



Combination of aerial and near surface geophysical data: Badlands case study of "Les Vaches Noires" cliffs, Normandy, France.

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Abstract

Several aerial and geophysical methods were carried out on "les Vaches Noires" cliffs (Normandy, France). This particular geological site is typical of Badlands formation, exhibiting Cretaceous to Jurassic formations. These cliffs are submitted to strong erosion processes previously described by numerous works. A new study was undertaken to best-understand the phenomenae, combining an aerial observation with a geophysical imaging. In that purpose, a Digital Terrain Elevation were constructed by means of photogrammetric method applied to hundreds of images collected by drone survey. Complementary 3D thermal infrared model was also considered to assess surface materials characteristics and subsurface hydrology. The Electrical Resistivity Imagery were implemented according to both transverse and parallel profiles to the coastal line, (i) from the top to the bottom of the cliffs, (ii) as well as at the bottom of the cliffs and onto the beach. A recent 3D-inverse electrical method were applied to take into account the whole topography and the layers direction of the geological formations. Spontaneous Potential also locally provides enriched information on hydrological pathways. Finally a local geophysical model were obtained offering a more comprehensive interpretation of cliffs erosion processes.

Photogrammetry, thermal infrared, drone, electrical resistivity imagery, spontaneous potential, badlands, erosion