



Impacts of mining activities on water resources to Megalopolis lignite district area

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The aim of this paper is to indicate which are the impacts of mining works on the water quality of the water regime of the area. Megalopolis is located in the center of Peloponnese, southern of Greece , it has three lignite open pit mines operate today, Xoremi, Marathousa and Kiparissia, whereas Thoknia lignite mine has recently finished its activity (1994). A power plant for the compulsion of lignite and generation of electricity is also located in this area. Alfeios river flows near all the mines and several diversions of its riverbed were made for the protection and proper operation of the mines. In the area of Thoknia old mine a deep aquifer is developed.

In this area 170 water samples were collected and elaborated from drills, wells, ponds and rivers. The first results from the elaboration of the hydrochemical analysis are :

1. The water quality of Alfios river is generally good, even though the domestic sewage of Megalopoli town are thrown at Alfeios river without the proper processing. Water samples from four sites along its path were collected., above the mining area and the power plants of the area, and below the mining area near Kiparissia mine, there is a continuous deterioration of the surface water as increases the concentration of SO_4^{-2} , Ca^{+2} , Mg^{+2} , Na^+ , Fe and NH_4^+ ions. The waste dump area, the mining works of the area or the Power Plants of the area probably causes this deterioration with the surface run off or the groundwater flow of the shallow aquifer. The waste dump area, the mining works of the area or the Power Plants of the area probably causes this deterioration with the surface run off or the groundwater flow of the shallow aquifer. The

concentration of HCO_3^- is also over the limits in most of the samples but these happens because of the geochemical reactions that take part in the geological formations of the area. Only in one sample, the concentration of SO_4^{-2} is over the limits.

2. The aquifer which is developed at the waste dump of Thoknia mine has also high values concentrations of E.C., HCO_3^- , SO_4^{-2} , Ca^{+2} , Mg^{+2} , Mn^+ , Total hardness which also show degradation of the quality of water due to ash deposition in the waste dump. The concentrations of Ca^{+2} , Mg^{+2} have been caused from the geological settings of the area but the high concentrations of Mn^{+2} is related to the geochemical formation of the lignites. The deep aquifer developed below the lignite layers at the neogene sediments shows no influence of its water quality from the waste dump, which declare no hydraulic connection between this aquifer and the leaching of the waste dump.

3. At the ponds created at the waste dump of Thoknia mine the water samples has shown degradation of the quality of water due to ash deposition in the waste dump. The major hydrochemical parameters showing this degradation are E.C., SO_4^{-2} , Ca^{+2} , Mg^{+2} , TDS. Sources of pollution in the area are also the existence of sewage sinks near the waste dump area and the spoil pipe of the power plant that outflow into Pond II of Thoknia waste dump.

The conclusions from these analysis are that: a) the quality of Alfios in comparison to the average hydrochemical texture from the other greek rivers , shows that we have higher values in Ca^{+2} , Mg^{+2} , K^+ , NO_3^- , SO_4^{-2} but not over the limits b) The main source of pollution are the Urban wastes of the Megalopoli town c) The mining activity had influenced the water quality of the river but not so much, only a very small portion of Alfios flow is consisted of mine water d) Special role in the chemical texture of the Alfios river has the geological settings of the area.