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Permanent grasslands are a very relevant cropping system in the North of Spain and support the main dairy farms in the country. Adaptation to climate change will be required given the projected changes of regional precipitation. To support such adaptation, modelling of these systems to generate high quality projections of the system performance is required. In the region to be simulated, grasslands are managed with a mixture of cuts and grazing. Several issues hinder the modelling of this type of systems: 1) the available data of grazing intensity presents large uncertainties; 2) there are few grassland models that allows flexibility to define a variable combination of cuts and grazing; 3) soil heterogeneity. This exercise has the goal of exploring the potential of PASIM to simulate mixed management grasslands. The model has been successfully applied in a permanent grassland in the French Massif Central, for a management that only contemplated cuts without grazing (Gómara et al., 2020).
The model was calibrated using data from Villaviciosa (Asturias, Spain, 5º 26' 27" W, 43° 28' 50" N, 10 m a.s.l.), located at northern Spain with a temperate climate. This calibration was used to simulate several grasslands locations distributed along the Cantabrian Sea. The soil information was obtained from Trueba et al. (2000). The model was configured for the optimum management for mowing and nitrogen fertilization. The 1976-2005 period and the 2030-2059 period were selected. For the future period two representative concentration pathways emission scenarios (RCP, van Vuuren et al., 2011) were selected (i.e. RCP4.5 and RCP8.5). An ensemble of climate models will be used from the Coordinated Regional Climate Downscaling Experiment (CORDEX, Giorgi and Gutowski, 2015) previously bias-adjusting them by using the European observational database EOBS (Haylock et al., 2008) with the empirical quantile mapping method included at the climate4R R package (Iturbide et al., 2019).
Modelling was challenging due to a combination of complexity (many processes involved) and uncertainty (observed data are difficult to generate). The results of the simulation exercise allow for assessing PASIM skill to reproduce the performance of these complex systems, as well as to

determine the main weakness of the model and the observational data and field experiments required to develop the corresponding model improvements.

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