HAZARD CLASSIFICATION AND FLOOD RISK FOR THE GREEK PART OF ARDA RIVER

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The European directive 2007/60/EC introduces general concepts regarding “the reduction the risk of adverse consequences, especially for human health and life, the environment, cultural heritage, economic activity and infrastructure associated with floods”. In this work we have determined the flood risk of the Arda river, based on the directive, and giving more specific expression.

The downstream part of Arda river has a length of about 35 km from the Bulgarian-Greek border up to confluence with Maritsa river, it flows outside the mountainous watershed, through an agricultural plane land, with a mild slope, close to several small agricultural villages. There is also a small part of Arda between the Greek-Turkey border and the confluence with Maritsa river (about 500 m), which belongs to Turkey.

For a deep understanding of the hydraulic behavior of the Arda river, an extensive hydraulic study was done, using HEC-RAS software, for seven different flood scenarios for return periods of T=5, 10, 20, 50, 100, 1000 and 10000 years. For each scenario the free surface elevation at 36 cross sections was calculated and compared with the elevation of the levees. When the levee elevation is smaller than the free surface elevation, then clearly there is an overflow from the levee out of the main Arda river flow. For each scenario, the discharge of the outflow was simulated, the width along the levee of the “overflow weir”, and the water depth of the flooded areas were calculated.

In Great Britain the flood hazard rating (HR) is calculated as a function of velocity (v), depth (d) and a debris factor DF such that HR = d x (v + 0.5) + DF. The hazard rating provides an assessment of the direct risk to life arising from the combination of water depth and velocity, based on experiments, and includes a debris factor which recognizes that debris-filled flowing water increases the danger to people. In addition a roadmap to reduce the vulnerability to flood is proposed. For this purpose a categorization of the vulnerability into three domains with respect to the intensity of hazard is proposed.

We apply this methodology for two sites, which presented significant hazard, i.e. Kastanies Church and road pavement Kastanies –Erdnine, close to train embankment and we estimate the degree of flood hazard.

Institutional settings in flood hazard and risk management