

## Hydrogeological Characterization of the Middle Magdalena Valley – Colombia

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We provide a detailed hydrogeological characterization of the complex aquifer system of the Middle Magdalena Valley, Colombia. The latter is comprised by 3 sub-basins within which 7 blocks have been identified for active exploration and potential production of oil and gas. As such, there is a critical need to establish modern water resources management practices in the area to accommodate the variety of social, environmental and industrial needs. We do so by starting from a detailed hydrogeological characterization of the system and focus on: (a) a detailed hydrogeological reconnaissance of the area leading to the definition of the main hydrogeological units; (b) the collection, organization and analysis of daily climatic data from 39 stations available in the region; and (c) the assessment of the groundwater flow circulation through the formulation of a conceptual and a mathematical model of the subsurface system. Groundwater flow is simulated in the SAM 1.1 aquifer located in the Middle Magdalena Valley with the objective of showing and evaluating alternative conceptual hydrogeological modeling alternatives. We focus here on modeling results at system equilibrium (i.e. under steady-state conditions) and assess the value of available information in the context of the candidate modeling strategies we consider. Results of our modeling effort are conducive to the characterization of the distributed hydrogeological budget and the assessment of critical areas as a function of the conceptualization of the system functioning and data availability.