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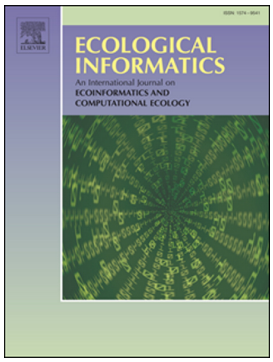

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Regional patterns of ecosystem functional diversity in the Argentina Pampas using MODIS time-series

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Abstract

The characterization of ecosystem functioning is significant for different purposes such as biodiversity conservation and ecosystem services. A key aspect of ecosystem functioning is carbon gains, since it represents the energy available for upper trophic levels. In this sense, remote-sensing methods have allowed the study of ecosystem dynamics and spatial distribution at different spatial and temporal scales. The objectives were to describe the regional patterns of ecosystem functional diversity and to establish the importance of interannual variability in the definition of Ecosystem Functional Types (EFTs) in the Argentina Pampas. EFTs were obtained from carbon gains using a set of seven functional attributes and their interannual variations, which were retrieved from 14-year NDVI time-series. An ISODATA technique was applied to all the analyzed variables, and the clusters that best separate in the n-dimensional space were selected using discriminant analysis. The Argentina Pampas shows a high heterogeneity in the spatial patterns of ecosystem functional attributes. The annual integral of NDVI (i-NDVI, a linear estimator of net primary productivity), a complex of ecosystem functional attributes that describe the interannual variability, and the annual relative range of NDVI (RREL, ecosystem seasonality) had the highest relevance to distinguish nine EFTs in the study area. This study shows a novel approach for mapping ecosystem functioning, which reveals the importance of interannual variations. This methodology includes the effects of climate variability on ecosystem dynamics, thus enhancing our understanding of ecosystem functional diversity. The results