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Modelling the effect of Flood Retention Ponds in Arachthos River (Arta, Greece)

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Arachthos River is the largest river in Epirus and the 8th largest in Greece; it is 110 km long and its drainage area is 2209 km2. After emanating from Pindus mountains (near Metsovo), it enters into the Pournari Reservoir in Arta, passes through Arta and discharges into the Ambracian Gulf near Kommeno. Arachthos River prevents flooding of the city of Arta and supplies water to most of Epirus.

The design of flood protection works in Arachthos River is currently in progress; it is performed by a consortium of Greek Consulting Firms for the Ministry of Infrastructure and Transportation. In the present work, we examine the effect of Flood Retention Ponds on the inundation area and the subsequent flood risk for the city of Arta. The Flood Retention Ponds are constructed immediately downstream of the Pournari Reservoir and 5600 m upstream of the historic Bridge of Arta; their exact locations were identified after a preliminary study and field surveys. Firstly, we performed the design of the Flood Retention Ponds, based on international standards and specifications found in the international literature; then, we performed hydrodynamic calculations using the Hydrologic Engineering Center's-River Analysis System (HEC-RAS) 1D/2D with and without the Flood Retention Ponds. Thirdly, we compared the calculations and the corresponding inundation areas and derive conclusions on the effect of Flood Retention Ponds.