

Improving visualization and functionality of natural hazard warnings on multi-hazard platforms

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Keywords: natural hazard, warning, multi-hazard, platform, visualization

Abstract:

In the wake of the flooding events in Switzerland in 2005 that caused severe damages, the Swiss Federal Council adopted the project “Optimization of Warnings and Alerting”, aiming at improving natural hazard warnings and alerts in order to better inform and warn authorities and the public. To achieve the necessary coordination and collaboration, the Swiss federal institutes responsible for issuing natural hazard warnings joined forces in 2008 in the Steering Committee Intervention in Natural Hazards (LAINAT)¹. LAINAT is operational since 2009 and strengthens institutional processes to clarify political, strategic and technical aspects in a sustainable manner. It also facilitates new joint developments of forecasting and warning activities among the mentioned federal partners (Wernli-Schärer et al., 2016).

Our conference contribution focuses on various elementary, yet effective visualization and functionality improvements of natural hazard warnings on existing, operational multi-hazard platforms in Switzerland. These platforms are – with the exception of the MeteoSwiss app – web-based, contain real-time information and are designed for desktop and mobile devices. They are: the public Swiss natural hazard platform (Lienert et al., 2021), the Joint Information platform for natural hazards (Angehrn et al., 2019), the existing app and future website of MeteoSwiss, among others dedicated to publishing natural hazard warnings. These platforms have been analyzed in the context of a working group project (Deloitte, 2021) and in a prototypical manner (Dallo, 2022) and are currently under review regarding visual, textual and functional improvements, aiming at improving map legibility and user engagement.

For the natural hazard processes, particularly earthquakes and weather-related events (e.g., thunderstorms, heatwaves, floods, avalanches, and wild fire) the following improvements will be discussed: 1) depiction of the static temporal dimension; 2) depiction of warning regions (Figure 1); 3) changing color of location markers; 4) addition of a timestamp; 5) improved labelling of information sources; 6) consistent handling of hazard level “no hazard” as to existing international standards; 7) adding textual support for impacts of natural hazards; 8) adding textual support to temporal dimension such as onset, end, timeslot, historical data; and 9) integration of sharing functionality.

The proposed improvements derive from scientific transdisciplinary studies and research prototypes (Figure 2) that were co-developed by scientists from different disciplines and tested with the general public (Dallo, 2022). The findings showed that many users have difficulties interpreting information presented on multi-hazard platforms. Even basic visual modifications may greatly improve people’s comprehension of the warnings on such platforms. However, these modifications have to be conceptualized and implemented jointly to avoid ambiguity for the users and to avoid incoherence among the various federal partners and multi-hazard platforms. To this end, LAINAT provides an institutional framework and structure to enable such a concerted optimization process for multi-hazard platforms. The current contribution therefore also highlights how scientific results are eventually brought to policy.

¹ Federal Office of Meteorology and Climatology ([MeteoSchweiz](https://www.meteo.ch)), the Federal Office for the Environment ([FOEN](https://www.bafu.admin.ch)), the Federal Office for Civil Protection ([FOCP](https://www.bfs.admin.ch)) in conjunction with the National Emergency Operations Centre ([NEOC](https://www.neoc.admin.ch)), the Swiss Federal Institute for Forest, Snow and Landscape Research ([WSL](https://www.wsl.ch)) in conjunction with the Institute for Snow and Avalanche Research ([SLF](https://www.slf.ch)), ETH Zurich in conjunction with the Swiss Seismological Service ([SED](https://www.sed.ethz.ch)) and, since 2018, the Federal office of Topography ([swisstopo](https://www.swisstopo.ch)).

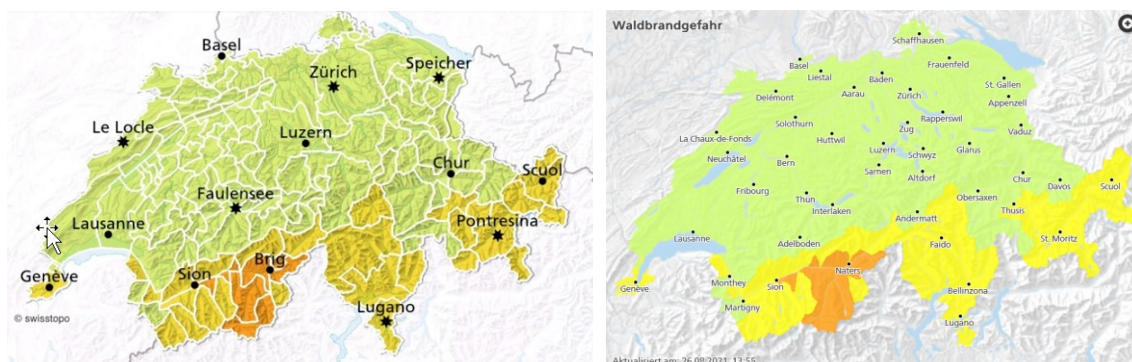


Figure 1. Warning regions for forest fires depicted by explicit borders (left) and without borders (right). Showing explicit borders has proved to be confusing.



Figure 2. Evidence-based recommendations for the design of event-related overviews on multi-hazard platforms, from (Dallo, 2022).

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