. Copernicus EMS services are available to municipalities, county administrative boards and authorities through an activation at the national focal point. Here, we aim to present our map portals and the mapping service provided by the Copernicus Emergency Mapping Service.

From Data to decision making

Speaker: Hafliði Sigtryggur Magnússon
Authors: Eydís Líndal Finnbogadóttir, Hafliði Sigtryggur Magnússon
National Land Survey of Iceland

Building a Spatial Data Infrastructure (SDI) is challenging. The end users of SDI are in many cases unknown in the process. The linkage between data, tools, and analysts is therefore often unclear. User cases are therefore important in explaining the importance of the SDI.

In this presentation we will present an example of how the SDI helped in discussions around political decision regarding Protected sites and how new tools and structure for Geodata saved time and helped a new user group, that is, politicians, to get an overview. We will talk about obstacles when accessing data in Iceland, new GI tools, and open softwares and uses of network services.

Keywords: INSPIRE, SDI, OSKARI, GeoNetwork, GeoServer, Open data, Network services.

Use of Joint Cooperation Map during UCI Roads World Championships

Author and Speaker: Snorre Halvorsen,
City of Bergen, Norway

Norway is hosting this year's UCI Road World Championships. The region and City of Bergen will feel the impact of estimated 500000 visitors during the 9 days period of the World Championships, and will be exposed to approximately 300 million TV viewers around the world

Due to the nature of Road Bicycling, the arena for the sport are public roads. The City of Bergen will encounter 9 days of total closure due to the "French Fences" put up to protect the cyclists. This will have an huge impact on all public and private services in the region and in the city. Hospitals, police station, fire stations and logistics services and other vital services are all within the affected zone.

Since 2015, a large number of actors have been involved in the risk and emergency planning to mitigate the increased risk. Specific plans have been made for health services, firefighting services, security services, traffic services, business & public continuity and information services. In addition, a Joint Cooperation Committee have made plans for Joint Cooperation during the World Championships.

32 actors from vital public and private services will be gathered in the Joint Cooperation Centre. Together we will monitor all movements and respond to incidents occurring during the World Championships. To ensure situational awareness, a Joint Cooperation Map have been developed. This will contain layers of static information from the different emergency response plans, and dynamic information for use during a response situation.

As head of the Joint Cooperation Centre, I will share details from the planning process prior to the UCI Road World Championships including his experience of using the Joint Cooperation Map.

Session B
Mapping, simulation and Cataloging
13:15-14:30

Mapping floods at decimetre resolution using unsupervised RGB imagery classification: An application to the Skaftá 2015 glacial flood, Iceland

Author and speaker: Dr. Emmanuel Pagneux
Icelandic Meteorological Office

Unsupervised imagery classification was used extensively for mapping, at a decimetre resolution and key locations, the inundation extent of the Skaftá 2015 glacial outburst flood, Iceland. Locations considered for mapping are areas where a slight increase in water levels during flooding events can cause significant network disruptions that neither hydraulic nor water-stage models can represent correctly due to the use of elevation terrain models that lack either the vertical accuracy or the planimetric resolution needed to such an end.

Low-altitude aerial imagery acquired during the flood with handheld cameras operating in the visible spectrum was orthorectified and submitted to a cluster analysis of DNs RGB averages using natural-break optimisation. Orthorectification was achieved by means of projective and spline transformation, yielding photograph ground resolution as high as 0.1 metre.

The results suggest that in most cases, minimal manual corrections are needed after extraction of DNs classes representing the flooded areas, the main obstacle to geographically accurate results being the quality of the orthorectification process.

Geospatial Short-Range Simulation of Coastal Inundation based on

Water Gauge Estimates

Speaker: Janne Kovanen
Authors: Janne Kovanen, Juha Oksanen, Tapani Sarjakoski
National Land Survey of Finland

We present a system providing an uncertainty-aware sea flood inundation forecast for the Southern coast of Finland. We produce the forecast for the following two days with a temporal resolution of one hour and spatial resolution of two meters. For modelling, we use the Monte Carlo method. It is used to produce instances of the inundation boundary, which are in the end combined. The uncertainty is based on the statistics of the high-resolution digital elevation model and past water gauge estimates.

The analysis is run in parallel using many-core processors. The analysis input is composed of hourly water gauge estimates computed by the Finnish Meteorological Institute. The estimates are loaded from publicly accessible standardized web-interfaces immediately after publication. Similarly, we put the hourly results behind a standardized interface. Moreover, we provide access to the results from a map interface.

The Catalogue of Icelandic Volcanoes (CIV)

Speaker: Bergrún Arna Óladóttir
Icelandic Meteorological Office
Authors: Bergrún Arna Óladóttir, Evgenia Ilyinskaya, Gudrun Larsen, Magnus T. Gudmundsson, Kristin Vogfjord , Emmanuel Pagneux, Bjorn Oddsson,
Sara Barsotti, Sigrun Karlsdóttir

The Catalogue of Icelandic Volcanoes (CIV) is an open-access web resource (http://icelandicvolcanoes.is/) intended to serve as an official source of information about volcanoes in Iceland for the public and decision makers. It contains text and graphic information on all active volcanic systems in Iceland, as well as real-time data from monitoring systems in a format that enables non-specialists to understand the volcanic activity status.

The CIV is a collaboration of the Icelandic Meteorological Office (IMO), the Institute of Earth Sciences at the University of Iceland, and the Civil Protection Department of the National Commissioner of the Iceland Police, with contributions from a large number of specialists in Iceland and elsewhere. It was funded by the ICAO, the EU through the project FUTUREVOLC and the Icelandic government.

Here I will present some examples of both short- and long-term hazard assessment studies performed for some key Icelandic volcanoes by using numerical simulations.

Session C
Models and monitoring
15:00-17:00

Modelling the atmospheric dispersal of tephra for short- and long-term hazard assessment

Author and Speaker: Sara Barsotti
Icelandic Meteorological Office

During an explosive eruption magma is fragmented into small pieces that are injected into the atmosphere and transported by the wind. This air-borne material (called tephra) can persist in the atmosphere over minutes, days and/or weeks, depending on its size and the height of injection.Tephra can have a widespread impact affecting both the immediate vicinity of a volcano (local environment, sensible infrastructures, human health) and also countries hundreds/thousands of km away from the eruptive site (e.g. by air traffic disruption). Tephra represent a trans-boundary volcanic hazard occurrring on a large range of temporal and spatial scales. Simulating by numerical models the dynamics of tephra dispersal and its deposition on the ground can help in quantifying this hazard and in designing appropriate mitigation actions.

In case of a new eruption Veðurstofa Íslands will use different dispersal models to forecast the movement of volcanic ash cloud in the atmosphere and to anticipate (on a short-term time window) where, when and how much tephra will affect specific regions in the country. At the same time these models have been applied to investigate the potential impact of hypothetical eruptions on critical infrastructures by adopting a Monte Carlo approach. In this way the long-term hazard assessment is done by quantifying and visualizing probabilities.

Using UAVs to monitor slope instability

Speaker and Author: Daniel Ben-Yehoshua
Svarmi ehf. Iceland

Svarmi ehf. is collaborating with the Institute of Earth Sciences to understand potentially hazardous slope processes. Two areas are currently under observation. One is located on Svínafellsheiði in SE Iceland. The fracture was first documented in 2014 and firstly mapped with a hexacopter in August 2016. As a result a high resolution orthomosaic and 3D model revealed additional fracture sets in the vertical cliff as well as a better insight into the local stratigraphy. An absolute minimum volume of 200.000 m^3 of mobile rockmass was calculated.
Further flights, later this summer will show, whether differences in the slope are noticeable from the measurements. The second research area is located in the Icelandic Highlands on the south facing slope of Litlhöfði. In July 2017 the area was mapped with a fixed-wing drone which enables to analyse the full extent of the the mobile mass.

Monitoring the vegetation resources of Iceland

Speaker: Bryndís Marteinsdóttir
Authors: Bryndís Marteinsdóttir, Elín Fjóla Þórarinsdóttir, Guðmundur Halldórsson, Gústav Ásbjörnsson, Jóhann Þórsson, Kristín Svavarsdóttir, Magnús H. Jóhannsson and Sigþrúður Jónsdóttir
Soil Conservation Service of Iceland

A long term vegetation monitoring programme is currently being developed in Iceland. This programme is based on an agreement between the Soil Conservation Service of Iceland (SCSI), Ministry of Industries and Innovation, the Farmers Association of Iceland and the Icelandic National Associations of Sheep Farmers, and managed by the SCSI.

While the vegetation in Iceland has been mapped at a coarse scale, data on vegetation changes are fragmented. However, to achieve sustainable land management it is necessary to obtain information on vegetation changes over time and related land-use data.

The monitoring programme will be based on an adaptive monitoring approach, span several spatial scales and focus on both vegetation resources and land-use. Satellite images will provide large scale data, but drones and on-site vegetation analyses, by land users and specialists, will be used for obtaining higher resolution data. The overall objective of the monitoring programme is to use these data to promote, in collaboration with stakeholders, sustainable land management.

Copenhagen Cloudburst Management Plan and Preparedness the Planning Approach And the Emergency Approach

Author and speaker: Margit Lund Christensen
HOFOR – Greater Copenhagen Utility, Denmark

An example on how to deal with cloudbursts. During my presentation, I will try to answer questions like: The municipality of Copenhagen have taken a planning approach to deal with cloudbursts, but what was the drivers, and what kind of data was used to get the cloudburst plan approved politically.

How does Copenhagen deal with a cloudburst during an event? How do we know that this is a cloudburst event? How is the organization behind an emergency? Which data is available, and how is data used? Which data would we like to have that is still missing?