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Accidental pollution of the karst underground by hydrocarbons – Pazinska jama and Delnice case study, Croatia

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Hydrocarbon pollutants are common source of various kinds of air, soil and water pollution because of wide use and environmentally harmful properties. Even very small concentrations of hydrocarbon chemicals prevent groundwater exploitation for the public water supply. In spite of growing efforts to preserve the quality of groundwater resources, accidental pollution is becoming increasingly frequent. The consequences of ecological accidents are particularly expressed in karst regions where specific hydrogeological circumstances influence rapid water infiltration, fast circulation and transportation of pollutant, often to the large distances from the pollution site.

The analysis of two accidental pollution cases of the karstic underground by hydrocarbons has been made. The first accident is related on discharge of approximately 100 tons of fuel oil (mazut) from the tank of nearby factory to the sinking stream Pazinčica and Pazinska jama sinkhole-cave in central Istria. The second one was related to a spill from tank truck transporting diesel fuel directly over the shallow cave roof when 20 tons of fuel were disharged to the karst underground near Delnice in Gorski Kotar.

Due to the fact that both accidents happened within catchments of significant springs captured for public water supply, the monitoring of all potentially endangered springs has been established. The results pointed out the oscillations of the examined parameters, but neither exceeded the maximum permitted concentrations for drinking water. Such unexpected results are consequence of favorable geological and hydrogeological settings that include deep underground circulation and lower specific weight in respect to the water and hydrophobic behavior of hydrocarbon contaminants.