

Title: Landsat images applied to natural grasslands of Southern Brazil

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The objective of this study was to analyze the potential use of Landsat images to discriminate seasonal patterns of forage mass on natural grasslands of Southern Brazil. The experiment has been performed since 1986 in the experimental area of the Federal University of Rio Grande do Sul (30º06'06''S, 51º40'59''W and 46 m), Brazil, in an area of 64 ha of natural grassland. The experimental unit has been managed under distinct forage allowances (FA): 4, 8, 12 and 16 kg of dry matter (DM) per 100 kg of the animal's live weight (LW) per day (% LW), fixed throughout the year, and variable FAs in the Spring; 8-12% (8% on Spring and 12% in other seasons), 12-8% (12% on Spring and 8% in other seasons) and 16-12% (16% on Spring and 12% in other seasons). This concept requires continuous stocking rate adjustment to the targeted forage allowance as pastures grow. Forage mass was measured every 28 days by double-sampling technique. The experiment was arranged in randomized blocks with two replicates of area by treatment. The data used in this study refer to the period between 2004 and 2015. A pixel grid of Landsat 8–OLI sensor images with 30 meter spatial resolution and biweekly temporal resolution was used to relate the Normalized Difference Vegetation Index (NDVI) with forage mass data. The data was analyzed using Sequential Tests at a 5% significance level. Data collected between 2004 and 2010 were used to develop the model, while data between 2011 and 2015 were used to validate the model. NDVI, treatment and season were the effects influencing forage mass responses. The model's coefficient of determination was 59.9% (n = 385). The validation model for observed by predicted forage mass (n=114) presented 60,75% of coefficient of determination. The results show that NDVI can be used as an index to estimate forage mass in natural grasslands of Southern Brazil.

Keywords: Landsat images, NDVI, forage allowance, forage mass, modeling

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