Documenting interventions in manuscript illuminations with macro-XRF scanning

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Macro-X-ray fluorescence (MA-XRF) scanning enables the graphic visualization of the distribution of individual elements within pigments, inks and gilding used in painted illuminations. The resulting XRF maps from this non-invasive, non-contact analytical method are presented as multiple images (typically, one for each element). Capturing both surface and sub-surface elemental distributions, these element maps can be examined and overlaid using standard image software (e.g., Photoshop) to aid in the interpretation of the relative distributions of elements, and by inference the materials used, within the painted design. It can also help visualize what has been lost, or changed. Macro-XRF scanning can aid in the visualization of damages and interruptions to the paint surface from loss, wear, or negligence along with areas that might have been reworked, repainted or retouched. The elemental composition of such reworked areas can provide evidence to the researcher regarding whether the interventions were made long ago or more recently.

These element maps can thereby serve to document past interventions, in some cases providing information not revealed through more traditional imaging methods, like UV photography. Using examples from the collection of illuminated manuscripts in the J. Paul Getty Museum, both medieval and modern interventions are investigated. Whether the designs were intentionally changed to establish new ownership, were repainted in the later Middle Ages to give new meaning to the design, or were retouched in the nineteenth or twentieth centuries to minimize the appearances of flake losses in the paint layer, by the use of macro-XRF, interventions in painted illuminations can be more precisely documented than ever before.