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ABSTRACTS

Study of the steatite industry of Tepe Hissar (Damghan, Iran, 3rd millennium BC). Enhancement of photographic recordings by the means of the image processing software LEICA LAS Montage 3D

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In the last years became available softwares capable of assembling on the vertical axis of the focal plane the points that the physical limit of the microscope optics could not resolve. Thus, such software applications can focus on the same image several plane of focusing. In fact, one of the main problems of analogical microphotography is represented by the limit of the depth field available. Such software evolution gave birth to a generation of products that besides granting a perfect focusing of complex images well beyond the resolution power of the lenses, create virtual 3-D images, measured along the 3 cartesian axes. By using the Leica LAS multi focus software, a n number of perfectly focused images are “melted” into a single image, assembled with all the non-redundant points. Such images represent perfect 3-D microtopographic models of the recorded objects, and this allows the recording in detail of several classes of micromorphological features. We have applied the method to the study of manufacturing traces on a Bronze age steatite bead making industry from Tepe Hissar, Iran (3rd millennium BC). Negative tool marks such as grooves and cuts on the stone can be studied in detail recording their profile and its variations at regular intervals. In this way it is possible to distinguish cuts made with lithic tools from those made with copper/bronze saws. The method is completely non destructive and avoids the more common use of siliconic moulds observed in positive by the means of SEM.

Digital restoration of historical documents by diversity techniques and statistical processing

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Using spectral or spatial diversity associated with statistical processing has been proved useful to restore degraded texts in historical documents. By linear independent component analysis, we have been able to separate the main text from interfering patterns or hidden features in color or multispectral document images, and to cancel the showthrough-bleedthrough distortion from suitably registered graylevel recto-verso document images. By applying the same principles to RGB recto-verso images, we have now demonstrated that the recto and verso patterns can be separated as in the graylevel case, and their original colors can be reconstructed. Some examples from real documents will be shown.