

Fig. S1: Surface elevation changes between 2011 and 2023 in the Ze'elim fan, draped upon LiDAR DSM, showing the formation of internal depressions along most of the Ze'elim gullies. Gully numbers in white, from north to south, after Avni et al., (2016).

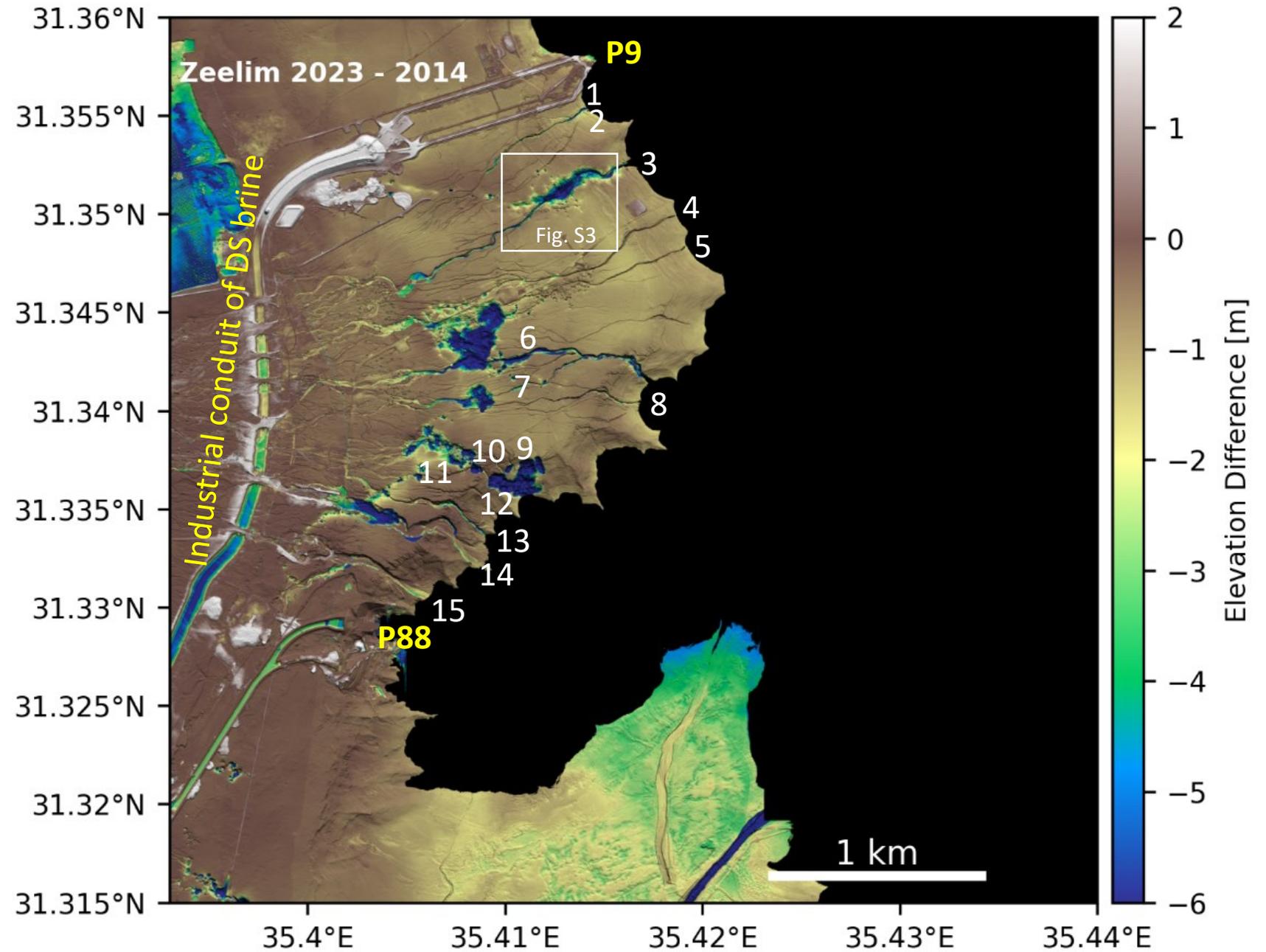


Fig. S2: GIF animation showing the development of sinkholes, subsidence and gullies at the Ze'elim fan between 2005 and 2023. Provided as a separate file.

Fig. S3: GIF animation of LiDAR differential maps of the lower section of gully 3 between 2011 and 2023. For location, see Fig. S1. Note the depression that developed at the central part of the image since 2022. Provided as a separate file.

Fig. S4: Elevation maps draped upon hill-shaded DSMs for the years 2011-2019 for the southern part of the Ze'elim Fan. Note the seaward migration of sinkholes in Gully 10 and the widening of the sinkholes in gullies 7 and 14. White circles mark the first shoreline discharge sinkhole (2015).

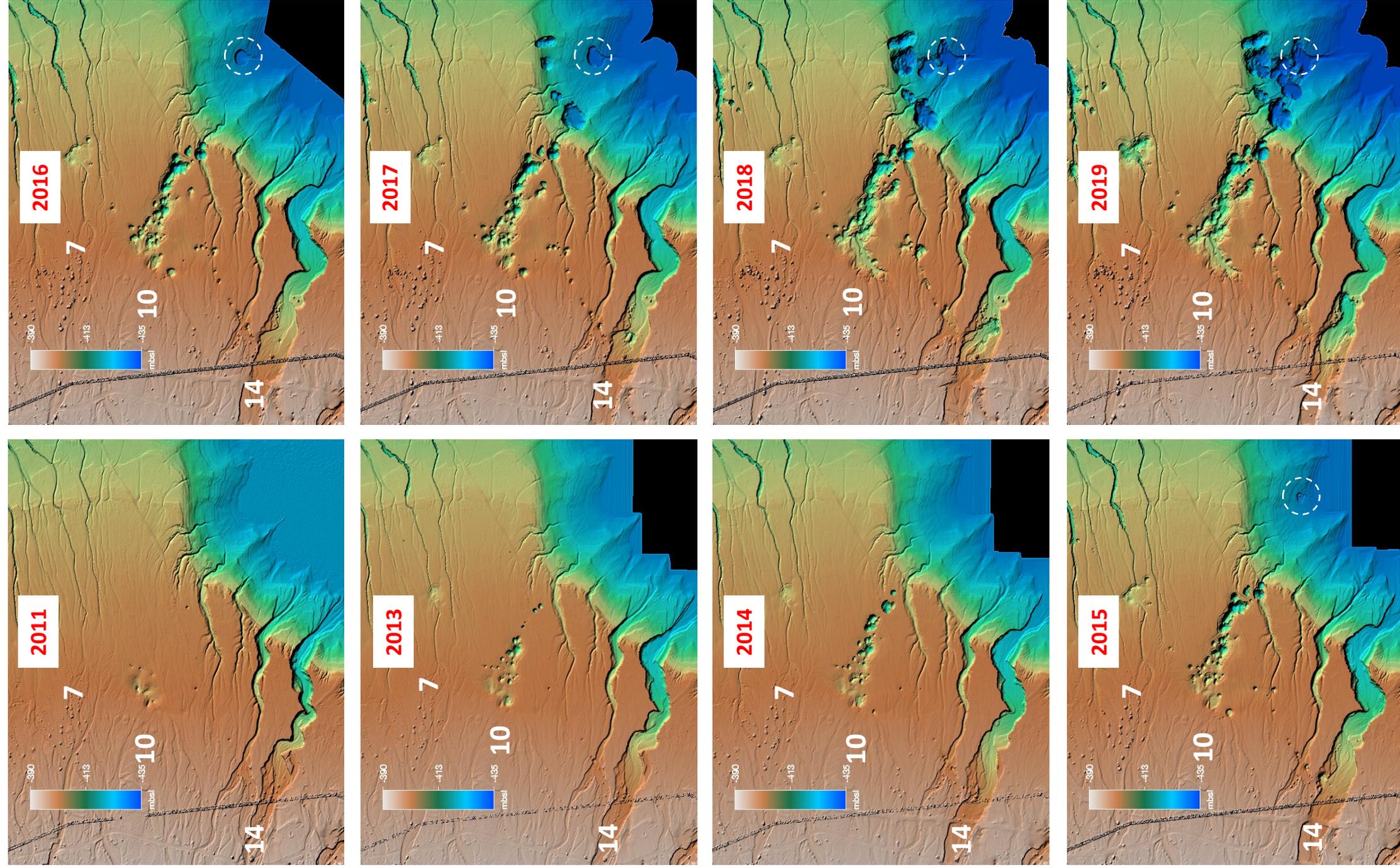


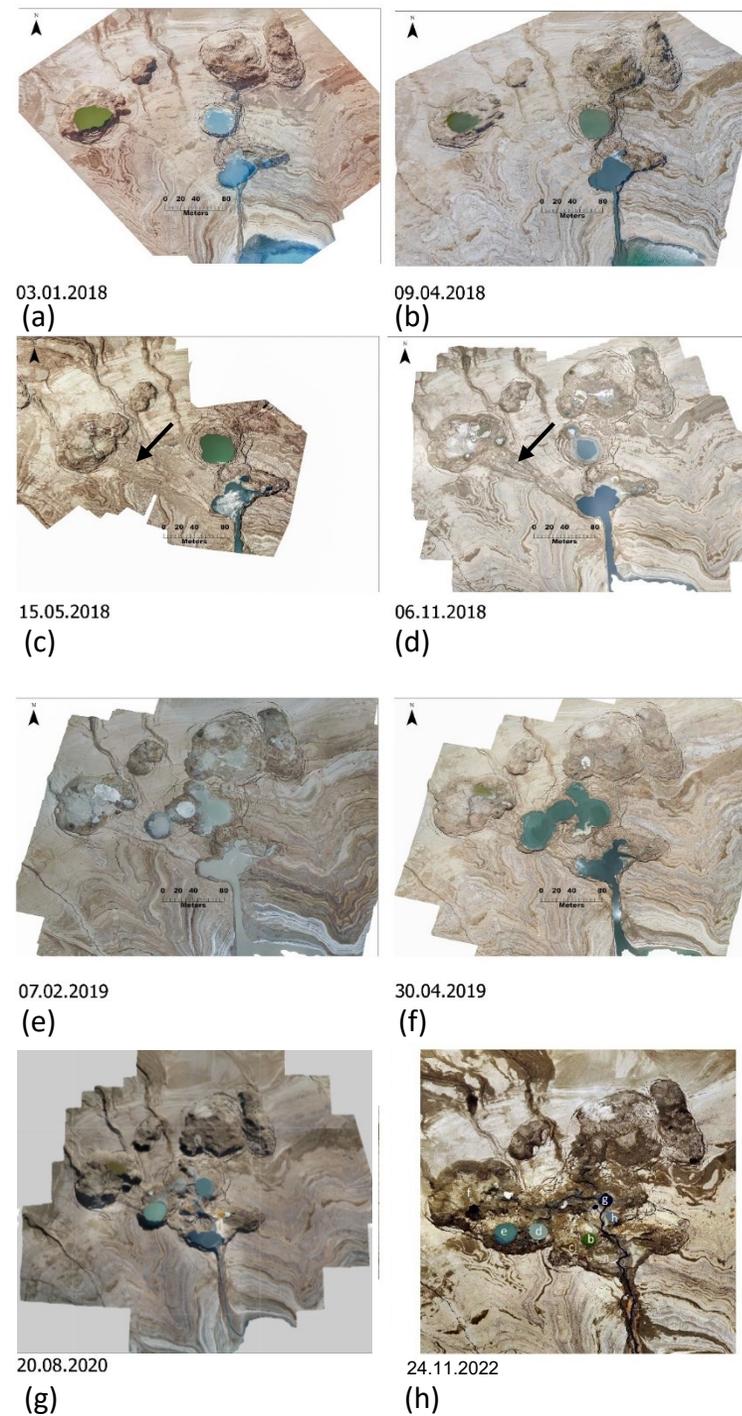
Fig. S5: The first shoreline discharge sinkhole in Ze'elim fan. For location, see Fig. S4. (a) Oblique aerial photo, 30.9.2014. (b) TLC picture, 20.2.2015.





Fig. S6: Discharge sinkholes at the lower end of gully 10 and their outflow channel to the DS. For location, see Fig. 5. (a) Oblique drone photograph, February 7, 2019. White star marks the location of the first discharge sinkhole in 2015 (Figs. S4, S5). (b) 2023 aerial photo showing the outflow channel and groundwater discharge at the shoreline south of the channel.

Fig. S7: Time-series of drone-based rectified photographs showing the development of the discharge sinkholes at the lower end of gully 10 between January 2018 and November 2022. Note the evidence for significant overflow from the western sinkhole (black arrows in panels (c) and (d)), which occurred immediately after the exceptional flood event of 26-28 April 2018.



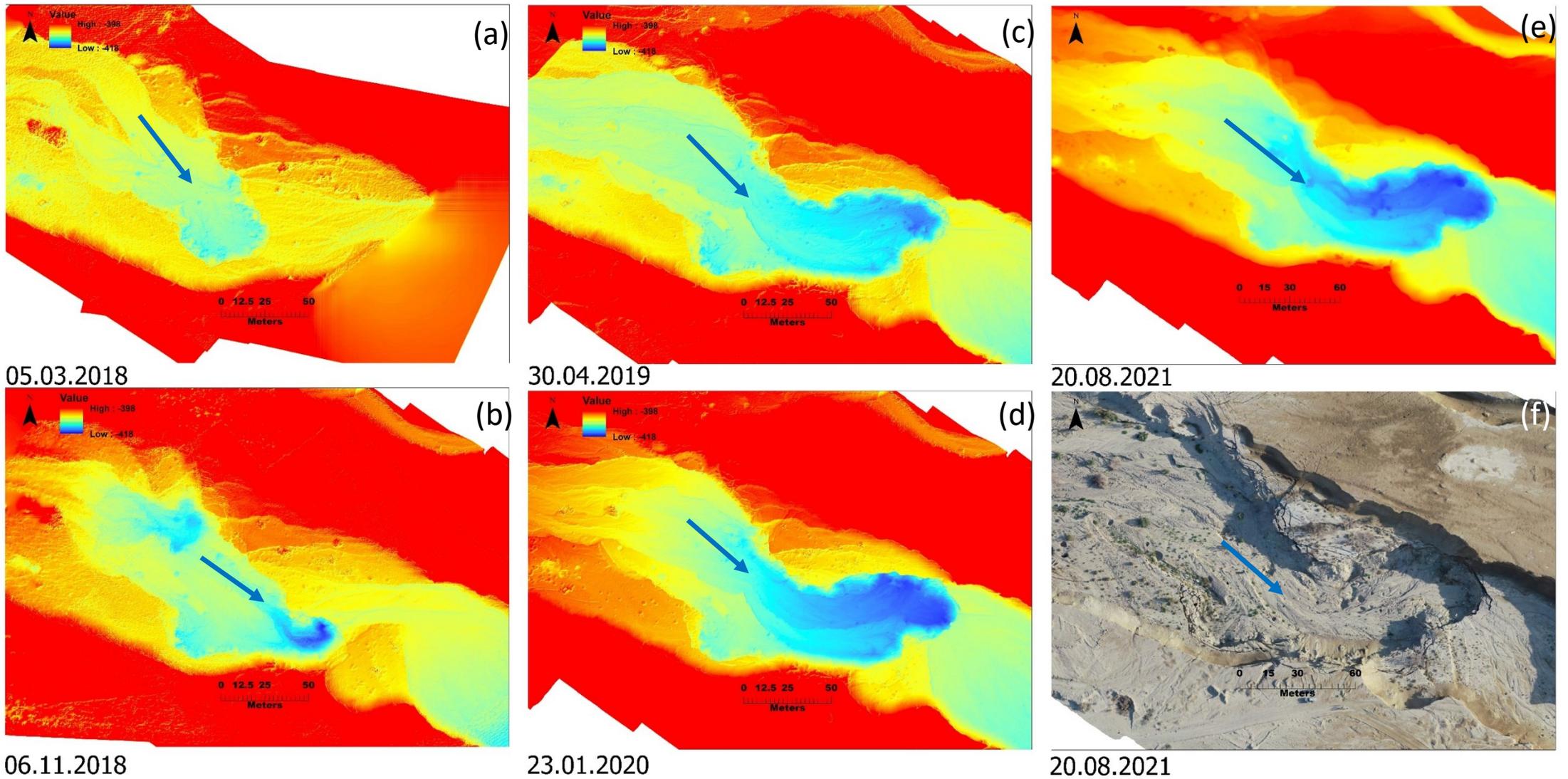


Fig. S8: (a-e) Drone-based topographic models showing the development of the recharge sinkhole at gully 14 between March 2018 and August 2021. (f) A rectified photograph of the discharge sinkhole site in August 2021. Blue arrows mark the floodwater direction. Note the eastward migration and the deepening of the depression with time.

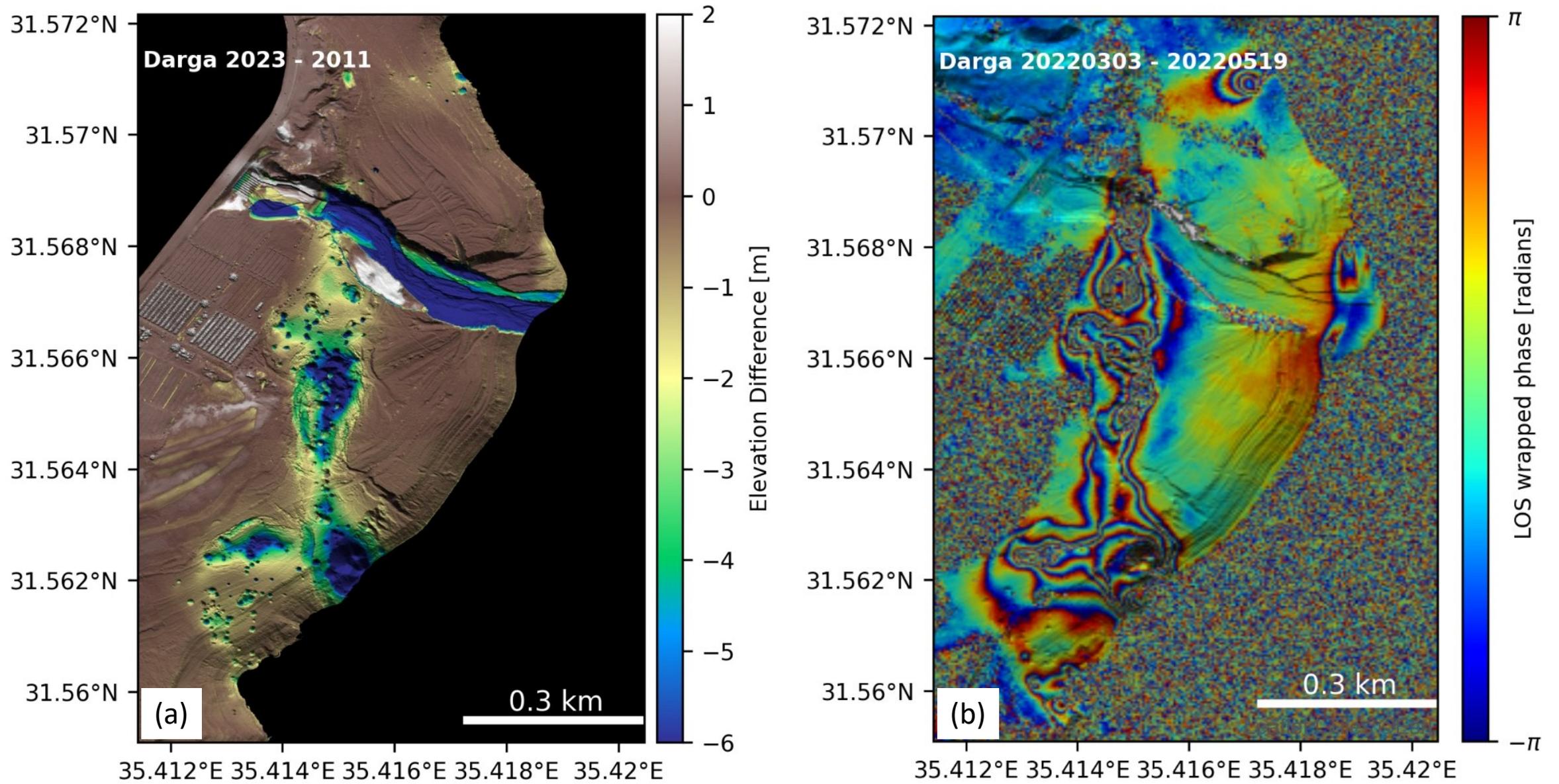


Fig. S9: Sinkholes and subsidence across high-gradient riverbeds. For location, see Fig. 15. (a, c, and e) LiDAR change maps between 2011 and 2023 of the Darga, Hazazon and Arugot riverbeds, respectively, showing that river incision and flow continue despite the subsidence. (b, d, and f) Interferograms showing the subsidence across the three streambeds.

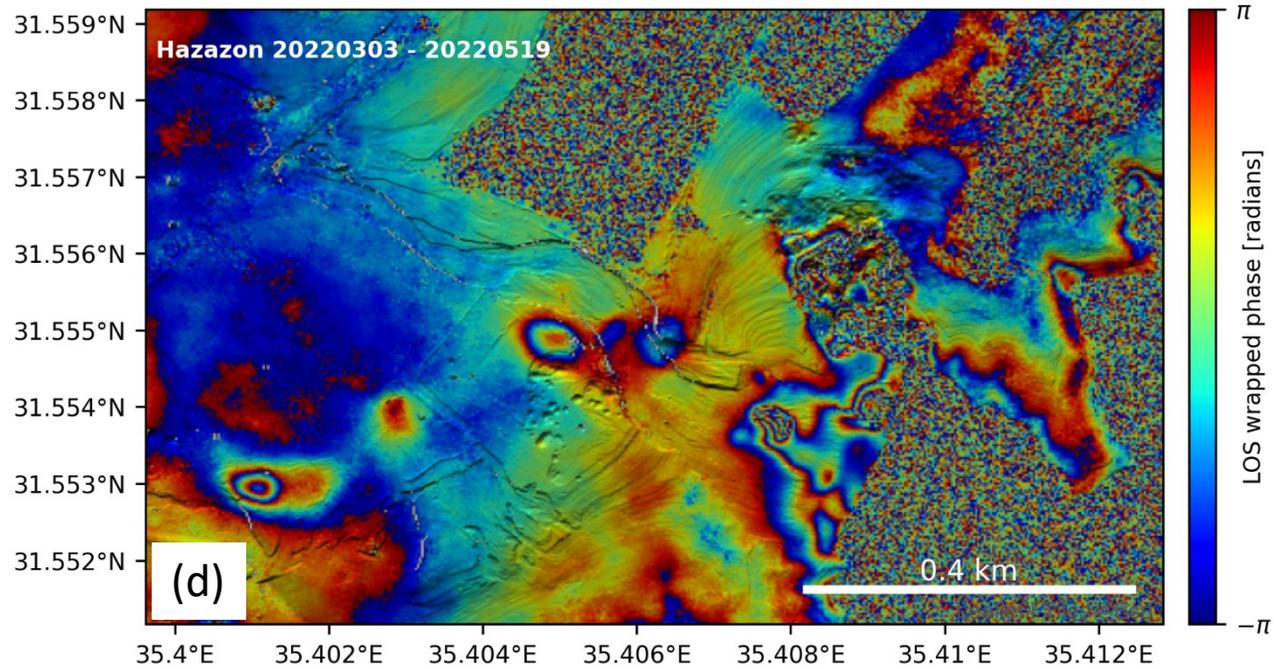
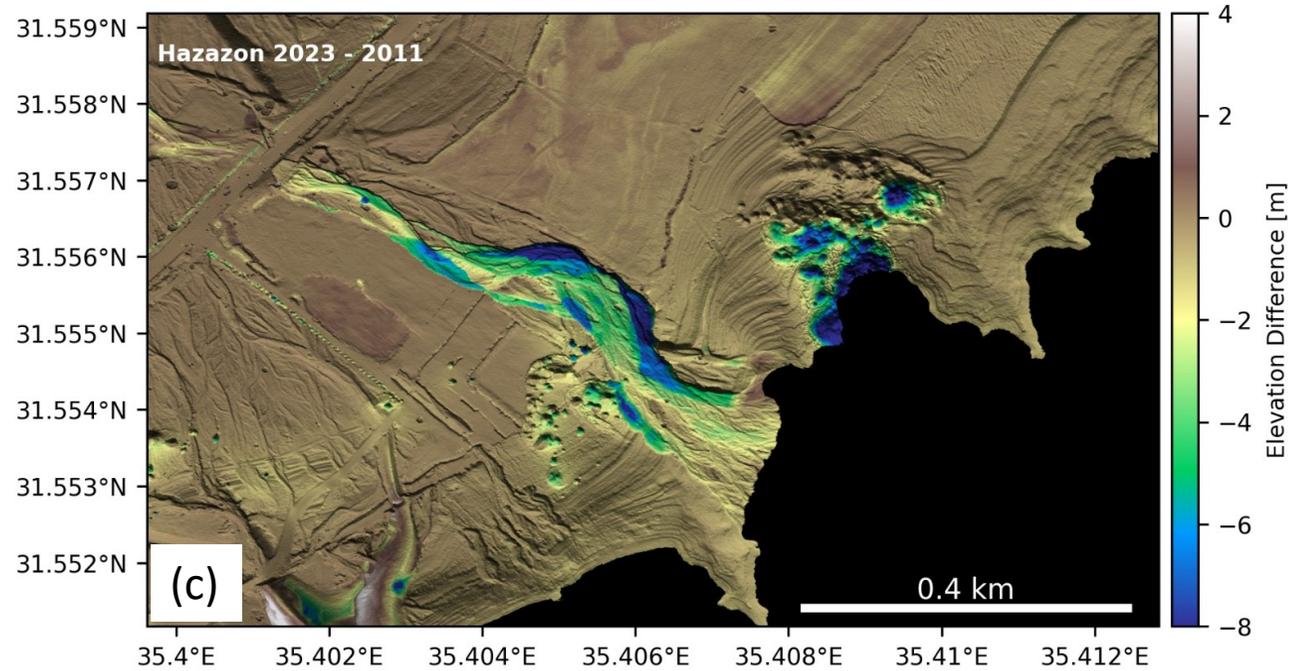


Fig. S9 c,d

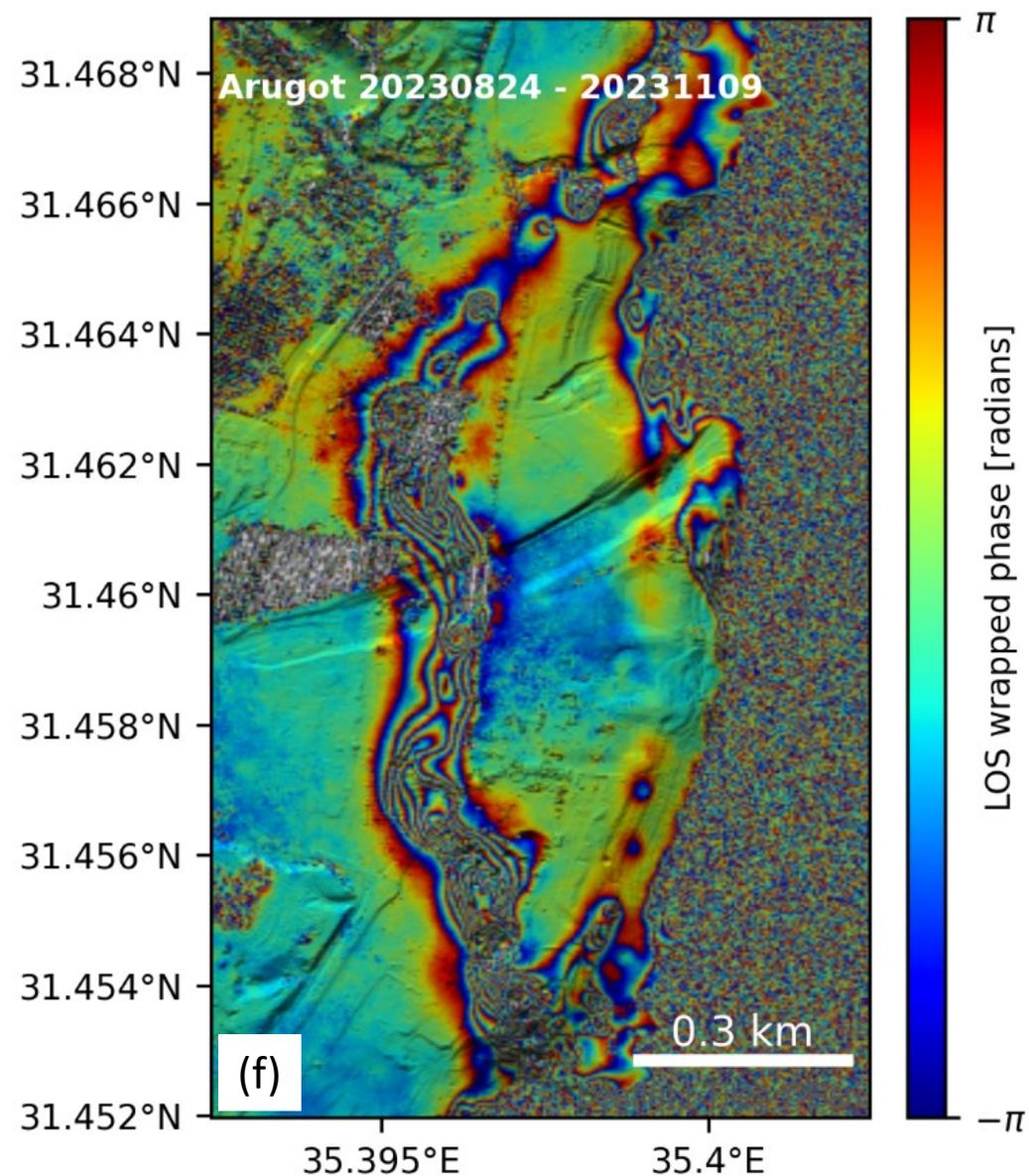
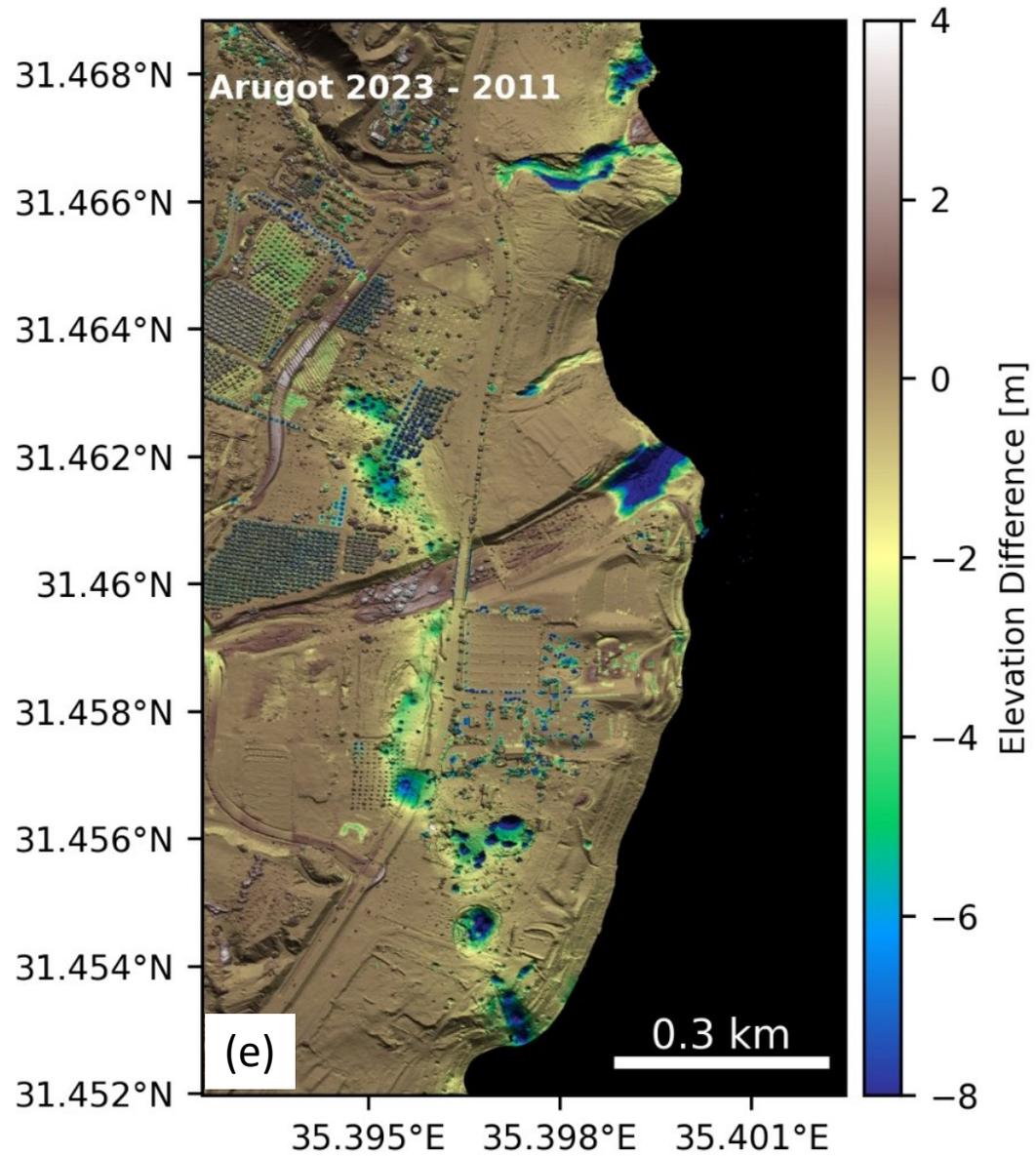


Fig. S9 e,f

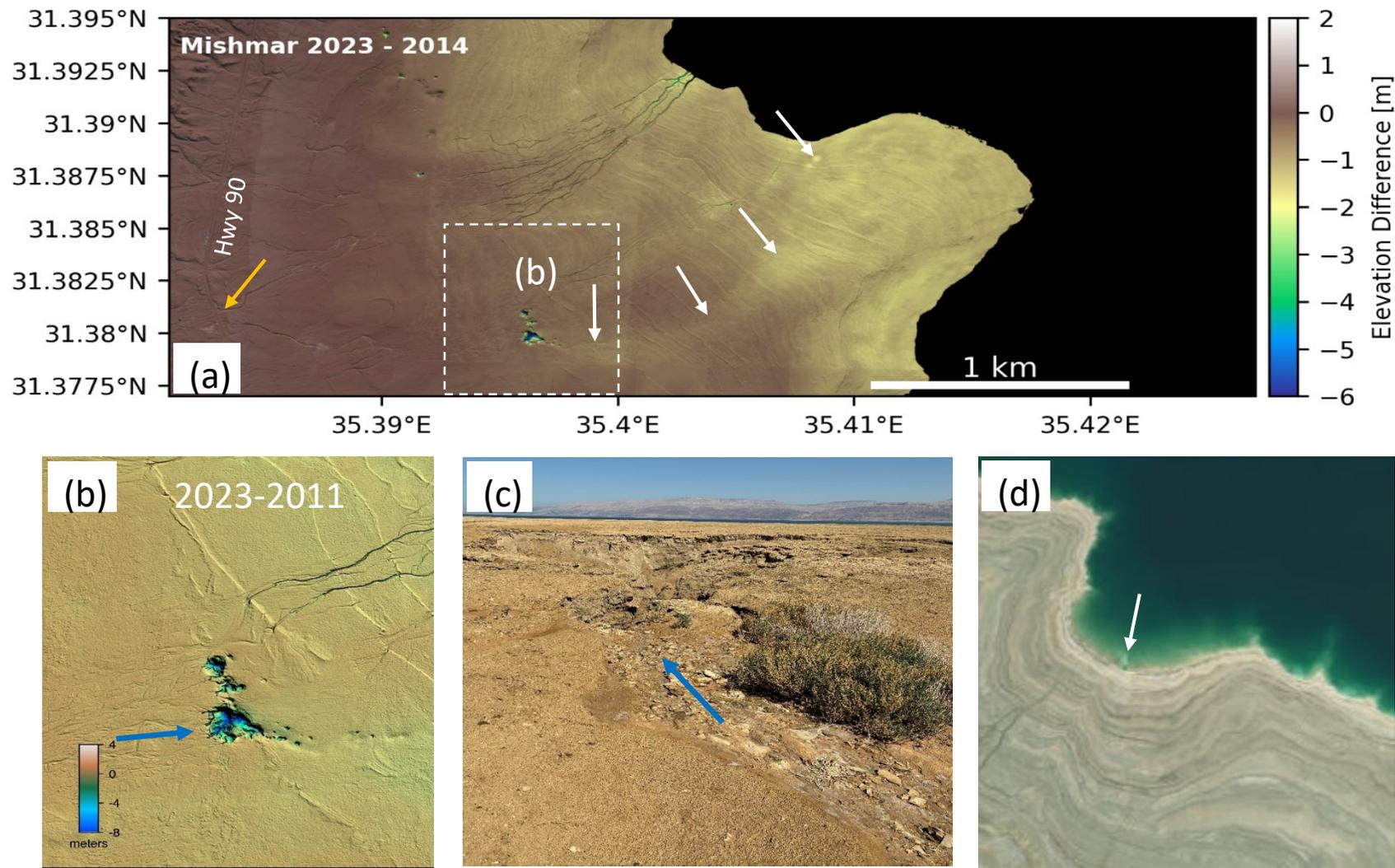


Fig. S10: Sinkholes and subsidence along the Mishmar low-gradient riverbed. For location, see Fig. 15. (a) LiDAR change map between 2014 and 2023 showing mild curvilinear subsidence east of the sinkholes (white arrows). Orange arrow marks the crossing point of Highway 90. (b) Zoom on the sinkhole site (see location in panel a), showing the southern braided streambeds draining into sinkholes (blue arrow) and a northern streambed bypassing the sinkholes. The NW-SE lineaments are abandoned shorelines left by the declining waters of the DS (c) View to the east on one of the drained streambeds. Blue arrow marks the flow direction. (d) Aerial photo of the fan shoreline in 2023 showing evidence for underwater springs (marked by white arrow).

Fig. S11: Sinkholes and subsidence across the Qidron intermediate-gradient gravel riverbed. For location, see Fig. 15. (a) LiDAR change maps between 2017 and 2023, showing that river incision and flow continue despite the subsidence. (b) Interferogram showing the subsidence across the streambed.

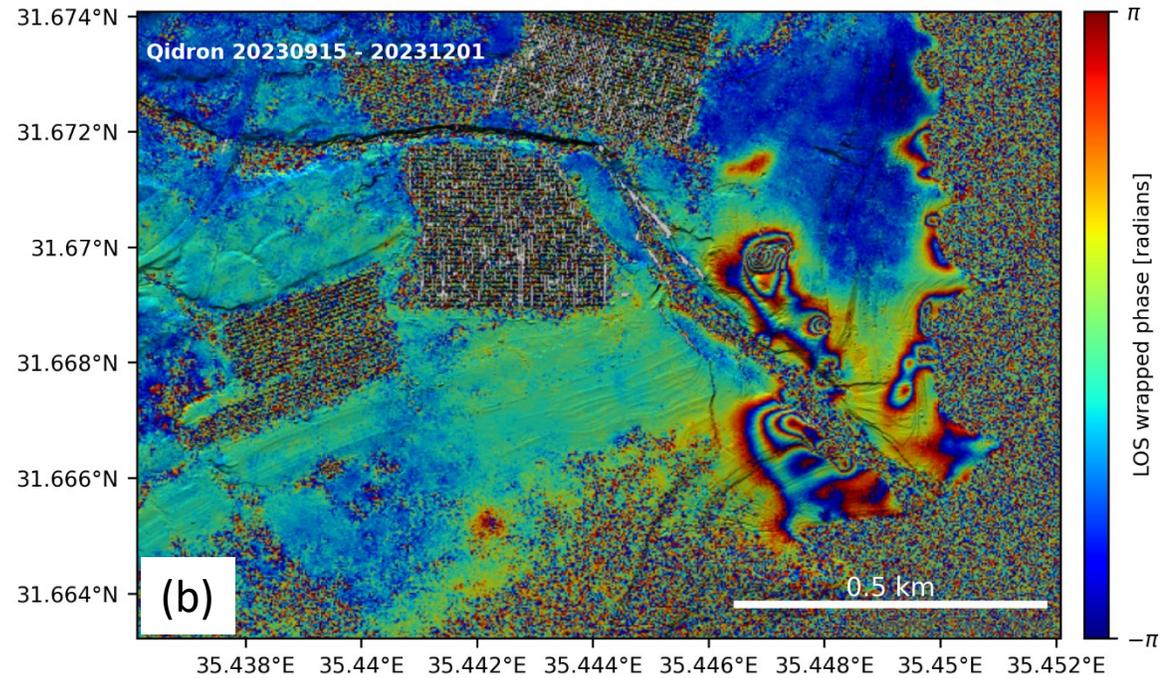
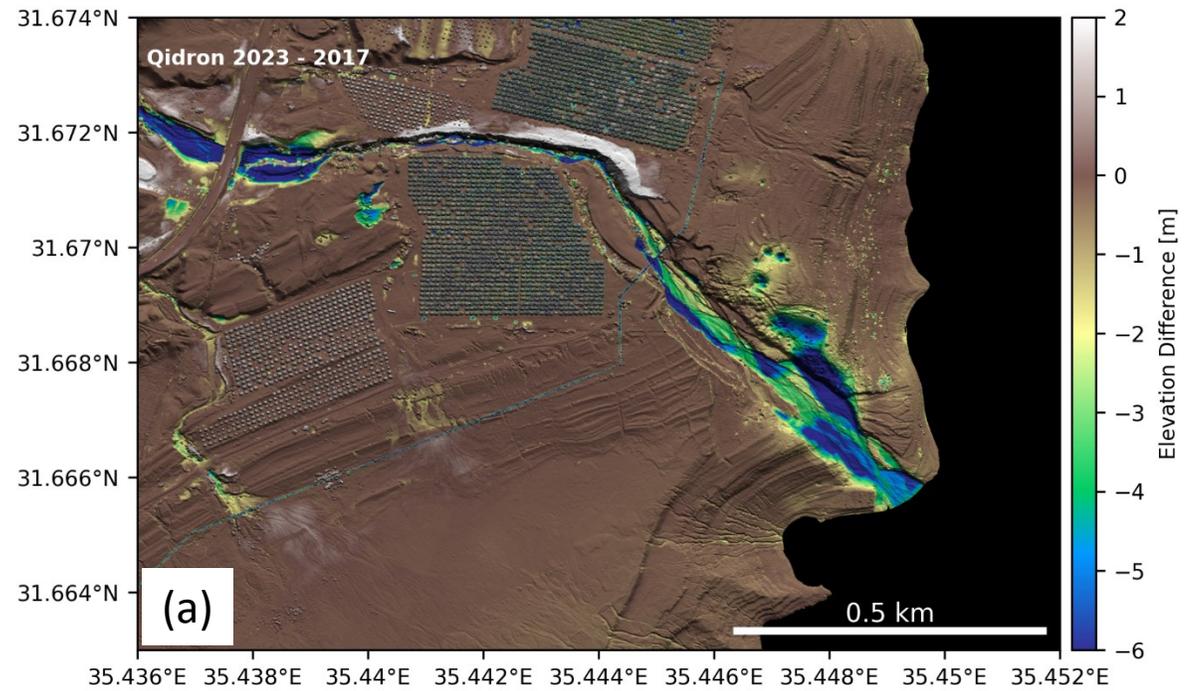


Fig. S12: Sinkholes and subsidence along the Tmarim intermediate-gradient mud-dominated streambeds. For location, see Fig. 15. (a) LiDAR change maps between 2017 and 2023 showing the NE-striking subsidence strip that connects sinkhole 1 with sinkhole 2. (b) Interferogram showing the subsidence lineaments between sinkholes 1 and 2 and between the northern sinkholes and the shoreline (white arrows). (c) Shoreline sinkhole 3 (location in panel b). (d) Underwater sinkhole (March 2024) southeast of sinkhole 3.

