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# Subsurface erosion by soil piping: significance and research needs

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## Abstract

Soil erosion is not only a geomorphological, but also a land degradation process that may cause environmental damage affecting people's lives. This process is caused both by overland and subsurface flow. Over the last decades, most studies on soil erosion by water have focused on surface processes, such as sheet (interrill), rill and gully erosion, although subsurface erosion by soil piping has been reported to be a significant and widespread process. This paper presents a state of art regarding research on soil piping and addresses the main research gaps. Recent studies indicate that this process (1) occurs in almost all climatic zones and in the majority of soil types, (2) impacts landscape evolution by changing slope hydrology, slope stability and slope-channel coupling, (3) is controlled by various factors including climate and weather, soil properties, topography, land use and land management. These issues are illustrated with various case studies from around the world. However, the majority of the reviewed studies used surface methods for soil pipe detection, although soil piping is a subsurface process. Surface methods, such as geomorphological mapping, may underestimate the piping-affected area by 50%. Moreover, most studies are limited to few case studies without