



## **Temporal monitoring of vast sand extraction at Sakarya River floodplain (NW Turkey): Implications for environmental impact and natural hazards**

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In the last decade, the amount of sand extraction in Turkey increased dramatically from 10 to 120 million tones/year (TURKSTAT). This increase is directly related to the economy-politic program of the national government which prioritized construction/renewal of building stock and expansion of transport infrastructure. Accordingly, previous designated sand quarries become inadequate to compensate the urge for sand, causing the expansion of sand mines both in number and areal coverage.

Sakarya River drains most of NW Turkey (~60.000 km<sup>2</sup>) with average annual discharge as 164.5 m<sup>3</sup>/s, carrying ~23400 tons of suspended sediment load (EIE) to the Black Sea. The morphology of lower reaches of Sakarya River is controlled by the North Anatolian Fault, forming wide strike-slip basins along its strike within the Pontide mountain chain.

The focus of this study is the recent floodplain of Sakarya River at Adapazarı Basin, between Boğazköy and Adapazarı Metropolitan area (~15 km in length). The study area is highly populated and an important asset for agriculture. We used satellite imagery (Keyhole, Landsat MSS-TM-ETM and ASTER) and aerial photographs to monitor the environmental change and areal expansion of sand mines (1970-recent). We also employed UAV based photogrammetry to produce cm scale DEM for precisely calculating the total volume of the extracted sediment.

The preliminary results indicate that currently 80% of the floodplain is exploited or severely altered with sand mining. The mining operations cause severe loss of agricultural land and destroy the natural habitat (i.e. the breeding sites of the endangered species of anadromous sturgeon, *Acipenser gueldenstaedtii*). The sand mines also drastically increase flood, slope failure risk and noise pollution with operating at very close proximity to settlements.