**The relative abundance of three plant functional types in temperate grasslands and shrublands of North and South America: effects of projected climate change.**

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**Aim**

Use a regression model that relates climatic variables to the relative abundances of shrubs, $C_4$ and $C_3$ grasses to project the plant functional type composition of temperate grasslands and shrublands within North and South America in response to climate change.

**Location**

The temperate zone grassland and shrubland regions of North and South America.

**Methods**

We used a regression model to project changes in the relative abundances of shrubs, $C_4$ and $C_3$ grasses under three general circulation model (GFDL, GISS, UKMO) climate change scenarios. The three climate change scenarios were applied to a global data set of mean monthly temperatures and precipitation. The regression model, which incorporates mean annual temperature, mean annual precipitation and seasonality of precipitation as input variables, was used to project plant functional type changes. Spatial patterns of change were analysed using a geographical information system.

**Results**

Relative abundance of $C_4$ grasses were projected to increase >10% throughout most of the study region at the expense of $C_3$ grasses. There were essentially no areas where $C_4$ grasses decreased in abundance, and the areas with no change were largely the southern Great Plains and the Intermountain Basin and Range of North America. $C_3$ grasses declined throughout with the exception of the north-western Great Plains of the US and Canada, and north central Argentina. Changes in shrub abundance were mixed with some increases in Patagonia and the desert regions of the south-western US; there were also some projected decreases, however, the locations varied across models.

**Main conclusions**

The projections made by our regression model were consistent with those of other more complex vegetation dynamics models. Changes in plant community composition in response to climate change may be substantial in certain areas and will probably lead to changes in water and nutrient cycling.