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RAPID IMAGE-COLOR INTENSITY ANALYSIS: EXAMPLES FROM COASTAL LANDFORMS ALONG THE BLACK SEA COAST OF UKRAINE AND POTENTIAL APPLICATIONS TO ENVIRONMENTAL ASSESSMENT OF THE KAKHOVKA DAM CATASTROPHE

Rapid-response assessment of land-surface changes is a challenging task for labor-intensive software, such as Geographic Information Systems and other platforms. Remote sensing technologies (aerial and satellite imagery, small UAVs, etc.) are increasingly employed as sources of high-definition spatial databases, especially important in areas with limited access, such as along parts of the northern Black Sea coast, Ukraine. For rapid analysis of aerial and profile-style patterns of relative color intensity, ImageJ-based freeware can be used to quantify grayscale (GS) variations, both spatially and temporally, assuming corrections for cloud cover and light source. In a full 256-value spectrum, the darkest features on the landscape (water surface, dense vegetation, etc.) will have the lowest values (GS<50), whereas lighter hues (GS>100) will be common for other types of ground cover or sediment (exposed sand, snow, etc.). Anthropogenic features can be similarly analyzed using changes in color contrast. Pixel size is constrained by the original image resolution, with sub-meter scale possible. Here, we present several examples from the Black Sea coast of Ukraine where GS analysis is applied at different scales: 1) photographs of sediment samples Dolphin Beach, Odessa) and sedimentary sequences (Sasyk Liman) with contrasting composition and 2) satellite images of coastal landforms, with examples of coastal strandplain morphology (Biryuchyy Island), inlet cross-sections (Tendra Spit), and zoogenic features (Biryuchyy and Dzharylgach Islands). This method can be potentially applied for assessing and quantifying environmental impact on land cover, including explosion craters, fires, flooding, draining (see example below) and other surface changes related to military activities, including the consequences of the June 2023 Kakhovka Dam catastrophe.