Holocene Avulsions of the Euphrates River in the Najaf Area of Western Mesopotamia: Impacts on Human Settlement Patterns

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We present a study that reconstructs the ancient courses of the Euphrates in part of the Mesopotamian floodplain west and southwest of the ancient site of Babylon. The focus is on tracing paleochannel courses, determining when these paleochannels were active, and understanding the patterns of avulsion. The research was carried out using a combination of geological, geomorphological, remote sensing, historical, and archaeological approaches. Fieldwork included "ground truthing" of the remote sensing work, manually drilling boreholes (up to 7 m in depth), sedimentary and geomorphological documentation and sample collection for radiocarbon dating. As a result, five main courses of the Euphrates in five different periods have been mapped in this area, including four previously unidentified and/or unlocated migrations that linked the different periods. The main courses are the Purattum Course (before 3100– 1000 BC), the Arahtum Course (1000–125 BC), the Sura Course (125 BC to AD 1258), the Hilla Course (13th to 19th century AD), and the Hindiya Course (19th to 20th century AD). There has been an overall migration of the main channel from east to west across the study area over time. The location of avulsion nodes changed along the length of the river, mainly downstream over time, but with a cluster of avulsion events near Babylon and a notable manmade interference in the 20th century at the Hindiya Barrage