

# From Geological to Lithological Maps – Exploring Differential Erosion to Improve Lithological Information for Landslide Susceptibility Assessment

Sérgio C. Oliveira<sup>1,2\*</sup>, Raquel Melo<sup>1,3</sup>, Fernando Marques<sup>4</sup>, Rute Fonseca<sup>5</sup>, Rita Pimenta<sup>6</sup> and José Luís Zêzere<sup>1,2</sup>

<sup>1</sup> Centre of Geographical Studies, Institute of Geography and Spatial Planning (IGOT), University of Lisbon, Lisbon, Portugal

<sup>2</sup> Associated Laboratory Terra, Lisbon, Portugal

<sup>3</sup> School of Science and Technology, University of Évora, Évora, Portugal

<sup>4</sup> University of Lisbon, Faculty of Sciences, Department of Geology and Instituto Dom Luiz, Lisbon, Portugal

<sup>5</sup> University of Lisbon, Faculty of Sciences, Department of Geology, Lisbon, Portugal

<sup>6</sup> GEOCORE – Consultores de Geologia, Ambiente e SIG, Oeiras, Portugal

\*corresponding author: cruzdeoliveira@campus.ul.pt

**Abstract.** For landslide susceptibility assessment, lithology information is often extrapolated from official geological maps, which do not allow a direct spatial transformation into a detailed lithological map. To overcome this limitation, a study was made for the Grande da Pipa River basin, Portugal, to detail the existing geological maps, keeping the units' age sequence but separating the main lithological types. In addition, it explored supplementary cartographic information (e.g., slope angle) to infer the boundaries of lithological units using differential erosion and associated morphological interpretation criteria. Finally, the lithological map produced was compared with the official geological map using sensitive analysis and different partitions of a historical landslide inventory. The results consistently record improved predictive capacity for landslide susceptibility if more detailed lithological maps are used instead of the commonly available geological maps.

**Keywords:** geological map, lithological map, cartographic information, susceptibility, landslides.