



Electrical Resistivity Tomography and Ground Penetrating Radar for locating buried petrified wood sites: a case study in the natural monument of the Petrified Forest of Evros, Greece

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A geophysical survey was carried out in the Petrified Forest of Evros, the northernmost regional unit of Greece. This collection of petrified wood has an age of approximately 35 million years and it is the oldest in Greece (i.e. older than the well-known Petrified Forest of Lesvos island located in the North Aegean Sea and which is possibly the largest of the petrified forests worldwide). Protection, development and maintenance projects still need to be carried out at the area despite all fears regarding the forest's fate since many petrified logs remain exposed both in weather conditions – leading to erosion – and to the public. This survey was conducted as part of a more extensive framework regarding the development and protection of this natural monument. Geophysical surveying has been chosen as a non-destructive investigation method since the area of application is both a natural ecosystem and part of cultural heritage. Along with electrical resistivity tomography (ERT), ground penetrating radar (GPR) surveys have been carried out for investigating possible locations of buried fossilized tree trunks. The geoelectrical sections derived from ERT data in combination with the GPR profiles provided a broad view of the subsurface. Two and three dimensional subsurface geophysical images of the surveyed area have been constructed, pointing out probable locations of petrified logs. Regarding ERT, petrified trunks have been detected as high resistive bodies, while lower resistivity values were more related to the surrounding geological materials. GPR surveying has also indicated buried petrified log locations. As these two geophysical methods are affected in different ways by the subsurface conditions, the combined use of both techniques enhanced our ability to produce more reliable interpretations of the subsurface. After the completion of the geophysical investigations of this first stage, petrified trunks were revealed after a subsequent excavation at indicated locations. Moreover, we identified possible buried petrified targets at locations yet to be excavated.