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Analysis of recurring sinking events of armored tracked vehicles along dirt roads in the agricultural periphery of the Gaza Strip

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The second (Al-Aqsa) intifada (Arab violent uprising) which erupted across Israel in 2000 eventually led the Israel Defense Forces to deploy armored tracked vehicles (ATVs) (tanks, armored personal carriers, and D-9 bulldozers) within Israel's agricultural periphery of the Gaza Strip, following daily attempts by Arab terrorists and guerillas to penetrate Israel. Combat movement of the ATVs was mainly concentrated to dirt roads, between agricultural fields, wherever possible. As a result of semi-arid Mediterranean (climate) winter rains, annually averaging 250 – 350 mm, it was reported that ATVs often sank in muddy terrain. This study investigated what caused ATVs to sink. The main data collected concerning the types of vehicles that sank related to: land-use characteristics, soil type, and daily rainfall. Interviews with commanders were also conducted for additional details. Between the fall and spring, surveys and weekly / bi-weekly field soil cone penetrometer tests were conducted at ten sites with different pedological and land-use characteristics.

The loess soils, especially in agricultural fields, were generally found to be conducive to ATV traffic, even shortly after rainstorms of 10-30 mm. However, following several rainfall events exceeding 10 mm, ATVs and tanks regularly sank into local topographic depressions in the undulating landscape. These consisted of short segments of dirt roads where runoff and suspended sediment collected. After the early rains in late fall, tank ruts fossilize and become conduits of concentrated runoff and fine particles eroded by ATV activity during the summer months. Tank track ruts that formed in mud, compacted the soil, drastically altered drainage patterns by directing significant surface flow, and suspended sediment into these depressions, creating "tank-traps" whose trafficability ranged from "untrafficable" to "trafficable with constraints."

This study shows that intense, routine, defensive military activity operated without any terrain and/or environmental analysis and monitoring can produce self-inflicted, environmental and combat problems. The cope of this work also demonstrates that it is vital to persistently promote and market the application of military geoscience products in order to save lives, limit expenses, and preserve the environment to a relative degree, often for the short and long-term benefit of both sides of a conflict.