A new application for quick boundary limits of avalanche events: procedure and first validation

Bornaz L.¹, Durand N.², Frigo B.², Dellavedova P.², Segor V.³

¹ Ad Hoc 3D Solutions s.r.l., Gressan (AO) - Italy
² Fondazione Montagna sicura - Montagne sûre, Courmayeur (AO) – Italy
³ Struttura assetto idrogeologico dei bacini montani – Ufficio Neve e Valanghe, Regione Autonoma Valle d’Aosta, Quart (AO) - Italy

Nathalie Durand
ndurand@fondms.org


Introduction

In Aosta Valley (NW Italian Alps) the avalanche census is the basis of the data collection to the continuous update of the Regional Avalanche Cadastre and avalanche hazard mapping.

Test sites

All the territory of Aosta Valley, but in particular three pilot avalanche sites have been chosen:

- Crammont in Pré-St-Didier
- Mandaz in Valgrisenche
- P.ta Seehore test site in Gressoney-La-Trinité

Both located in the NW sector of the Region and affected by N-NW perturbations

Lots of information to manage: the numbers of the avalanche cadastre

The map of Aosta Valley with the surveys of avalanche basins in Winter 2012/2013:

- in white: avalanche basin known by Regional Avalanche Cadastre;
- in orange: the GPS tracks made during (in situ and by helicopter) surveys.

Increase of the surveyed avalanches reported in Avalanche Cadastre of Aosta Valley from 1970 to 2013.

Number of events counted in the last eight winter seasons (2006-2013).

To ease the work of the technicians for the update of the avalanche cartography and cadastre, a new procedure to quickly draw the boundary limits of avalanche events is developing:

AdHoc4MAP³ methodology

- image acquisition with a specific photogrammetric camera – from aircraft or ground
- use of a 3D model of the area that could be associated to each pixel of a 3D coordinate

IMPORTANT

- Distance of image acquisition
- camera characteristics

Example of perimeter with AdHoc4MAP³ software

Step1: creation of avalanche event and association of alpha-numeric values to individual mappings

Step2: association with one or more images

Step3: geo-referencing of images

Step3bis: geo-referencing of images

Step4: draw the perimeter of the avalanche event directly on a original image

Step5: see the result directly in a 3D map

Step6: suitability to export perimeter on a cartography for rapid sharing of the results (in this case GIS support)