Impact of gold mining activities on river water quality in Nordic region

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In this research, we have comprehensively studied flow regime of Seurujoki River, locating in northern Finland, in parallel with fluctuations of Electrical Conductivity (EC) as a water quality index that has been increased due to mining activities at its catchment. Relation between flow regime and EC has been analysed spatially and temporally during 2008-2017. The analysis has been carried out by analyzing time series indicating observed data of EC in discontinuous time intervals in 4 stations along the river way. Results showed that in a condition, when there is no mining effluent to the river, minimum EC happen as the river discharge is its maximum. This is typically during snow melting season (in May). In contrast, maximum EC happen in cold seasons with the lowest river discharge. Linear relation with square-R value of 0.74 between EC and the river discharge were observed in uppermost station in snow melting season. On the other hand, when effluent from mining activities runs to the river after passing natural peat lands, no any correlation between water amount and EC in the river were observed. Moreover, we have produced an Impact Factor which is calculated based on minimum and maximum record of EC happened in the River. It is conducting a spatially and temporally review of mining activities in the river. The Impact Factor shows a proportional damage of mining in certain time and place to minimum and maximum record of EC in the river during last 10 years valid measured data. The magnitude of damage due to the accident which has happened in 2015 has 57% Impact Factor in Pumpaamo (0.5 km from the pollution source) and 55% in Lintula (6 km from the pollution source), whilst the Impact factor in the same day before mine, in the natural condition, is 7%.