Species distribution models (SDM) assume that the potential spatial distribution of a species can be predicted by relating sites of known occurrence with predictor variables known for these sites and for all other sites. The common application of this method is to predict species ranges with climate data as predictors. Global bioclimatic datasets are widely used in ecological research to estimate the potential distribution of species. Although these datasets offer high resolution information, they have not been tested rigorously in smaller regions, hence, it might not be appropriate to use them in regional SDM studies due to their poor representation of local climate features. Moreover, this problem may be aggravated when predicting potential distributions in the future as a consequence of the uncertainty derived from the future altered climate scenarios.

Faced with this problem a high resolution grid for the Basque Country has been developed as an alternative to existing public products: The Regional Baseline Climate of the Basque Country (RCBC). In this study we have modelled tree species under different climate datasets and SDM techniques in the Basque Country (Northern Iberian Peninsula), in order to compare the RCBC with the WorldClim bioclimatic dataset (WC) in a region of complex orography.

**MATERIALS AND METHODS**

**Climate:** Two different high resolution climate datasets have been compared: The Regional Baseline Climate of the Basque Country (RCBC) and the WorldClim bioclimatic dataset (WC).

**Forest species:** Two trees were modelled, European beech (*Fagus sylvatica*) whose distribution responds to a high relation with climate conditions, and Pyrenean oak (*Quercus pyrenaica*) which has a wider distribution. Presence/absence data was generated from the forest map of Spain.

**Potential habitat distribution:** GLM, MAXENT, SVM and MARS modelling techniques were applied for each climate dataset and species, to analyze the discrepancies and the predictive skill in all cases by evaluating the resulting models in the light of their AUC (area under the ROC curve). We performed a k-fold cross-validation of the models, with k=10 stratified randomly split subsets of presence/absence.

**Future climate change projection:** Resulting models were extrapolated in future climate conditions (period 2041-2071). Future climate data was obtained using an ensemble of 7 RCMs from the EU-funded project ENSEMBLES, considering the A1B future emission scenario. The delta method was applied to obtain the future climate projection (adding the differences obtained from the A1B future time slice (2041-2070) and the 20C3M scenario (1971-2000) to the baseline climatology.

**RESULTS: RCBC vs. WorldClim**

**Climatologies:**
- The spatial pattern of temperature is similar across datasets
- Minimum temperatures are similar and strongly controlled by the topography
- Maximum temperature of WorldClim is negatively biased
- Precipitation is seriously underestimated by WC and the spatial pattern is not well reproduced

**Habitat suitability prediction:**
- Predicted distribution areas are predicted to significantly shrink in the study area, although the results are likely to be influenced by the restricted spatial domain used for the analysis

**Model performance (AUC):**
- Model performance in terms of AUC was similar between datasets.
- *Quercus pyrenaica* was modelled with higher accuracy by the non-linear techniques

Reference: