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Abstract: The Magdalena River is the most important river in Colombia. It has a length of 1,500km, drains a catchment of 257,000km^2 and is home to 38 million people. The Magdalena River Research Center has conducted the Program for Magdalena River Modelling to improve their understanding of the river system. Within this modelling program, a SOBEK hydraulic model was constructed for the middle and lower basin of the Magdalena River (900km) with a one-dimensional component that represents the main channel system and a two-dimensional component for the floodplains and other inundation areas externally coupled to a WFLOW hydrological model that represents the discharges in tributaries. This coupled modelling was used to reproduce the behaviour of middle and lower Magdalena River in the time period between 1 Jan 2010 and 31 Mar 2011. Furthermore, a sensitivity and uncertainty analysis were carried out to evaluate the accuracy of the coupled modelling results. The hydraulic and hydrological modelling allowed us to reproduce the behaviour of the Magdalena River and its tributaries, although the model is limited by the uncertainty in climatological maps, cross sections, 2D DEM, dikes/levees/embankments as well as the measurements (zero level of the gauging stations) and rating curves. Comparisons between observed and calculated hydrographs showed a good model ability in representing the discharges and water levels regime of the middle and lower Magdalena River and its tributaries, emphasizing its value as a tool for understanding and predicting the system behaviour. The proposed modeling of the hydrological and hydraulic processes, provides a valuable tool for understanding ecosystem functioning and assessing its resilience to anthropogenic pressure, climate change, and climate variability. This kind of coupled modelling could be used in different scenarios in the Magdalena River and can be replicated in other rivers and considered in conjunction with other topics of interest, such as water quality, sediment transport, and aquatic habitat modeling.

***Keywords**:* Hydrological Modeling; Wflow; Hydraulic Modeling; SOBEK; coupled hydrological and hydraulic modelling; Magdalena River.