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Inland notches micromorphology

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Inland notches are well known phenomenon in Israel and can be found mostly along the mountainous backbone, developed in hard limestone or dolomite rocks within the Mediterranean climate zone and up to the desert fringe. LiDAR technology presents an opportunity to study the fine scale rock surface within the notch and its texture patterns. De-trending of the LiDAR reconstructed DEM to a local trend, surface roughness, was achieved by fitting a normalized surface to all measured ground points within the roughness neighborhood. Micro-topography plays an important role for modelling geomorphology dynamics, resulting in improved estimates for micro stream lines network and topographic erosion as well as mineral accumulation or deposition. Clearly, dissolution occurs whenever rock and solvent meet; thus water and moisture's crucial role in the decay of carbonate rocks results in texture and roughness variability. Study aims is to generate high resolution normalized DEM models using a terrestrial LiDAR, redefining the texture and roughness within the notch while assessing weathering processes caused by water. Plan curvature is the second derivative of slope taken perpendicular to its direction. It influences convergence and divergence of flow and it emphasizes the ridges and valleys across the surface. Concaved classified areas were tested against all planar curvature areas to distinguish them as unique areas based on their texture co-occurrence measures (GLCM). Overall negative curvature pixels show poor separability, in both TD and JM separation tests, while classes of curvature degree describe a positive trend showing medium and high concavity as unique areas. Study aims to link classified areas as the basic micro infrastructure for water flow, potential runoff flow and further accumulation of minerals. On the other hand, positive values of Plan curvature present the convexity of rock surface to imply diverging flow, thus describing the watershed line within the micro-topography. GLCM texture measure map distinct areas within the notch. Middle section of the notch has uniform texture neighborhood with relatively low mean elevation values (high values for homogeneity and energy). Bottom cavity of notch reveals a more chaotic texture, highlighting the spatial disorder with relatively high mean values. Entropy calculates how random the roughness values are, and as such, high values of this measure, at the cavity's bottom, suggest a potentially rapid erosion or disposition dynamics.