

Digital photogrammetry for the documentation of threatened archaeological sites and structures: the Valley of Turu Alty in Siberia, Russia.

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ABSTRACT — Since 1995, the Department of Archeology (UGent) has studied and inventorized the rich archaeological heritage and ecological landscape in the Altai mountain range in southern Siberia, Russia. During the expeditions of 2014 and 2015, the Department of Archeology and the Department of Geography (Ghent University) conducted research and fieldwork in the eastern part of the Altai Mountains, in the Valley of Turu Alty. This research area knows an unusually high concentration of archaeological structures (kourganes, steles, petroglyphs, etc.), mostly dated in the Bronze Age. These are mainly found in the northwestern part of Turu Alty (Bourgeois et al., 2007). This area, and more specifically a bowl shaped landscape - amphitheater - in the northwest of Turu Alty, was already studied by Jacobson & Kubarev (1994). The authors assume that this place has been used by various tribes for rituals, ceremonial and artistic activities since the Bronze Age. At the highest point of the amphitheater an oboe (stone heap) is located, bearing a large panel of approximately 2 x 1.5 m, with mainly deer and goats depicted in the form of petroglyphs. The bowl-shaped landscape further exhibits a natural sound enhancing feature. If a person talks at the top of the bowl with a normal ground tone, this can be observed at an equal frequency in the lower part of the bowl. Because of the above-described aspects, archaeologists believe that this amphitheater could have been an important cultural place in the past (Jacobson & Kubarev, 1994).

The archaeological structures in the Turu Alty valley are very well preserved because they are largely situated in the permafrost zone of the soil. Global warming thaws the frozen organic material under the various grave hills, thereby affecting the conservation of the organic material. The ritual and funerary sites and the organic material are very sensitive to these severe climate changes. They are therefore threatened to disappear over the next few centuries. The archeological landscape in the Altai mountains is further threatened by other factors: erosive processes, earthquakes, increase in tourism, industrial expansion (e.g. pipelines) and robberies. These endanger the archaeological heritage, which could lead to loss of landscape and archaeological value (Gheyle et al., 2011).

The Departments of Archeology and of Geography use topographic measurements and photogrammetry to document and create inventories of these important relicts. Detailed and accurate end products are generated: Digital Elevation Models (DEMs), (topographic) maps, contour line maps, scaled orthophoto plans and textured 3D models. Based on these photogrammetric products, archaeological findings and sites can be interpreted in their spatial, temporal and archeological context, together with their thematic properties (Bourgeois et al., 2007). These analyzes can lead to new and better insights about the life of and the relationship between the various Altai peoples (Scytho-Siberians).

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