

Modern forms of communicating avalanche danger – A Norwegian case

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ABSTRACT: Norway established a national public service for avalanche danger warning on 14 January 2013, based on international standards. This is an important milestone in the Government's efforts to improve public safety. It was reached after three years of research and development (2010-2012), which also included the development of a national landslide warning service.

NVE is responsible for the service and publishes the avalanche warnings on the website www.varsom.no. Our goal is to be an informative and educational avalanche service. The bulletin page is therefore designed to increase avalanche awareness and enable the public to avoid accidents. To make the bulletin as user friendly and educational as possible, the bulletin page contains relevant information and learning material, in addition to the bulletin itself. To increase the use of the bulletins, improve on our service and encourage the use of our crowd sourcing application for observation gathering, we use Facebook as a digital meeting place for the avalanche service and the public.

KEYWORDS: avalanche bulletin distribution, public licence policy, crowd sourcing, user involvement, communication, social media, education

1 INTRODUCTION

Arguably, one of the most influential forces on the Norwegian avalanche forecasting and communication is our open data policy. The actual bulletins and all observations registered in the publicly available database/application regObs (Ekker et al 2013) are available to partners and the public through an API.¹ All data is licensed by CC BY 3.0². As a consequence, anyone can develop their own avalanche warning application, using the data from the Norwegian Avalanche Centre. This provides us with a healthy incentive to strive to improve our own bulletin presentation and communication to make sure we are the preferred source.

The Norwegian Avalanche Centre's preferred channel for communication avalanche danger is the website www.varsom.no. Varsom.no is but one of our applications in what we refer to as the "Varsom-family" (Ekker et al. 2013), consisting of avalanche bulletins, map- applications and data collecting applications.

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¹"Application programming interface" is a software communication protocol.

² This license lets others distribute, remix, tweak, and build upon your work, even commercially, as long as they credit you for the original creation. This is the most accommodating of licenses offered. Recommended for maximum dissemination and use of licensed materials.



Figure 1. Logos used by the applications in the "Varsom-family"

www.varsom.no was initially developed in the period from August 2012 and up until the establishment of the public service for avalanche danger warning on January 14th 2013. The short design and development period included conceptual design, front-end design and actual coding. The budget for the project was 500 000,- Nok, or roughly 66 000 Euros in 2012.

2 BULLETIN DISTRIBUTION

www.varsom.no, our main channel for bulletin distribution, was developed using what is known as responsive design. This design approach allows the presentation of web-content adapted to individual screen sizes, rather than a "fixed grid" presentation. The primary goal during the initial development of www.varsom.no was to ensure that the bulletins and all relevant data and information are accessible on a mobile screen, in effect a "mobile first" approach. The main argument for this is the distribution of "smart phones" in Norway, and the need to make bulletins available "on site" for the user, not just on the home-computer.

Responsive design also bypasses, or perhaps rather delays the need to develop native apps for Android, iOS and Win Phone tables

and mobile phones. This has a very cost beneficial effect.

The bulletins are also published at the two weather forecast websites in Norway, yr.no and storm.no.

3 CONTENT

In addition to the actual bulletins, www.varsom.no also presents geographically relevant observations from the regObs-database, publicly available weather forecasts and precipitation radar images from the Norwegian meteorological service (Met.no/yr.no).

By combining publicly available and relevant data with the bulletins, we believe we provide the most complete presentation of the avalanche situation at any given time within the forecast season.

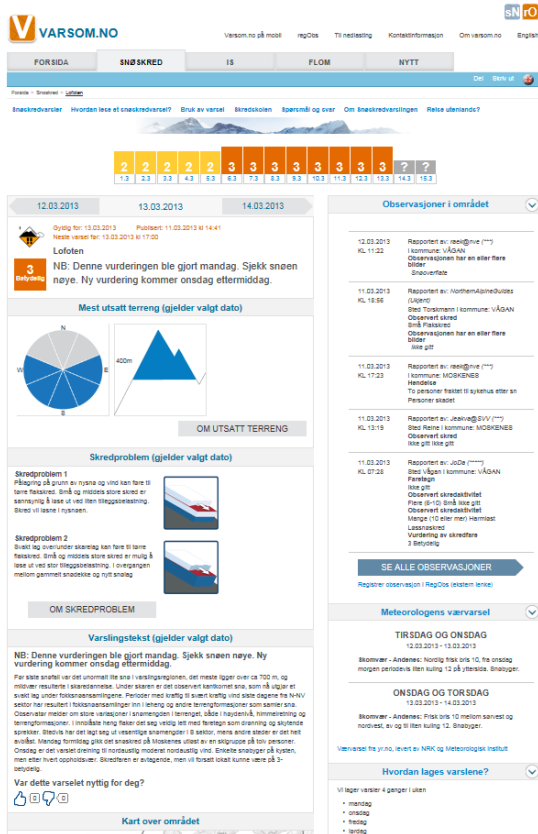


Figure 2. Screenshot of an actual bulletin for the Lofoten forecasting region, dated 13.03.2013.

www.varsom.no also presents avalanche educational material. We believe this is one of the key factors in not just making www.varsom.no the preferred channel for avalanche forecasts, but possibly to educate and eventually change peoples awareness and behaviour in outdoor activities. The educational

material is under constant evaluation and revision.



Figure 3. Educational material related to different user groups available in the bulletins.

User statistics show that this content is popular, and general safety advises aimed towards off-piste skiers is among the top ten most visited pages, avalanche bulletins included.

The avalanche services also started using video-material to portrait and explain common avalanche problems during the first operational season (Landrø et al 2013). The video material has proven to be a popular format for social distribution.

3 USE AND USERS

In the period between the official launch of the Norwegian Avalanche Centre (and www.varsom.no) and up until the end of the forecasting season (May 31th), www.varsom.no was visited by close to 100 000 unique visitors distributed over 261 000 visits.

The visitors accessed approximately 750 000 pages. 67, 1% was returning visitors.



Figure 4. Returning visitors vs. new visitors at www.varsom.no during the first season.

40, 2% of all visits came from a mobile phone or tablet. Of these, 76, 5% are iOS devices.



Figure 5. Peak visit from mobile phones during Easter vacation.

The user statistics also show a close relation between the forecasting regions and the visitor location.

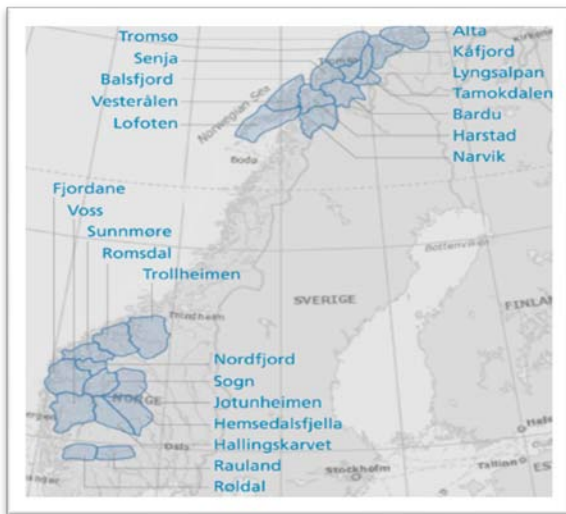


Figure 6 AB. A comparison of the 2013 forecasting regions and places visitors accessed the

bulletins from. (Darker blue indicates more frequent visits)

These are of course all moderate numbers compared to many well established avalanche forecasting services, but in light of the fact that these are numbers from our first season, and the fact that our forecasts also are presented by the two biggest weather forecast sites in Norway (yr.no and storm.no), we are very pleased to see such a large number of returning visitors.

All avalanche bulletins are made available in English as well as Norwegian.

National and international visits 2013:

Country/Territory	Visits
Norway	242 443
Finland	3687
Sweden	3654
Germany	2197
United Kingdom	1440
(not set)	1201
Denmark	1009
United States	953
France	945
Switzerland	824

4 APPS

Due to limited funding, it proved impossible to develop native apps for the avalanche service in addition to a website. This has been somewhat rectified on a later stage, and www.varsom.no is now available as an app both for iOS and Android- units. The apps are not completely separate products from the website, as the apps functions mostly functions as a dedicated web-browser for www.varsom.no. It is still considered beneficial for the avalanche service that the apps can be found and installed from App-store and Google Play.

5 SUPPORTING COMMUNICATION CHANNELS

In the first operational season, Facebook has become the number one referral site³ for www.varsom.no, even bigger than the national weather service yr.no. Facebook is, and has been, a very important supporting channel for the avalanche service, both before the 2013

³ Referral site as in a website that directs the user on to www.varsom.no

launch, and after. During the initial development period, we communicated the process to the public by using a publicly available blog-site and Facebook-pages for explaining priorities and asking questions to our would-be users

On our Facebook-pages, the avalanche service comments on the current avalanche situation, distributes provide educational information (such as video material) and engage users in the further development of the service. Changes in graphical presentations used in the bulletins have been tested on Facebook, and user surveys have been distributed (Muller et al 2013).

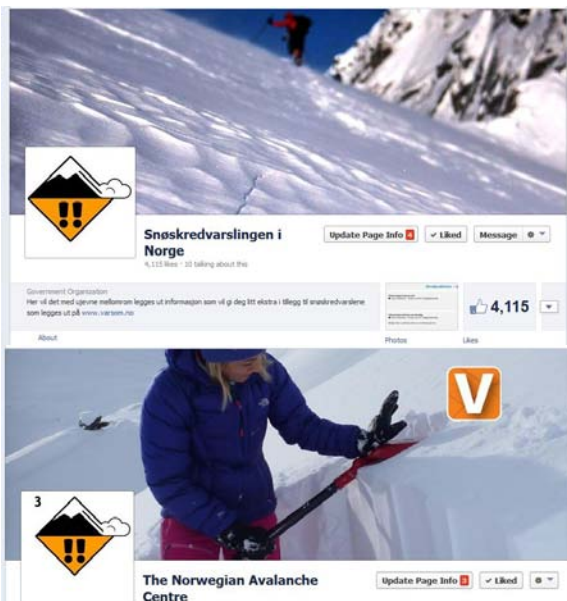


Figure 7. Facebook cover images.

The user engagement is a key element in getting the avalanche service known among the Norwegian population, and its Facebook-success is largely based on the dedication of the avalanche centres staff and their avalanche expertise. Likewise we also believe that the crowd sourcing element of the regObs-application is important in generating interest and engagement. All non-anonymous observations receive full credit when the observation is automatically published on the bulletin of the respective forecast region.

On the avalanche bulletin pages we have also integrated a low-level feedback functionality, asking the visitors if the bulletin content was of use.



Figure 8. “Voting” thumbs from www.varsom.no

We also believe that the avalanche service presence on Facebook, as well as the participation on several of the larger Norwegian back-country skiing events and avalanche awareness courses is beneficial to the avalanche service’s reputation and credibility (Muller et al. 2013).

All bulletins as made easy to share on all of the major social networks by embedding sharing functionality on www.varsom.no.

We also have several blogs tracking the technical development of key applications such as regObs and www.varsom.no, but given their somewhat more technical content, these attract a smaller audience.

7 FUTURE WORK

The Norwegian Avalanche service collected user feedback through two user surveys, Facebook engagement, and two workshops (Muller et al. 2013) While much of the feedback is very positive, we have plans for improving the actual bulletins by redesigning much of the key data-presentation that constitutes the main part of the bulletin. We are also working towards a better integration of weather forecasts in relation to the bulletins.

We hope to have the time and resources to develop java based plug-ins for use on external web pages as well. The plug-ins must require very little technical know-how to use, and thus make it easy and cost-free to integrate the avalanche bulletins on existing websites that want to display one or more regional bulletins.

A project group is currently also looking into the possibility of providing avalanche warnings by use of mass text-messaging technology.

By the end of 2013, www.varsom.no will also display national flood- and landslide warnings. We strongly believe that by channelling the different hazard warning through the same website it will be easier for the public to stay updated on the current situation in their region of interest, and increase the familiarity of the website, thus hopefully also the use of the website and its services.

8 ACKNOWLEDGEMENTS

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9 REFERENCES

- Müller, K., Kosberg, S., Landrø, M. and R.V Engeset, 2013. Report from the first operational winter of the Norwegian Avalanche Centre. Proceedings ISSW 2013. International Snow Science Workshop, Grenoble-Chamonix, France, 7-11 October 2013, this issue.
- Ekker, R., 2013. regObs – public database for submitting and sharing observations. Proceedings ISSW 2013. International Snow Science Workshop, Grenoble-Chamonix, France, 7-11 October 2013, this issue.
- Engeset, R. V., 2013. National Avalanche Warning Service for Norway – established 2013. Proceedings ISSW 2013. International Snow Science Workshop, Grenoble-Chamonix, France, 7-11 October 2013, this issue.

Landrø, M., Kosberg, S., Müller, K., 2013. Avalanche problems; an important part of the Norwegian forecast, and a useful tool for the users. Proceedings ISSW 2013. International Snow Science Workshop, Grenoble-Chamonix, France, 7-11 October 2013, this issue.