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Open source landscape ecology tools

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Abstract max. (200 words) Abstract

Grants or other notes about the article that should go on the front page should be placed here. General acknowledgments should be placed at the end of the article.

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1 Introduction

1.1 A short introduction to landscape ecology

Landscape ecology focuses on how ecological processes are influenced and modified by the heterogeneous landscapes they occur in and simultaneously how the ecological processes themselves influence the landscapes [1,2,3]. In this context, landscape ecology considers, besides others, spatial and temporal dynamics of heterogeneous landscapes, interactions, fluxes and exchange within these landscapes, how the landscapes influence ecological processes (and vice versa) and lastly how to manage these heterogeneous landscapes [4,1].

While human activities have altered their environment for millennials [5], in the past centuries the effects of humans on the global environment have increased to an unknown high, known as the the Anthropocene [6]. Today, almost all ecosystems are directly or indirectly influenced by human activities [7]. Thus, understanding the complex interactions between landscapes and ecological processes also becomes more important [3].

Because landscapes are defined as mosaics of different land covers, ecosystems, habitat types, or land uses [8,9], spatial context is important and ecological processes will vary spatially [3]. Thus, in contrast to many other subdisciplines of ecology, landscape ecology emphasizes spatial patterns [4]. Consequently, the field of landscape ecology relies on tools to preprocess, modify, model, analyze and visualize spatial data.

1.2 Open-source software and R

Open-source software includes all software which is released under a license that allows to freely use, modify and distribute the software [10]. Open-source software development has many advantages, such as fast innovation, transparency and reliability as well as longevity due to many diverse contributors [11,10].

One example of a successful open-source project is the R programming language and its *Comprehensive R Archive Network* (CRAN) for extensions (also called packages) [12]. Firstly introduced in 1995 [13], today the programming language is among the most popular programming languages, especially in ecology [14].

1.3 Landscape ecology in R

Paragraph headings Use paragraph headings as needed.

$$a^2 + b^2 = c^2 \tag{1}$$

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