New approaches to collect and treat massive data from Bronze Age funeral structures in Mongolia

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Résumé

Studies carried out in extreme environments involve many constraints: human, material, and temporal. It is therefore necessary to adapt data acquisition to these harsh conditions, while maintaining the capacity to collect enough information to answer the main research questions. For the study of Bronze Age burial structures in Mongolia, two methods based on photogrammetry have recently been developed within the framework of the Monaco-Mongolia mission. These methods offer new approaches for processing field data.

The first method was tested on the emblematic funeral stelae known as deer stones. Photogrammetric acquisition is carried out on-site using a simple camera. Models are computed in the laboratory and processed using a new method based on ambient occlusion, which allows the model to be recolored. Ambient occlusion creates a strong contrast between the edges and the footslopes, making the limits of engravings much easier to distinguish.

The second method was tested on aerial pictures of large, dry-stone funeral structures, where the stelae were discovered. Orthomosaics and digital elevation models obtained by photogrammetry provide a clear view of the organization of these sites. To facilitate the processing of this abundant documentation, a method based on machine learning has been developed. It quickly and automatically delineates each individual stone from the images.

Both pipelines are quick to implement in the field and, later, in the laboratory, allowing massive data collection during each field mission.

Mots-Clés: Bronze Age, Mongolia, rock art, deer stone, documentation, recording methods

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