



Hazard index applied to natural rivers – Preliminary result from a case study of mountain trails in southern Brazil

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Trails are one of the main places for ecotourism practitioners' activities. Many of them are located close to watercourses, and it is often necessary for practitioners to cross them. This often leads to dangerous situations, since critical conditions of water stages and flow velocity can make people lose their walking stability. One way to quantify these hazards is the hazard index (HI) which, in general, is defined as the product of the flow velocity by its depth (Stephenson, 2002). Although many studies have been carried out to determine the HI values as safety limits for people exposed to water flows, none of them analyzed the natural river conditions like those encountered during an ecotourism trail. In these environments, locomotion is hampered due to the surface which is usually highly irregular and often contains slippery rocks and sediments. Thus, that there is a gap related to the HI analysis in natural rivers, and more research becomes necessary, since more people have sought to carry out activities related to ecotourism. The main objective of this research is to apply HI approach in natural rivers so that its results can be utilized in the management of trails containing watercourses crossing. Initially, a bibliographic review was carried out, where some important concerns related to people's loss of stability were analyzed. The results of the bibliographic review were organized within a summary table which permits verifying variables with stronger influence on people's stability, during these walks. After this first stage, three mountain trails located in the Aparados da Serra National Park, in southern Brazil, were selected for field measurements. In all of these trails, measurements of flow depth and velocity were carried out using a small current meter and the granulometry of the river sediments was measured through an adaptation of the Pebble Count method. The measurements were taken at all points where tourists cross the riverbed during the trails, i.e., 23 measurement sites in total. The analysis of these data resulted in preliminar information: (i) an easy-to-interpret diagram that indicates the thresholds values of HI in natural rivers, named Hazard Index Diagram of Natural River (HIDNR); and (ii) list of the main variables responsible for people's loss of stability, in order to contribute to the safety of ecotourism practitioners. One of the next steps of the work is to analyze how the sediment transport and connectivity behaviour could give us insights about hazard levels.

REFERENCES

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