Digital field mapping and the interpretation of the complex
geomorphological setting of the Flims and Tamins Landslides ((Rhein
River valley Switzerland)

Marco Giardino (1), Diego Masera (1), Luigi Perotti (1), Andreas Poschinger (2), John Clague (3), and Nancy Calhoun (3)
(1) Department of Earth Sciences, University of Torino, Italy (luigi.perotti@unito.it), (2) Bavarian Environment Agency,
D-86179 Augsburg, Germany, (3) Department of Earth Sciences, Simon Fraser University. Burnaby, BC, Canada

We analyze landforms and deposits related to the Flims and Tamins landslides (Rhein Valley, Switzerland) using an
integrated geomorphologic-geomatic approach that includes literature analysis, field mapping and remote sensing.
These huge landslides (estimated volumes of 9.3 km$^3$ for Flims and 1.6 km$^3$ for Tamins) occurred at a time of large
slope instabilities in the Rhein valley around 9000 years ago. Our focus is peculiar landforms called "Tomas" that
occur as a series of distributed hills in the vicinity of and downstream of the Vorderrhein-Hinterrhein confluence.
Their origin has been debated for more than one and one-half centuries, but current thinking is that they are,
depending on the area, intact rootless masses of Flims or Tamins landslide debris rafted downvalley in a thick layer
of liquefied valley fill ("Bonaduz gravel" for the ones upstram) during the Flims landslide event.
Our analysis of the features involved: 1) analysis of a LiDAR-derived DTM (Swissmap) and base maps produced
from the DTM for field work (hillshade and 1 m spacing contour maps); and 2) field data collection and digital
GIS mapping of deposits and landforms with a pocket PC and GPS. We created a geo-database that includes
morphometric, structural and sedimentological data on the Tomas. We produced a digital map from the DTM and
field data, along with a comprehensive legend linked to our kinematic and dynamic interpretations.
We recognize and describe four groups of Tomas, which provide new insights into the genesis of these peculiar
features. Remote sensing and field data also allow us to precisely map the eastern boundary of the Flims landslide
deposit and to interpret the spatial relation between the Tomas and the Bonaduz gravel.