Spatial distribution of dissolved oxygen at rapid hydraulic structures as an indicator of local-scale processes

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ABSTRACT

This work aimed to examine the impact of rapid hydraulic structures on water temperature and dissolved oxygen concentration in the Porębianka mountain stream. This has been achieved by measurements of hydraulic characteristics and physiochemical properties of water such as water temperature and dissolved oxygen concentration. It has been shown that rapid hydraulic structures exhibit a large spatial diversity in morphology and flow paths, that manifests in the spatial heterogeity of thermal conditions and oxygen concentrations at a single structure scale. The results have demonstrated that pools between the rapids have higher oxygen concentrations when compared to rapid region. The highest concentrations of oxygen occured in pools located close to the upstream edge of the rapid ramp where the flow undergoes gradual acceleration. Elevated concentrations of dissolved oxygen were also observed in the dissipation basin. The lowest concentrations were observed at the stream banks. The results emphasise the relative importance of site-specific characteristics on physiochemical properties of flow, which might help to understand multi-scale processes across rivers and improve future plans of restoration practices in mountain streams.