NORDRESS
Nordic Centre of Excellence
On Resilience and Societal Security

Icelandic Met Office

Participatory early warning and monitoring systems for natural hazards

Summary of progress in WP 4.3, 2017 – 2018

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Purpose and structure of the talk

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- Overall aims of work-package 4.3
- Methodological approach in WP 4.3
- Summary of progress in 2017
- Major achievements to-date
- An outline of this year's work-plan
- Case-study: Design and use of Online Geo-Forms for Public Observations of Natural Hazards in Iceland

Overall aims of the work-package

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- **The problem**: Early warning and monitoring systems are sparse or lacking in many hazardous areas, making it difficult to issue timely public warnings or follow the process of hazardous events as they unfold.
- **The response**: To incorporate public observations into existing monitoring networks and real-time modelling and forecasting systems.

Methodological approach in WP 4.3

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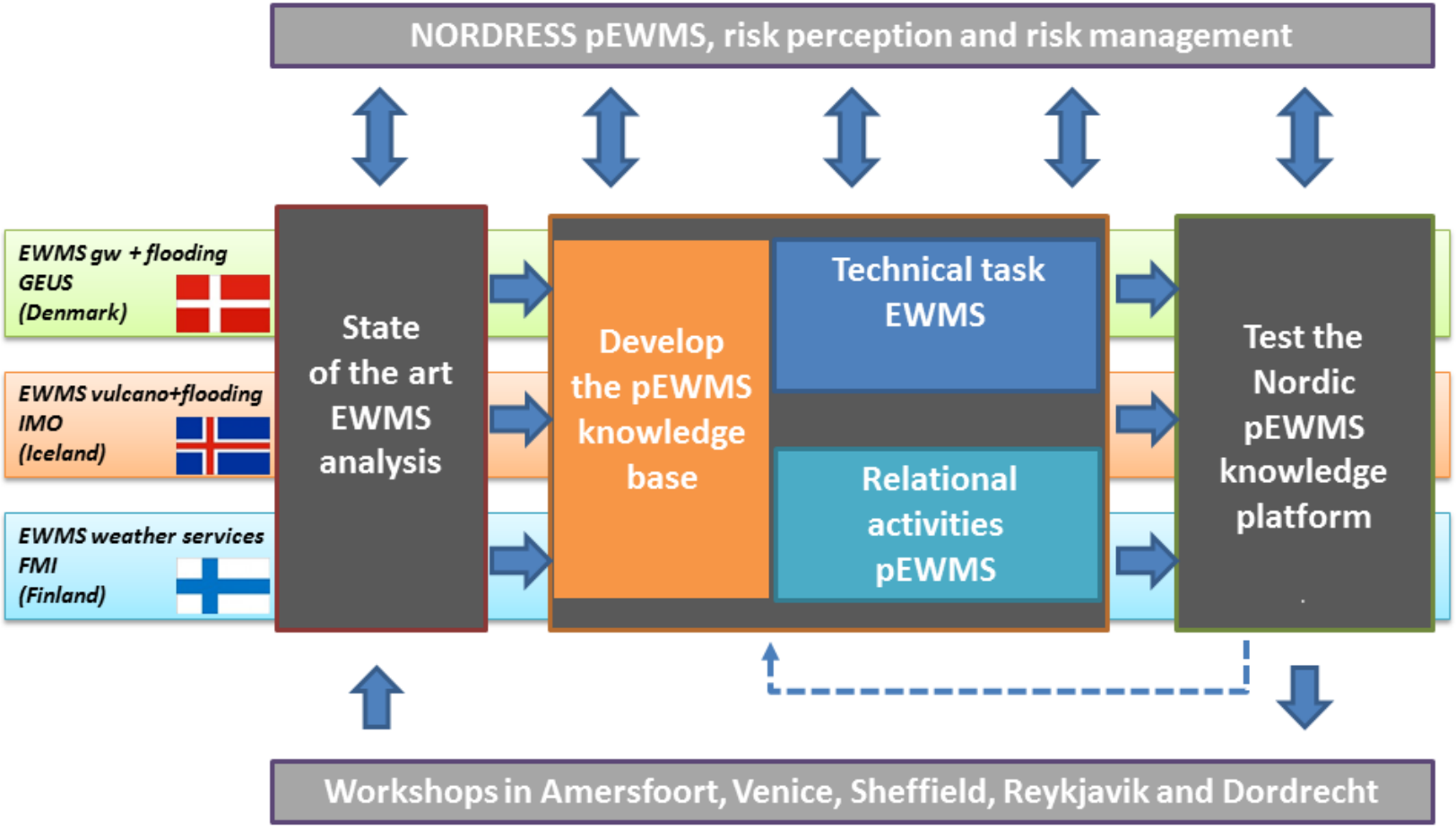
- Review of different participatory early warn. and mon. systems
- Workshops in Europe and Nordic countries



Why implement EWMS as participatory or people-centred?

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Observations from the public can be of use in many ways…

Risk knowledge
Knowledge of the relevant hazards, and of the vulnerabilities of people and society to these hazards

Monitoring and warn. services
A technical capacity to monitor hazardous precursors, to forecast how a hazard evolves, and to issue warnings

Dissem. and communication
Release of understandable warnings and preparedness material to those at risk

Response capability
Knowledge, plans and capacities for timely and appropriate action by authorities and those at risk

Source: Basher, R. 2006. Global early warning systems for natural hazards: systematic and people-centred. *Phil. Trans. R. Soc. A*, 364, 2167–2182. doi:10.1098/rsta.2006.1819

Summary of progress in 2017

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Funded directly by NORDRESS

- Two invited conference presentations
- Four talks / posters
- Outreach to the public via media interviews, e.g. IMO news about flooding in SE-Iceland in September 2017

Funded indirectly by NORDRESS

- Community resilience report: *Sharing good practice and multi-agency partnership framework* (Co-operation between WP 4 and WP 6)

Invited conference presentations in 2017

- Henriksen, H. J., 19 July 2017. *Participatory early warning and monitoring system (Nordress task 4.3)*. NordForsk Societal Security Meeting, Copenhagen.

- Roberts, M. J., 12 October 2017. *Design and use of online geo-forms for public observations of natural hazards in Iceland*. GI Norden and LÍSA conference, Reykjavík.

NSSA grants received in 2017

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Name, job title, organisation	Place visited	Purpose of visit	Duration of visit	Comments, output of the visit
EDUCEN conference	Dordrecht	Collect inspiration about culture in DRR	29.-31.03.2017	Oral presentation on NORDRESS + IDRiM
ECCA (European Climate Change Adaptation)	Glasgow	Session on local knowledge (WP4)	6.-8.06.2017	Oral presentations on pEWMS
CSA 2017 (Citizen Science Association Conference)	St. Paul	Academic / stakeholder conference	16.-21.5.2017	Oral presentation on NORDRESS results
IDRiM conference	Reykjavik	Session on risk communication	23.-25.08.2017	Oral WP4.3 presentation on trust and pEWMS

Major achievements to-date
IJDRR research article

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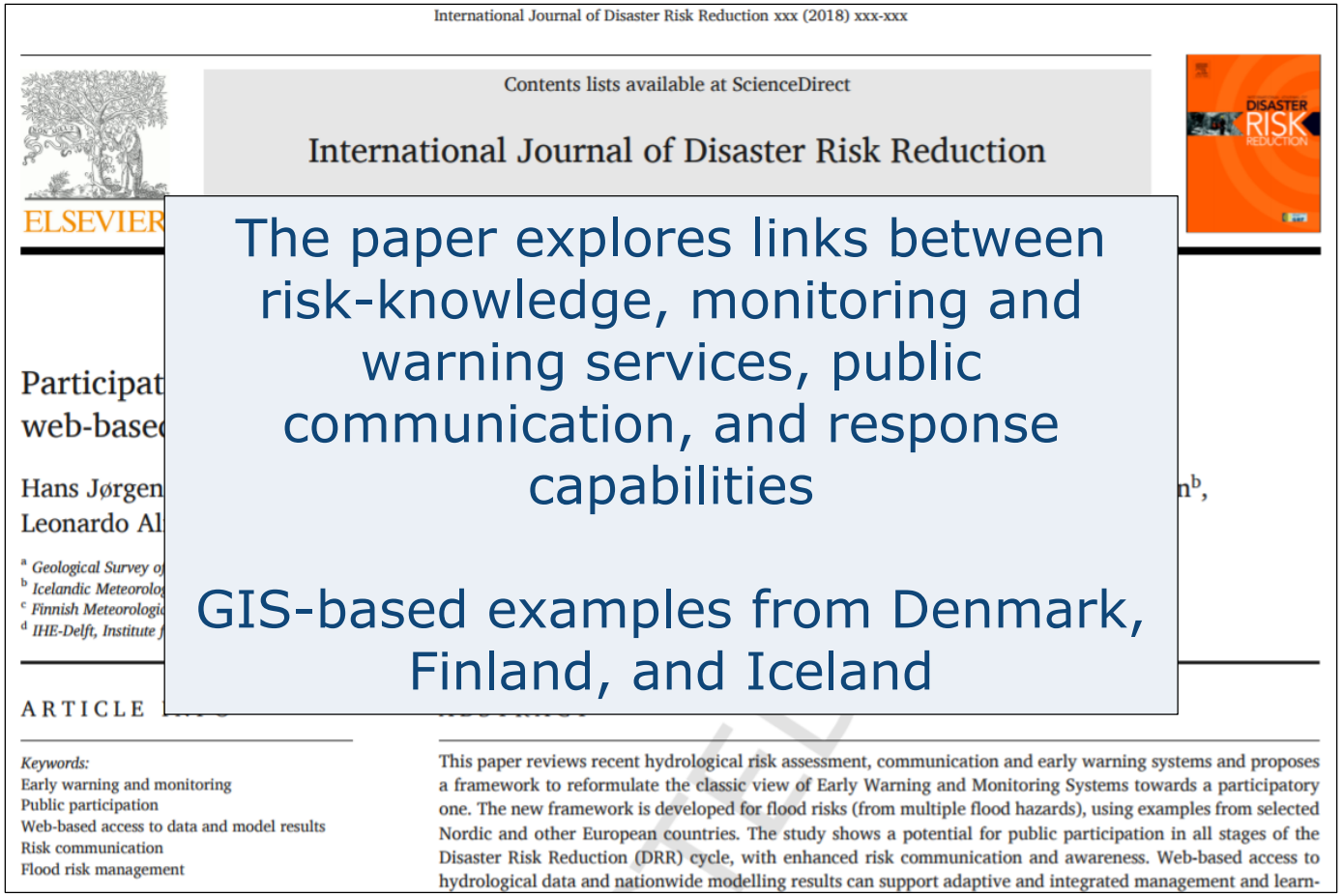

International Journal of Disaster Risk Reduction xxx (2018) xxx-xxx

Contents lists available at ScienceDirect

International Journal of Disaster Risk Reduction

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web-base

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[a] Geological Survey o
[b] Icelandic Meteorolo
[c] Finnish Meteorologi
[d] IHE-Delft, Institute

ARTICLE

Keywords:
Early warning and monitoring
Public participation
Web-based access to data and model results
Risk communication
Flood risk management

This paper reviews recent hydrological risk assessment, communication and early warning systems and proposes a framework to reformulate the classic view of Early Warning and Monitoring Systems towards a participatory one. The new framework is developed for flood risks (from multiple flood hazards), using examples from selected Nordic and other European countries. The study shows a potential for public participation in all stages of the Disaster Risk Reduction (DRR) cycle, with enhanced risk communication and awareness. Web-based access to hydrological data and nationwide modelling results can support adaptive and integrated management and learn-

The paper explores links between risk-knowledge, monitoring and warning services, public communication, and response capabilities

GIS-based examples from Denmark, Finland, and Iceland

International Journal of Disaster Risk Reduction, 2018

An outline of this year's work-plan

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In progress

- IMO technical memo: *Guidelines for developing a web-based registration form for public documentation of natural hazards*

Planned (with some tasks involving separate funding)

- Summary of work-package findings for the NORDRESS web-site
- DRR course at the University of Copenhagen, June 2018
- Additional paper to extend the findings of our IJDRR paper
- UNESCO conference Tech4Dev 2018, Switzerlan, July 2018
- Autumn meeting of the WP team – Citizen observatories for natural hazards (COWM2018), Venice, Nov 2018

DRR course featuring staff from GEUS and results from WP 4.3

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University of Copenhagen - Courses

NNMK16002U Natural Hazards

Volume 2017/2018

Expand all

Content

In an increasingly economically integrated, urbanized and populated world, society's vulnerability to natural hazards has never been greater. This course provides an introduction to the different types of natural hazard, their location, scale and frequency and the science of the processes at work during, for example, volcanic eruptions, earthquakes, tsunamis, landslides, storms, meteor impacts and space weather events. Case studies will be used to illustrate methods of natural hazard risk assessment, warning and mitigation.

Learning Outcome

Knowledge:
At the end of this class the student should have a basic understanding of

- The different types of natural hazard, their scale and frequency
- The location of high-risk, natural hazard, zones
- Climatic and other effects of large volcanic eruptions
- Mass-extinction events in the geological record
- Age dating methods for determining event frequency beyond the historical record
- Methods of natural hazard risk assessment, warning and mitigation

http://kurser.ku.dk/course/nnmk16002u/2017-2018

Why do observations from the public matter? Verification of impact!

Public observations can be incorporated into existing monitoring networks and forecasting systems so that:

i. more timely and accurate warnings can be issued;

ii. more comprehensive compilations of damage impacts are received; and

iii. hazard awareness and perception of risk are improved.

Flash flooding in Siglufjörður, 28 Aug 2015

Flood forecasting with in-built verification of river changes (NORDRESS)

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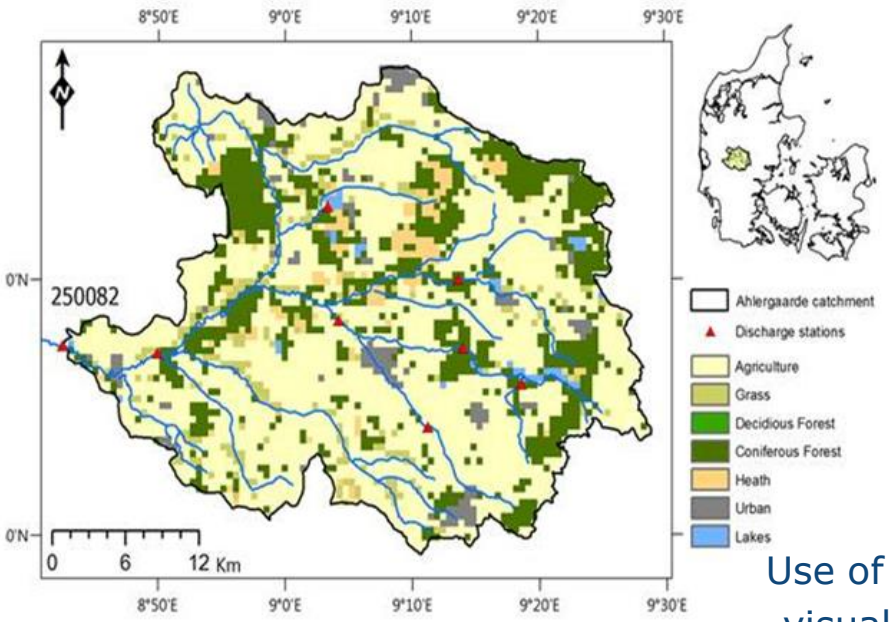
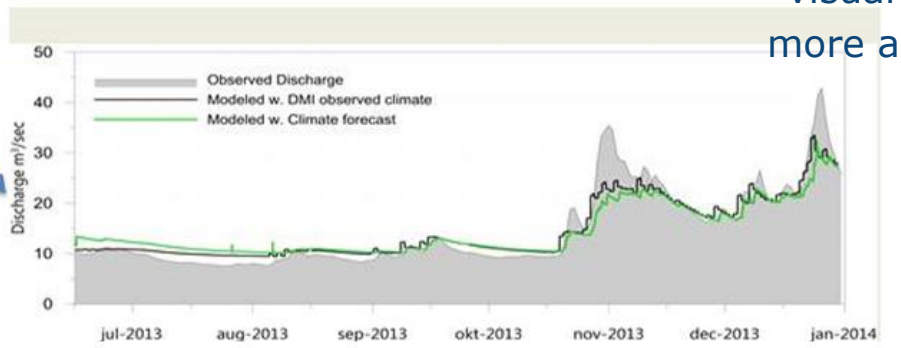
Danish case-study from the NORDRESS project (Henriksen *et al.*, in press)





Use of gauging data and visual observations for more accurate discharge estimates

Participatory-based approach to early warnings – NORDRESS

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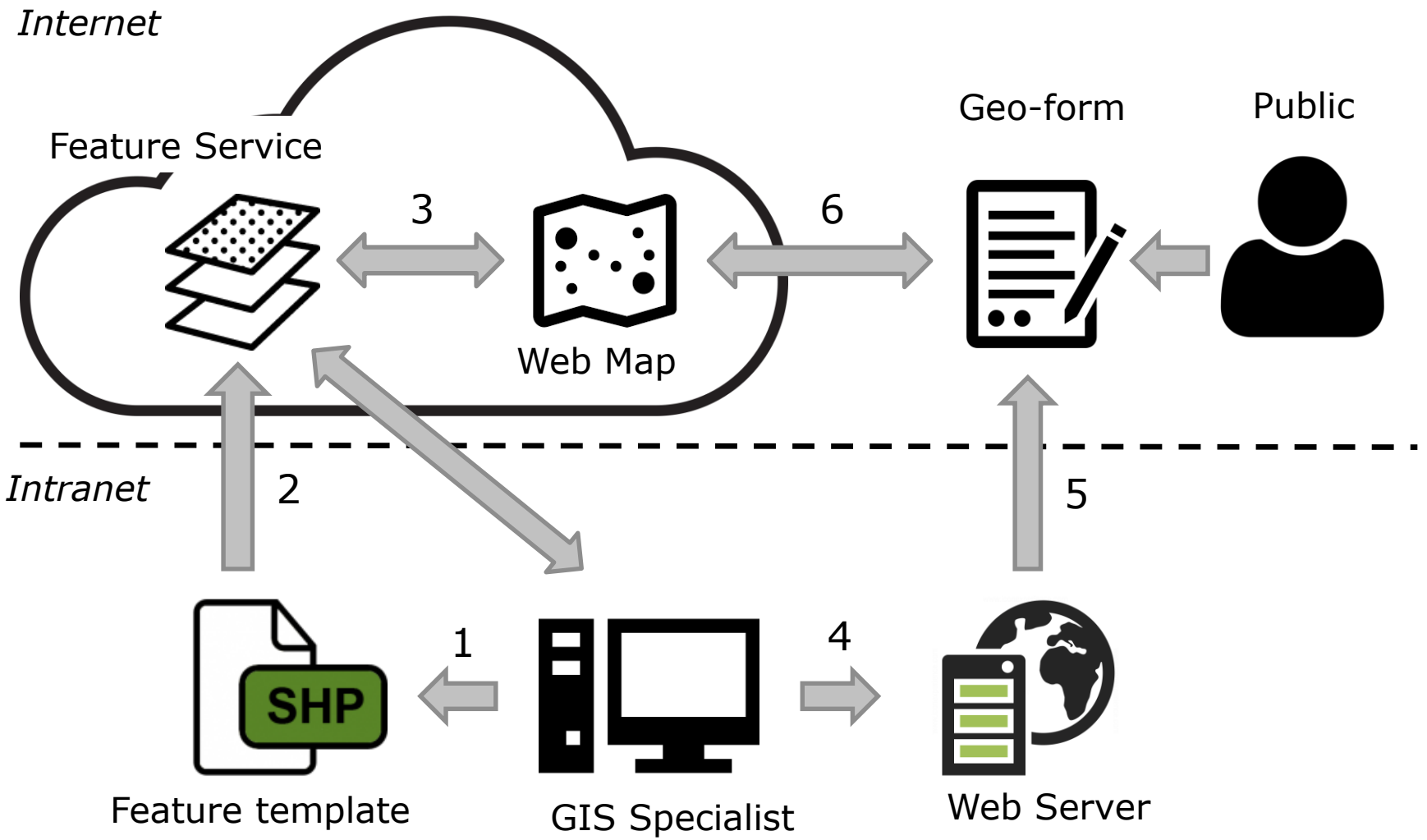

Experimental online geo-form at IMO for registering flooding

http://vatnsflod.vedur.is

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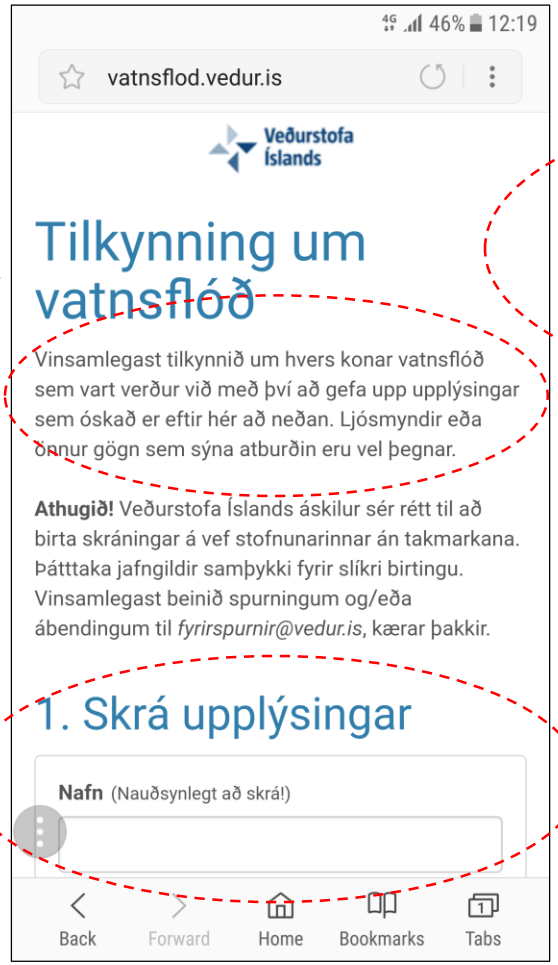
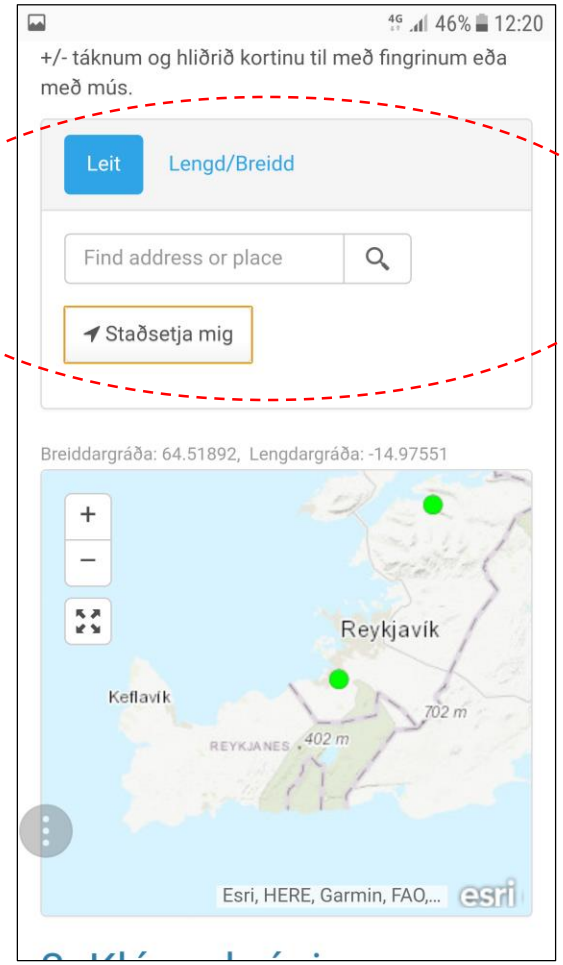
Introductory text

Observer's name and contact details





Location options, including automatic location from the telephone's built-in GPS

URL: http://vatnsflod.vedur.is

Geo-form services have a role in the disaster-risk-recovery cycle

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Participatory early warning systems take advantage of people-centred observations via a two-way exchange of warnings and local feedback, helping to:

i. improve risk-awareness within the affected region;

ii. increase the technical capacity to monitor, model and forecast with **higher accuracy**;

iii. improve the content and timeliness of public warning, thereby helping to maintain trust; and

iv. heighten response capabilities, both during the hazard itself and in the long-term recovery between recurring events.

Conclusions

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i. On-line GIS services are clearly a viable and effective way of gathering non-technical information from the public.

ii. Public participation in key stages of the warning process can help to validate forecasts and provide early recognition of potentially harmful changes.

iii. Public reports of unusual or damaging natural events not only provide scientists and first-responders with valuable local information and context, they also help to increase public awareness of natural hazards.