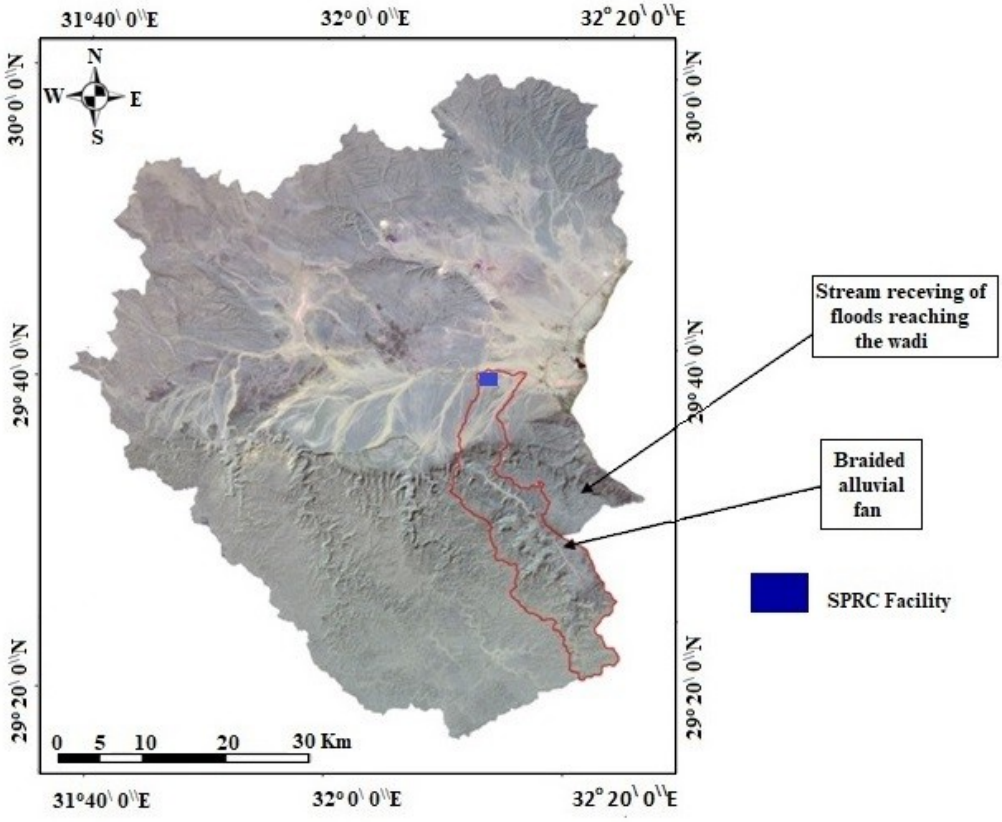

Fig. 1 Landsat satellite image for the north-west Gulf of Suez catchment, showing Wadi El Abiad sub-catchment delineated by red line.

Fig. 2 Location of some constructed dykes in Wadi Ghuwaba area for flash flood protection.

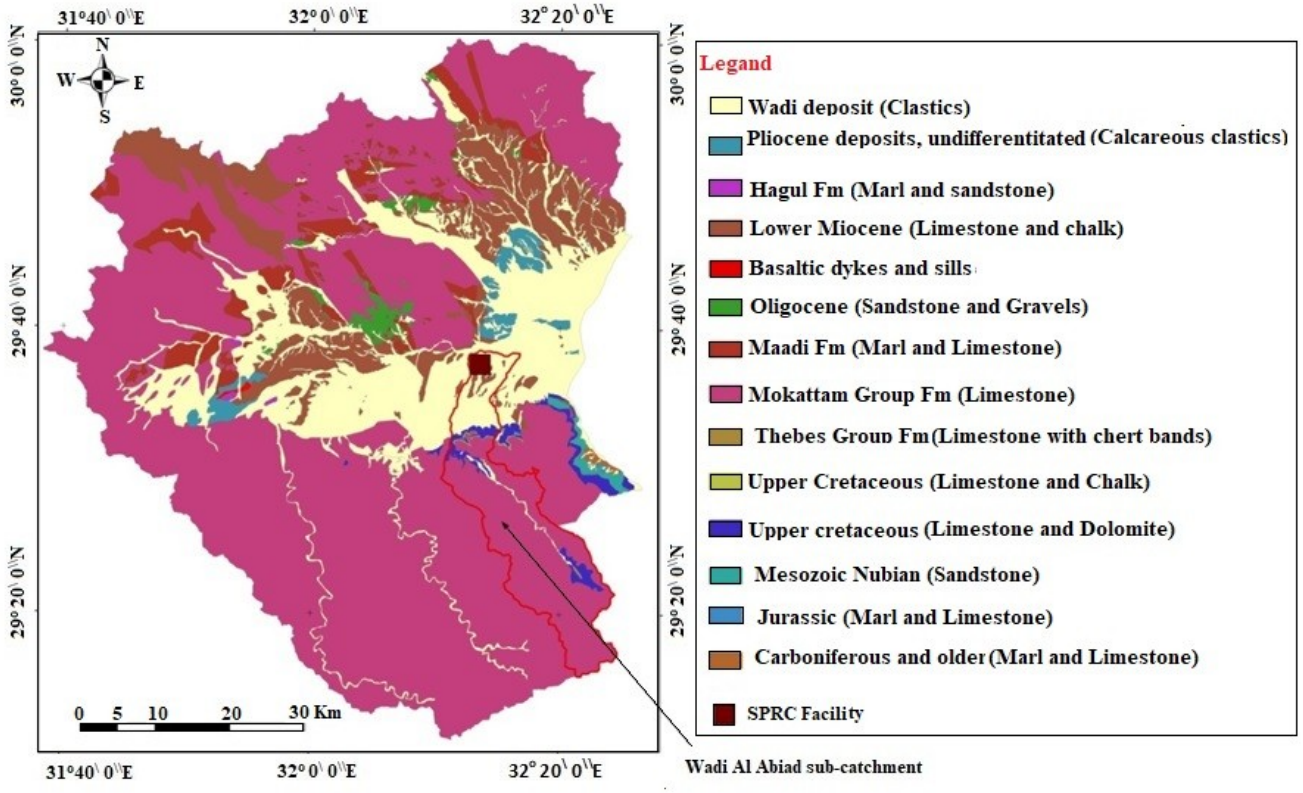

Fig. 3 Geological map of the study area, modified after CONOCO 1987.

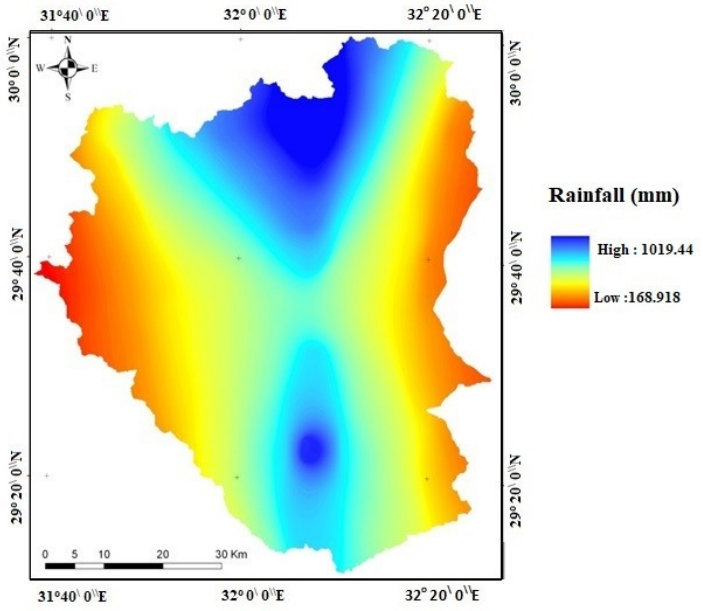

Fig. 4 Average annual rainfall for the northwest Gulf of Suez catchment from 1st of Jan 2006 to 31 Dec 2020 was obtained from TRMM data (NASA, 2004).

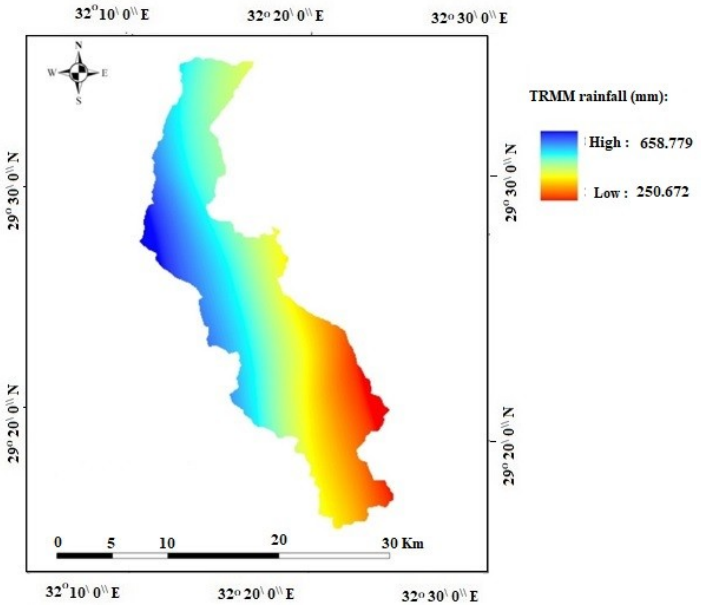

Fig. 5 Average precipitation over Wadi El Abiad sub-catchment.

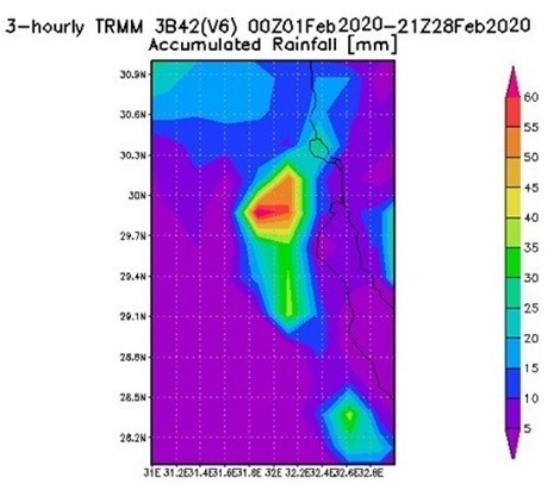

Fig. 6 Maximum monthly rainfall record (Feb 2020) over the northwest Gulf of Suez catchment.

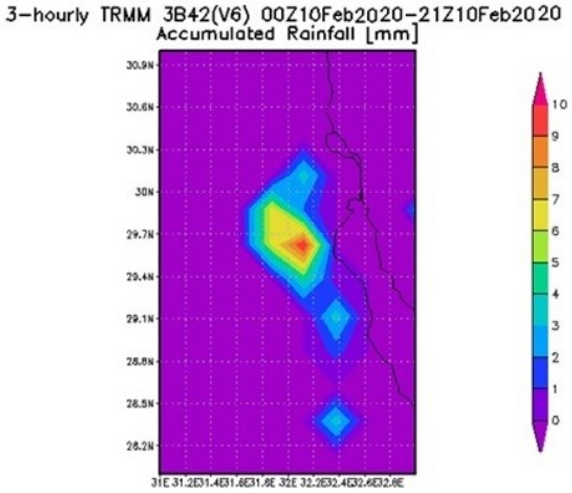

Fig. 7 Maximum daily rainfall (10th of Feb 2020) over the northwest Gulf of Suez catchment.

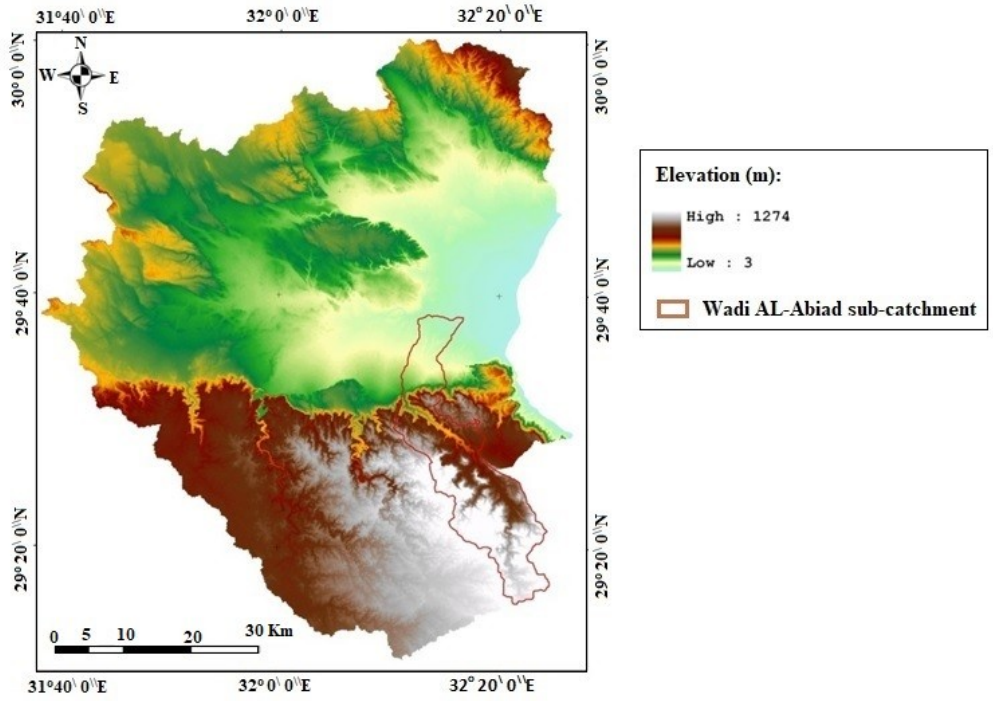

Fig. 8 DEM for the northwest Gulf of Suez catchment, Wadi El Abiad sub-catchment is outlined by red line.

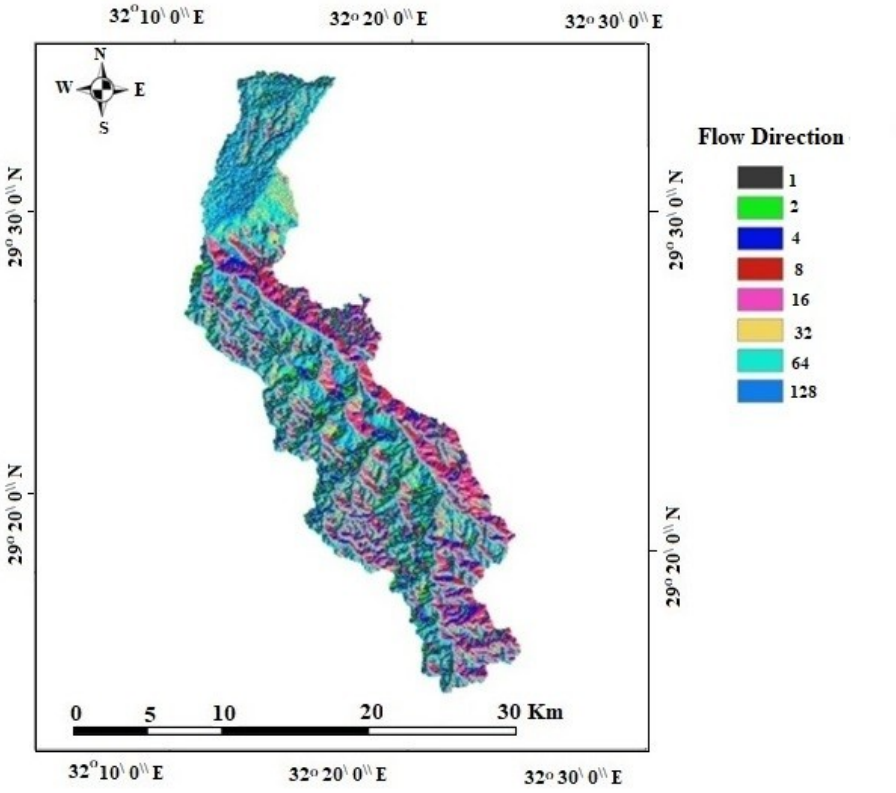

Fig. 9 Flow direction map for Wadi El Abiad sub-catchment.

32	64	128
16		1
8	4	2

Fig. 10 Schematic diagram shows the D-8 algorithm of flow direction.

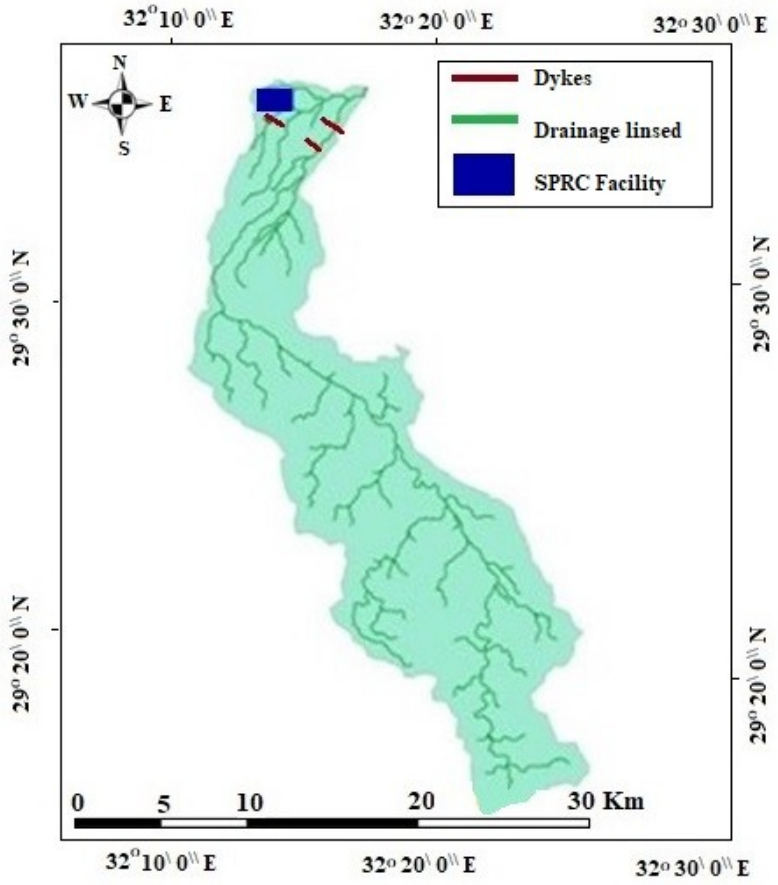

Fig. 11 The delineated drainage networks for Wadi El Abiad.

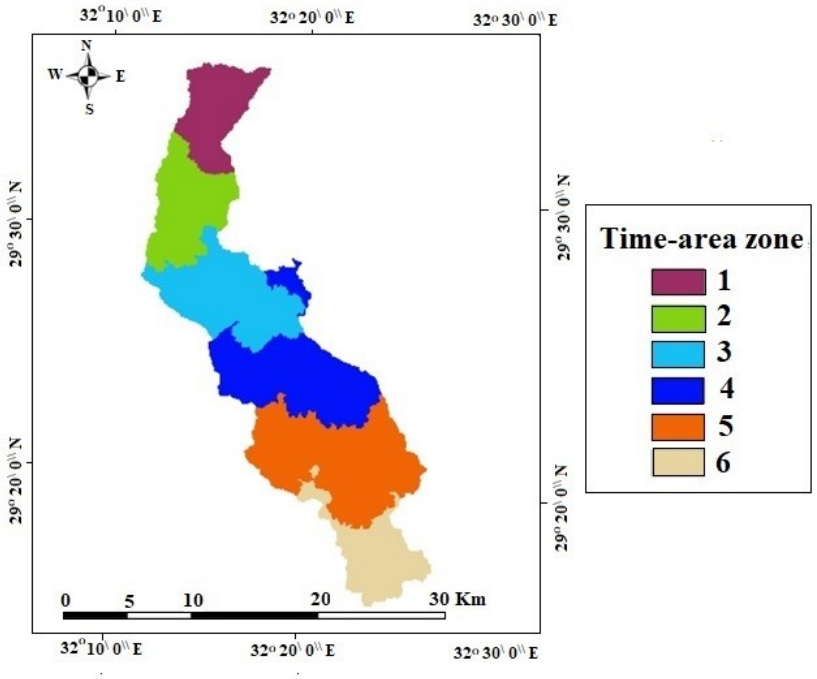

Fig. 12 The estimated hourly time -area zones of Wadi El Abiad.

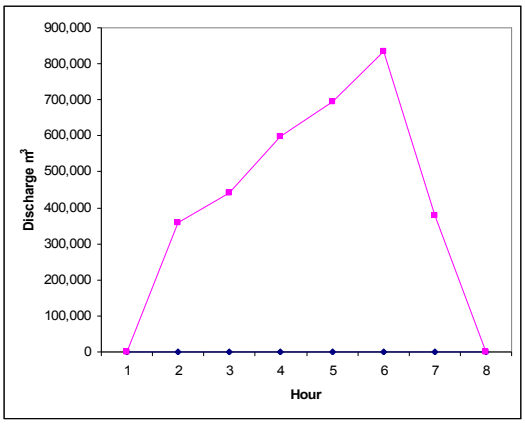

Fig. 13 A hypothetical runoff hydrograph when the estimated time area zones receive a uniform effective precipitation of 10 mm per hour at once.

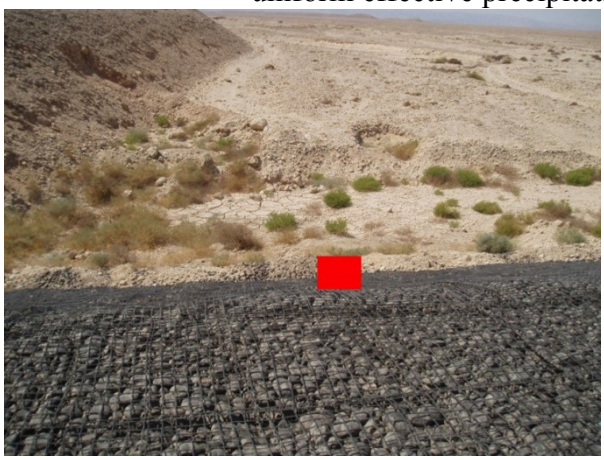

Fig. 14 Field view of the eastern part of Wadi Naout, note the small area being filled with silt and clay behind the dyke. The red square refers to the site of the picture of Figure. 15.

Fig. 15 Average thicknesses of the two delivered suspended load behind the dyke at Wadi Naout during the period from 2006 to 2020. The older and thinner load is under the tape and the last one is thicker, displaying more conspicuous mud cracks.

Fig. 16 Wadi Umm Rassis dyke trapping conspicuous mud layers (surface to the right of the picture). The red square refers to the site of the picture in Fig. 17.

Fig. 17 Measurement of thickness of flash flood suspended load behind Umm Rassis dyke.

Fig. 18 Trash marks as evidence of three floods on a dyke erected in a main stream. This stream is subjected to severe flash floods events.