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Monitoring of Acid Mine Lakes By Unmanned Aerial Vehicle (UAV) on Geographic Information System (GIS) Around Can Region, Biga Peninsula, NW Turkey

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In the past three decades, a few small scale private enterprises have been operating around Can Region, Biga Peninsula, NW Turkey which is rich in lignite reserves. They have abandoned the operation land without providing any working of rehabilitation. during the operation of high sulfur content lignite, the topography have been damaged and this caused the large holes and deterioration in these areas. As a result of discharge of surface water the artificial lakes have been formed. In the course of the time, these lakes gain acidic character due to acid generation from pyrite oxidation. Significantly high acidity with low pH values ranging from 2.53 to 3.05 is recorded from AMLs. High iron and aluminium concentrations were found in all lakes, the maximum of which reached a level as high as 338.17 and 357.47 mg/L, respectively. AMLs are monitored regularly by Unmanned Aerial Vehicle (UAV) for a year. DJI F550 branded hexacopter is used as UAV. Photographic capturing processes are carried out at 50-100 height meter by 12 megapixel GoPro Hero3 digital camera. The images are linked with each other and referenced by iWitness software. UAV images are then combined to mosaicking method by ENVI software. These images are coordinated by Global Mapper software with the coordinates of ground control points in the field measured by GPS and the geographical referenced data are obtained. The images obtained periodically are transferred to ArcGIS software for digitizing, areal calculation and visualization processes. Areal change and shape of AMLs whose area are smaller than 0.3 km² are determined. The results show that hydrogeochemical properties and areas of AMLs are affected by climatic conditions in a short interval of time.

Keywords: *Acid mine lake, Geographic Information System, Hydrogeochemistry, Unmanned Aerial Vehicle*