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Title: ASSESSING DEGRADATION IN MEDITERRANEAN RANGELANDS WITH A MULTIDISCIPLINARY DYNAMIC MODEL

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Abstract: This paper refers to degradation of Mediterranean rangelands and the way it can be assessed. Firstly, a multidisciplinary, non-spatial, annual dynamic model is presented. It tries to formalize the relationships linking the dynamics of shrubs, herbs, soil, livestock and farmers' behaviour with exogenous time-scenarios regarding possible drivers of degradation, namely weather, prices and political instruments. In its simplest expression, the model does not portray a pasture-livestock system, as usually, but a shrubs-soil one. Secondly, a procedure to assess rangelands' risks of degradation is proposed. It consists in analyzing a great number of the model's annual equilibria, which are obtained by generating random-normal values for the exogenous variables of the model. Thirdly, both the model and the assessment procedure are applied to a rangeland in Lagadas County (Northern Greece). A low risk of degradation by shrub invasion and a negligible risk of degradation by erosion are found. Finally, a sensitivity analysis of parameters is carried out. It shows that some abiotic factors, especially average rainfall, would be those whose eventual change in the future could most likely make degradation risks to increase in Lagadas. Economic factors related to livestock numbers—i.e. prices and subsidies—and other factors linked to biomass consumption per animal show significant effects on controlling shrub expansion but provoking negligible impacts on erosion rates.