



Effects of colmation processes in the hyporheic zone on stream temperature patterns of the River Yalbag (Mongolia)

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The hyporheic zone is an ecotone between the surface stream and the groundwater, mediating the exchange of water, nutrients, and organic matter in response to variations in discharge and bed topography. Essential ecological functions of the hyporheic interstices of gravel-bed rivers are controlled by bed permeability which is related to the amount of fine inorganic particles in the bed sediment. Amongst others, the hyporheic zone is acting as a thermal buffer what results from in- and exfiltration of groundwater. The study presented here aimed to identify significant effects of reduced surface water / groundwater exchange on surface water temperatures. The study was conducted in the River Yalbag, a second order stream in the North-East of Mongolia. The watercourses of north-eastern Mongolia represent one of the last undisturbed natural areas in the northern hemisphere which have not yet, or only slightly, been changed due to human impact. In recent years anthropogenic activities were increasing, especially due to a rapid expansion of open-cast goldmining. Mining activities cause highly increased sediment loads in the rivers downstream of the mining areas due to the washing of the soil during gold extraction. First results show that fine sediments may intrude into the riverbed and progressively reduce porosity, thereby causing a decrease in exchange rates. Simultaneously, a significant increase in mean summer temperatures of about 7°C was measured at the affected sites in comparison to reference sites. Therefore, we analysed the main control variables of stream temperature: reduced surface water / groundwater exchange; removal of riparian vegetation and increased incident solar radiation; warming of surface water in settling ponds. We conclude that the hyporheic zone is crucial for the ecological integrity of streams and rivers and has to be considered in the formulation of conservation or management

strategies.