

Article

An overview of the geomorphological characteristics of the Pergamon Micro-Region (Bakırçay and Madra River catchments, Aegean Region, West Turkey)

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Supplementary Materials

Table S1. The definition and classification rules of landform units for the geomorphological map (modified from [1])

Landform unit* ¹	Definition	Classification rules based on different sources* ²
UPLAND		
Ridge	The chain of hills; generally higher than the surrounding slopes from certain distance	Merged by the geomorphons classes <i>summit</i> and <i>ridge</i> (Dg).
Slope with debris cover	The slope areas covered by vegetation and debris	Merged by the geomorphons classes <i>shoulder</i> , <i>spur</i> and <i>slope</i> (Dg); slope with bare rock (see below) was excluded.
Slope with bare rock	Bare solid bedrock exposed on the mountainous surface; vegetation, soil and sediment covers are sparse or lacking	Bright color in the satellite imagery; no obvious vegetation cover (GE).
Valley without fluvial deposits	Intramountainous valleys without infill fluvial deposits	First, geomorphons classes <i>hollow</i> , <i>footslope</i> , <i>valley</i> and <i>depression</i> in the mountains were merged into valley; then, valley without fluvial deposits was extracted by subtracting the fluvial infill valley (Dg).
Valley with fluvial deposits	Intramountainous valleys filled with fluvial deposits	F; valley cross profiles show a saucer shape (De); often used as an arable land (GE).
LOWLAND		
Colluvial zone	Connecting area between the elevated mountain and the plain; generally covered by loose, unconsolidated colluvial sediments and alluvial fans [2]	Elevation decreases from the elevated area to plain (Ds); L2 and L3.
Alluvial plain	Largely flat terrain adjacent to main river	Generally flat (Ds); often used as irrigated arable land (GE).
Littoral plain	The flat–gently inclined area adjacent to the Aegean Sea and covered by intercalated terrestrial, littoral and marine deposits	Generally flat (De); often used as an irrigated land or other agricultural areas (GE); L3.
Delta	The area formed at the river mouth to the sea and filled within fluvio–littoral sediments	Delta-shaped (GE); L3 and L4.

Alluvial fan	Fan-shaped body, deposited by avulsive channels which emerge from a mountainous catchment to an adjoining valley [3]	Fan shape, elevation decreases from fan apex to toe (De, Dh, Ds, GE); L2.
Perennial stream	Natural watercourse	L1.
Intermittent stream	Natural watercourse; always ceases to flow in dry periods	L1.
Paleochannel	Abandoned river channel	Curved structure on the plain and separated from the main river (Dh); usually holds water (GE).
Assumed paleochannel	Older abandoned river channel or oxbow	Curved structure (Dh) with 1–2 m elevation difference to the adjacent plain (De); water is not visible at least during dry seasons, and color in the satellite imageries shows different tone (darker) to the adjacent area (GE); F.
ANTHROPOGENIC		
Reservoir	Water body closed by dam within the intramountainous valley	CLC; dark (blue) and broadened water surface (GE); sometimes bright-colored sediments when low water stands (GE).
Mining area	Surface mine or quarry, including those currently in use and abandoned ones	CLC; bright-colored bare surface with artificial terrain (GE).
Agricultural terrace area	Area with artificial terraces	Continuous or discontinuous lines with intervals between 1 and 20 m (sometimes up to 50 m), always developed along contour lines (GE); F.
Irrigation/drainage canal	Artificial watercourse for irrigation or drainage of the cultivated land	Dark, straight line on the plain (GE); F.

*1 Other features, e.g., small water bodies, settlements and roads, were merged into their nearest classification.

*2 GE: Google Earth (last accessed 8 June 2020); D: TanDEM-X (e: elevation; h: hillshade; s: slope; g: geomorphons); CLC: Corine Land Cover 2018 [4]; F: field observation; L: literature (1: [5–8]; 2: [9–12]; 3: [13]; 4: [14]). The order shows the priority of different sources.

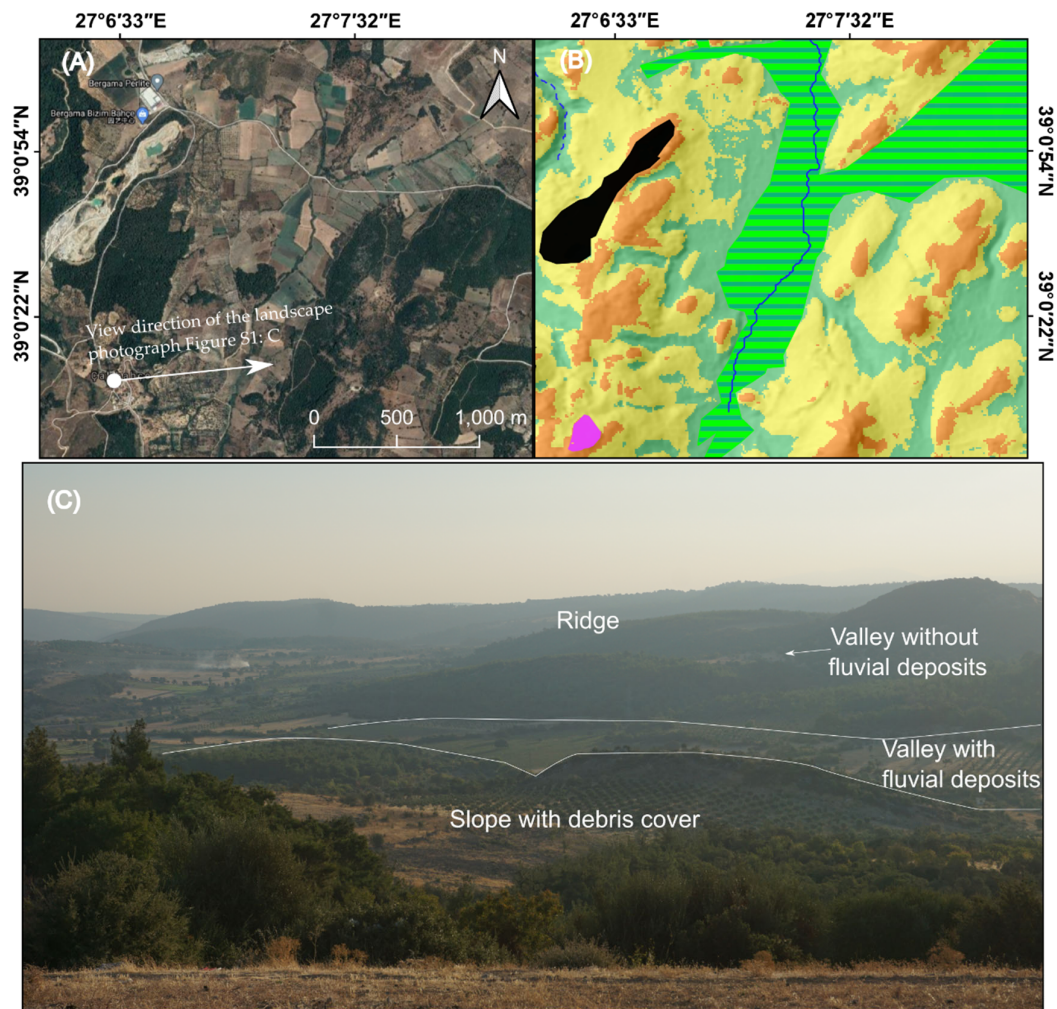


Figure S1. Çalıbahçe basin, indicating how we use the satellite images and geomorphons to generate the geomorphological map (ridge, valley without fluvial deposits, valley with fluvial deposits and slope with debris cover) and the validation in the field. (A) Data: Google Earth satellite images (WorldView-2, last accessed 8 June 2020). (B) Geomorphological map (legend refers to Figure 4, same below). (C) Landscape photograph.

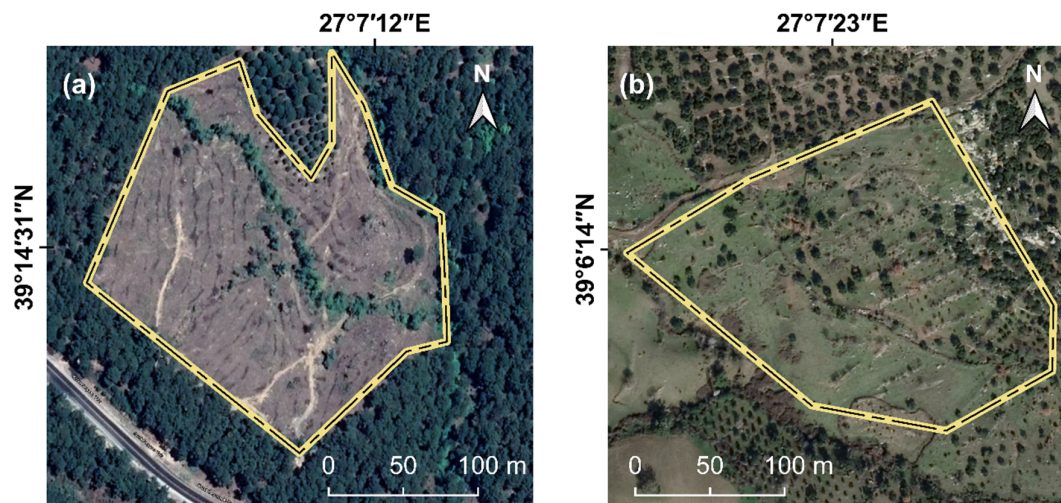


Figure S2. Terrace examples: continuous (a) and discontinuous (b). Data: Google Earth satellite images (WorldView-2, last accessed 8 June 2020).

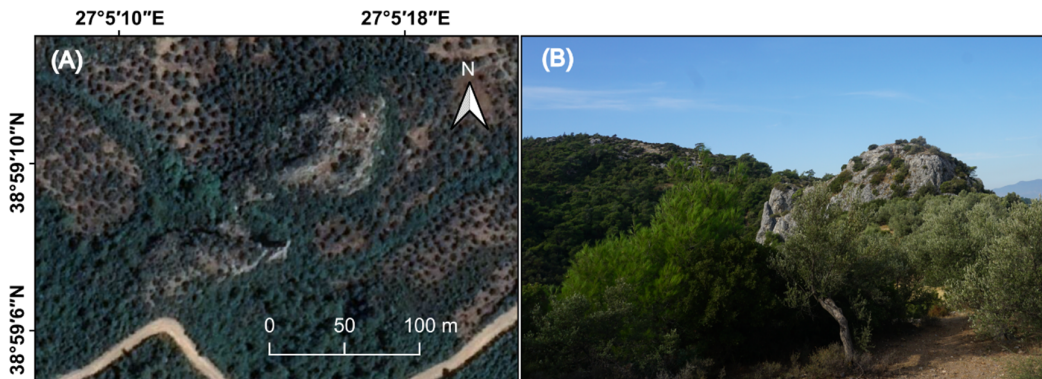


Figure S3. Slope with bare rock in Tekkedere valley. (A) Data: Google Earth satellite images (WorldView-2, last accessed 8 June 2020). (B) Landscape photograph.

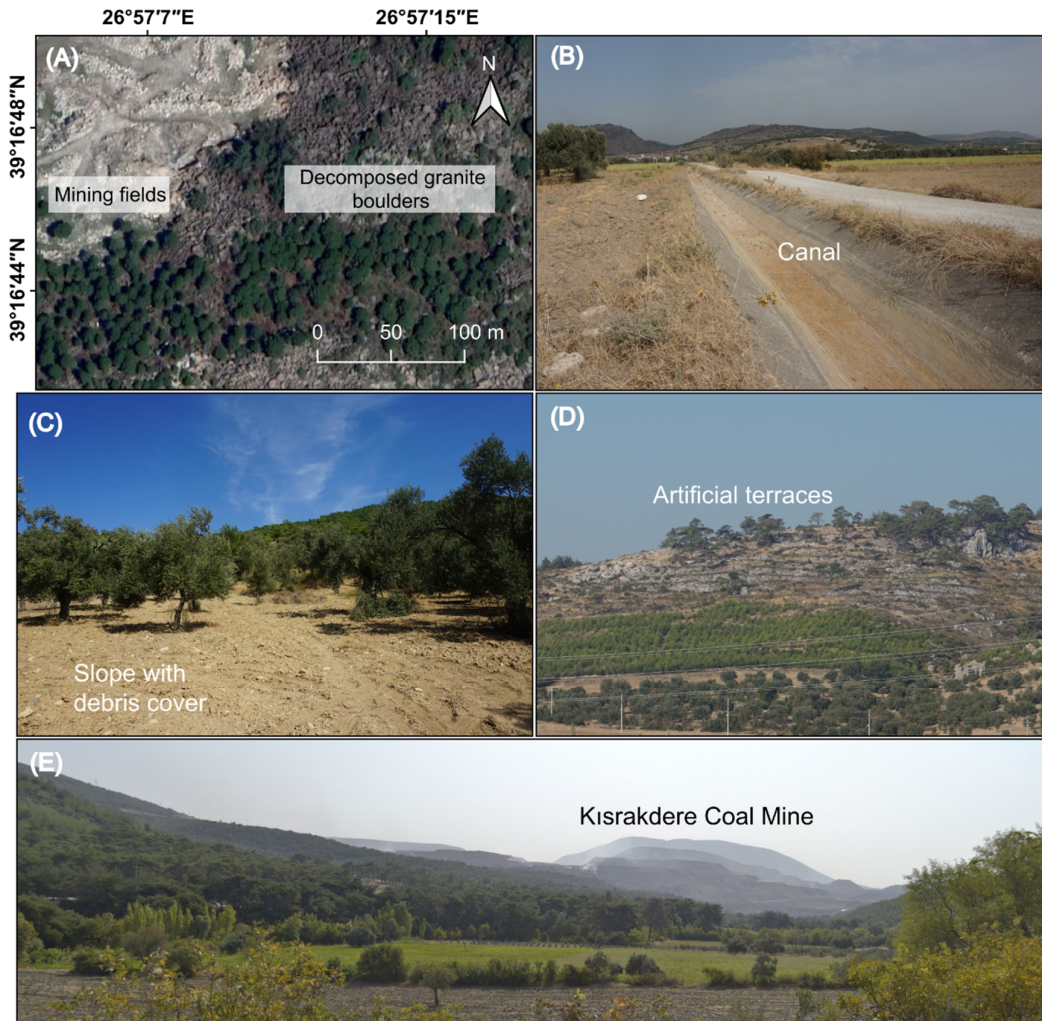


Figure S4. (A) An example of mining fields and decomposed granite boulders at the northwestern slopes of the Kozak interior plain (subunit 2.1). Data: Google Earth satellite images (WorldView-2, last accessed 8 June 2020). Photographs of a canal on the Bergama Fan (B), slope with debris cover in the Tekkedere valley (C), artificial terraces in Çalibahçe basin (D), Kısırkdere Coal Mine (E).

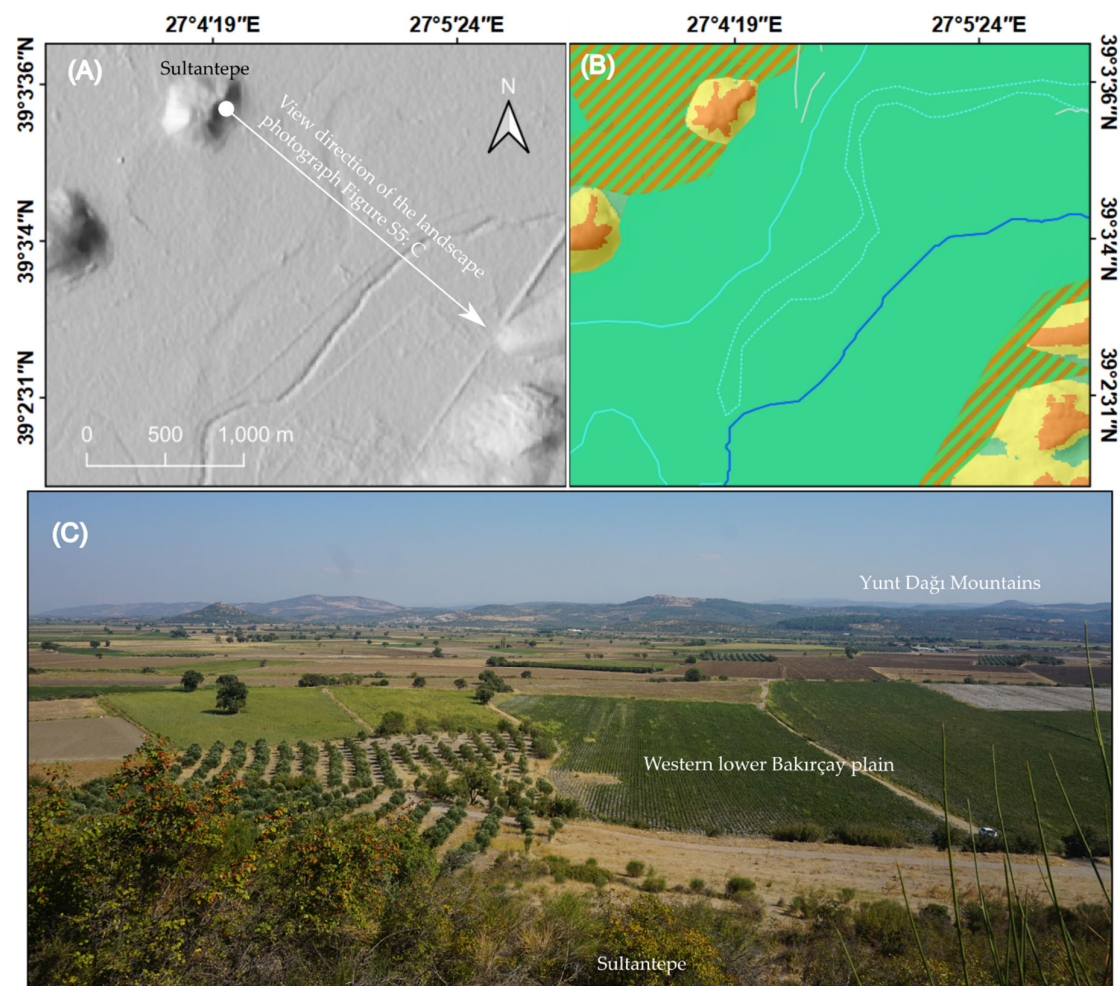


Figure S5. The western lower Bakırçay plain from the Sultantepe to the Yunt Dağı Mountains. (A) The hillshade of TanDEM-X data, indicating the features of alluvial plain and paleochannels which are highlighted in Figure S5: B. (B) Geomorphological map. (C) Landscape photograph.

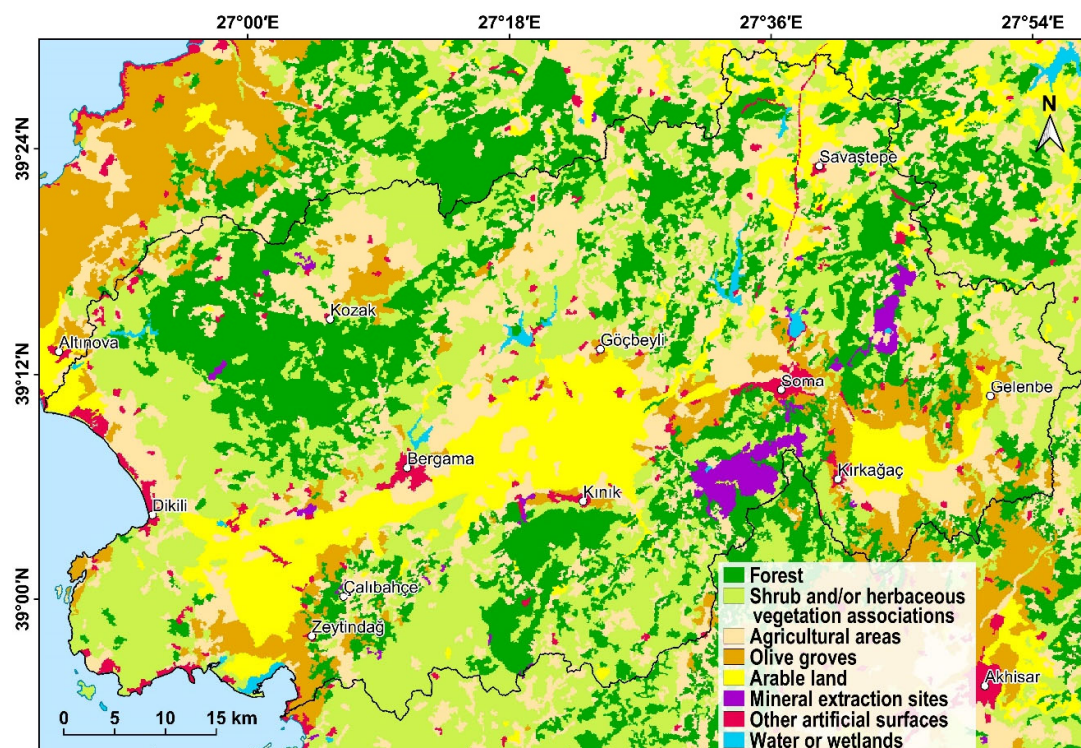


Figure S6. The land cover map of the Bakırçay and Madra River catchments and the adjacent coastal areas. Data: Corine Land Cover (CLC) 2018 (Version 2020_20u1) [4].

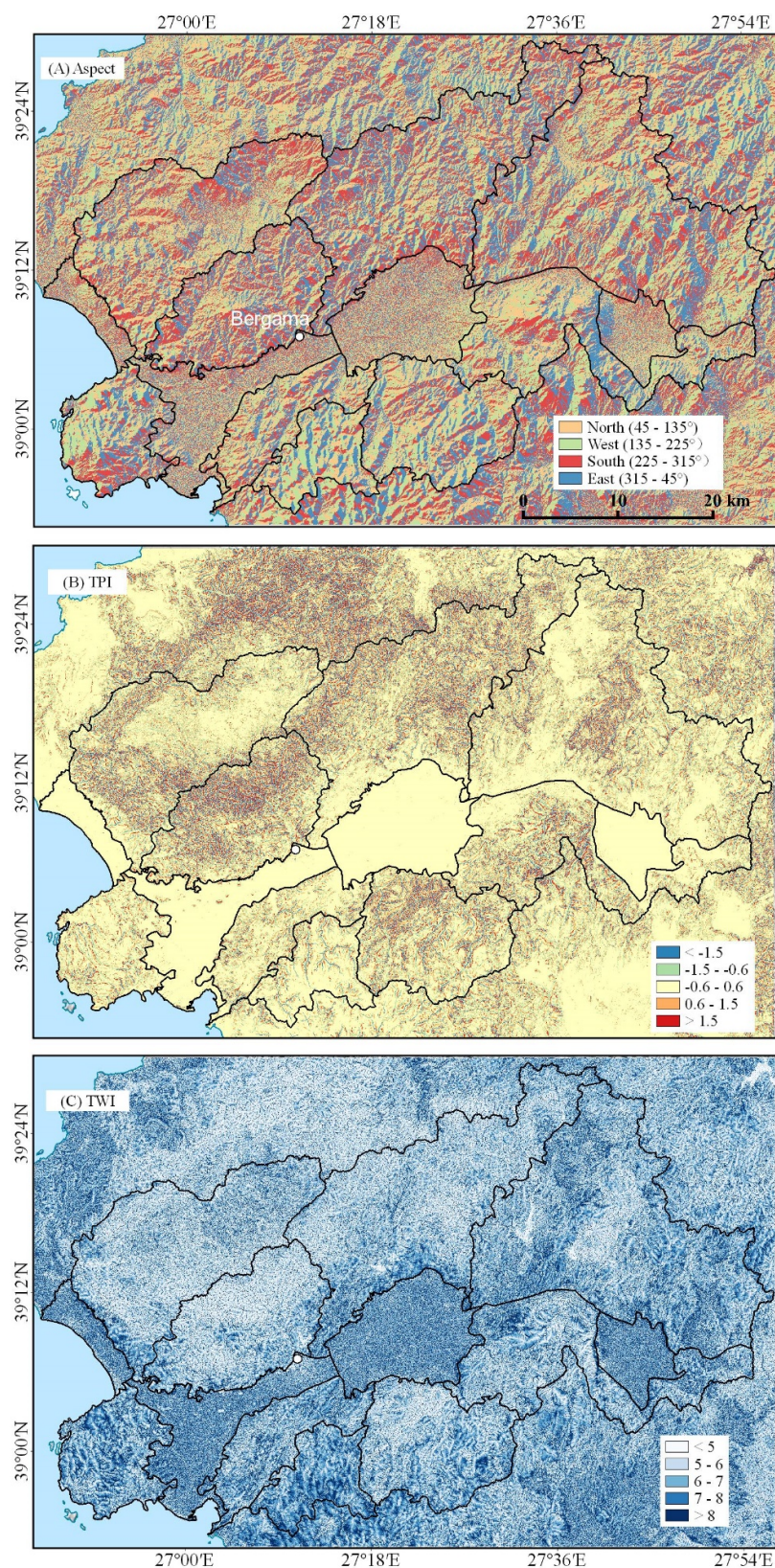


Figure S7. Additional geomorphometric parameter maps derived from TanDEM-X data. (A) Aspect. (B) Topographic Position Index (TPI). (C) Topographic Wetness Index (TWI).

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