

# Acquisition and documentation of prehistoric funeral stone stelae

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## Abstract

We acquired neolithic (3rd millennium BC) funeral stone stelae from the archeological site of Petit-Chasseur (Sion, Switzerland), that are currently exhibited in the Musee d'Histoire du Valais. These archaeological excavations are important records for the investigation of prehistoric cultures in the alp region, and are currently only described and documented by traditional graphical means (latest Corboud and Curdy 2009). This first technology driven analysis documents the stelae accurately for demonstration and reproduction applications, and allows an in-depth analysis of the structure and possible superimposed engravings.

In order to capture the various fine engravings we focused on a precise 3D acquisition, and compared two techniques: a highly accurate structured light scanner (Breuckmann, smartSCAN3D), and a structure from motion approach. With the structured light scanner we acquired different positions and angles from a tripod (see Figure 1a ), and combined those to a complete model of a stela by using a contour matching algorithm. Each acquisition was averaged four times to reduce noise. The texture was captured under environmental illumination – without the structured light projector. For the structure from motion approach we acquired a set of around 200 images with fix camera parameters. Having a smaller and more handy device allowed to capture without a tripod, from a wider range of distances and angles.

We compared the two approaches by defining the structured light scanner as a reference and calculating the distance of the point cloud. For both approaches we used the same controlled lightning environment and colour-checker charts for an accurate texture.

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(a) Acquisition setup using two light sources and structured light scanner.



(b) 3D rendering of an acquisition from the structured light scanner.