OVERVIEW

Degradation of walking tracks, mainly due to sheet erosion associated with hiking activities, damages the natural and recreational value of protected natural areas. Senda Schmidt is a popular trail located on the northern slope of the Sierra de Guadarrama (Central Spanish System), that shows high denudation morphologies on account of accelerated soil-erosion processes basically caused by human influence (trampling by continuous trekking), resulted in exposed roots. Previous works have used dendrogeomorphological methods in this trail to estimate rates of sheet erosion based on the changing morphology of tree rings (from concentric to eccentric) when root is exposed. This study aims to evaluate soil erosion reconstructing the first year of root exposure by analyzing changes in wood anatomical parameters within growth rings. Additionally, different multivariate statistical approaches were used in order to determine the influence of different environmental factors affecting the variation in velocity of the sheet erosion processes.

STUDY AREA

The research was conducted in the Senda Schmidt. This trail passes through the upper part of the Valsaín forest, which is located on the northern slope of the Sierra de Guadarrama (Central Spanish System). Senda Schmidt is one of the most popular mountain trails in the Sierra de Guadarrama, which has caused a large number of roots to be exposed due to accelerated erosion as a consequence of trampling from hiking.

ANATOMICAL ANALYSIS. DETERMINATION OF THE FIRST YEAR OF ROOT EXPOSURE

The exposed root system of Pinus sylvestris is characterized by an exceptionally wide latewood, which is clearly distinguishable as it is made up of several rings of thick walled tracheids. There is an major reduction in cell lumina (C) There is no morphological/anatomical pattern that is repeated in all samples.

CONCLUSIONS

Study findings reveal a trail with major soil erosion problems, with estimated soil loss within the range 1.8-2.9 mm/year. In contrast, erosion rates obtained from the analysis of changing morphology of tree rings (from concentric to eccentric) is not as reliable. It is as a consequence of that this morphological change is not always clearly noticeable. In addition, the multifactor ANOVA analysis indicated that erosion rates estimated are higher in the last 21 years than before, which seems to be related to an increase in outdoor activities in Senda Schmidt during this period.