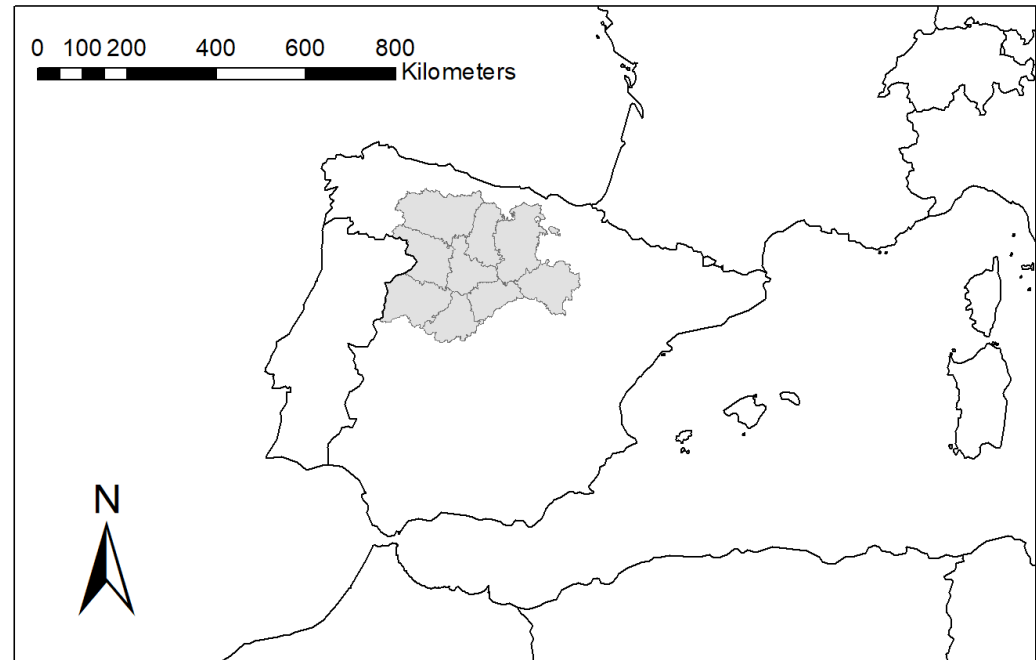


Risk of drought for winter cereals in Castilla y León (Spain) under current and future climate

Margarita Ruiz-Ramos, Alfredo Rodríguez, Antonio Saa Requejo, José L. Valencia, María Villeta, Ana M. Tarquis

EGU, April 28th 2021

- **CLIMATE DATA BASES**
 - Observations: station & gridded E-OBS (1950-2019)
 - Simulations: 10 RCMs EURO-CORDEX (~12 km), RCP4.5 y RCP 8.5 (bias adjusted)
- **Identifying agro-climatological indexes related to agricultural drought**
- **Projecting the indexes into the future**
- **Region: Castilla y León**

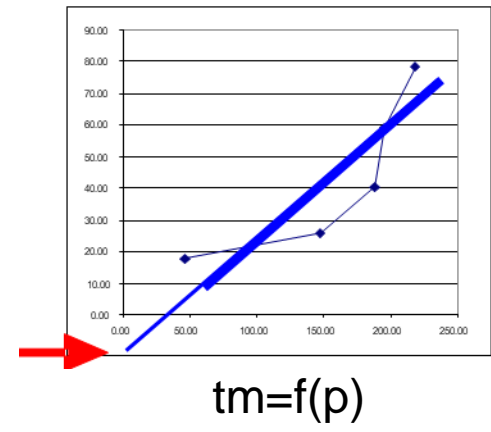


Agro-climatological indexes

INDICES	Descripción
Ndays3_10_Mean (nr. days)	Mean number of days between two events of 10mm in 3 consecutive days between October and June
Ndays_3_10_Max (nr. days)	Maximum number of days between two events of 10mm in 3 consecutive days between October and June
Ppt3_5 (mm)	Accumulated rainfall in March, April and May.
Ppt3_5_plus (mm)	Accumulated rainfall in March, April, May and first ten of June
Ppt9_11 (mm)	Accumulated rainfall from September to November
Ppt12_2 (mm)	Accumulated rainfall in December, January and February
Tx_5 (°C)	Maximum absolute temperature in May
Tx_6 (°C)	Maximum absolute temperature in June
Slope_10 (°C/mm)	Ratio between the increase in mean temperature (tm_i) and the rainfall (p_i) on a ten-day scale from April to May, both included

Bad years: high slope, low independent term

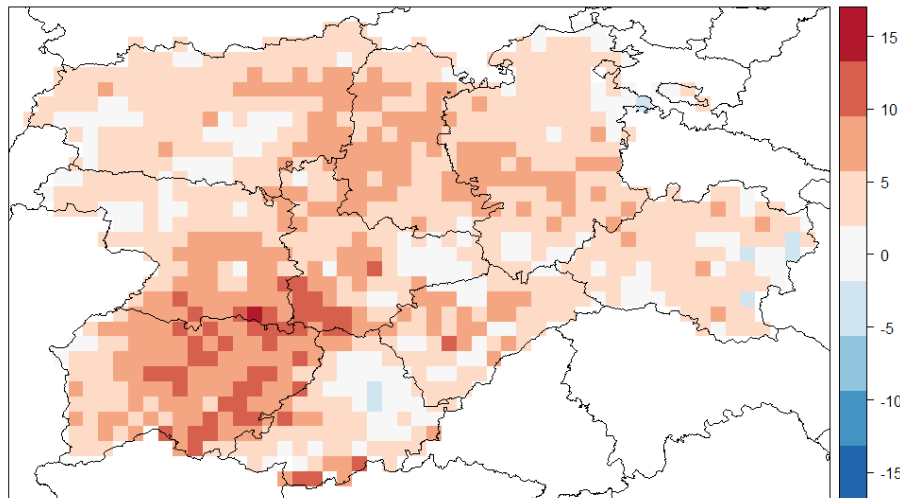
Good years: low slope, high independent term



& Ndias_10Mean 2020-2049 RCP8.5

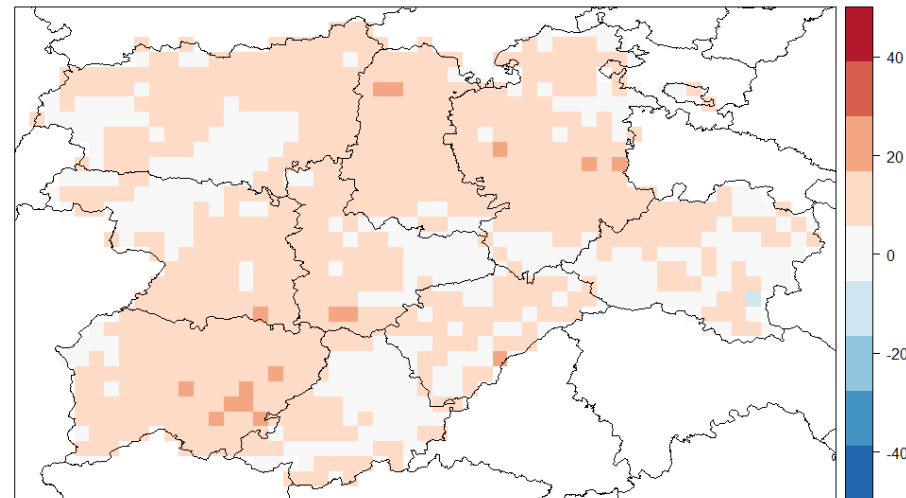
In number of days

CHANGE-ABS_2020_2049_1990-2019_Ndias3_10_Max

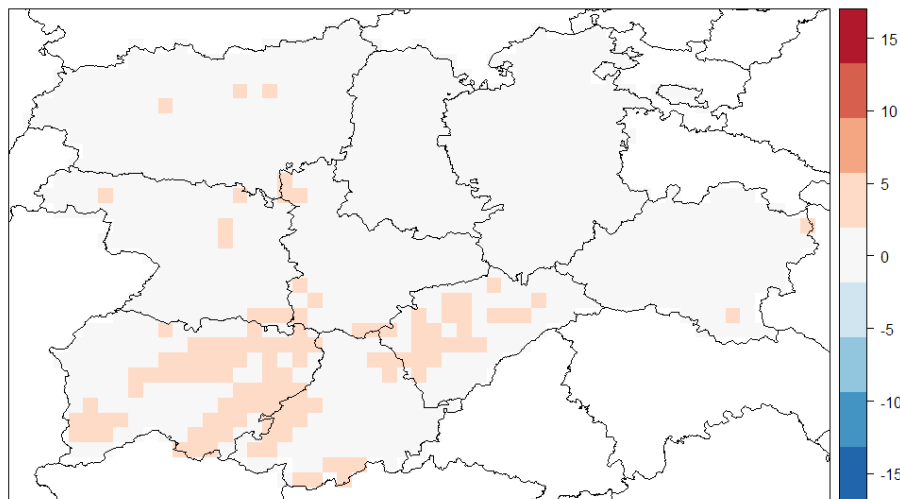


In %

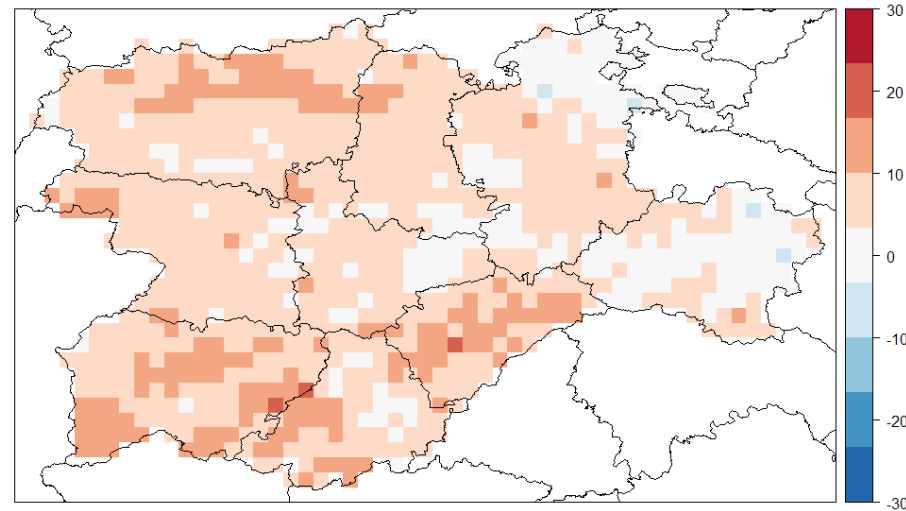
CHANGE-REL_2020_2049_1990-2019_Ndias3_10_Max



CHANGE-ABS_2020_2049_1990-2019_Ndias3_10_Mean



CHANGE-REL_2020_2049_1990-2019_Ndias3_10_Mean

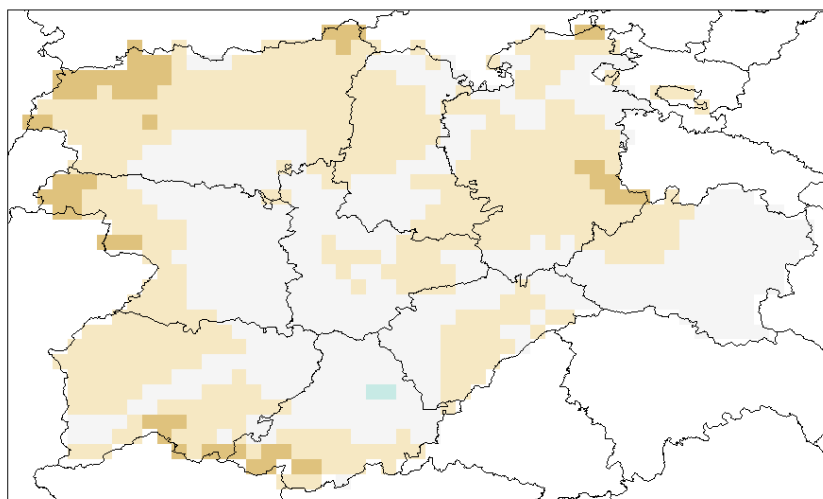


Changes in Ppt3_5 & Ppt3_5 plus 2020-2049 RCP8.5

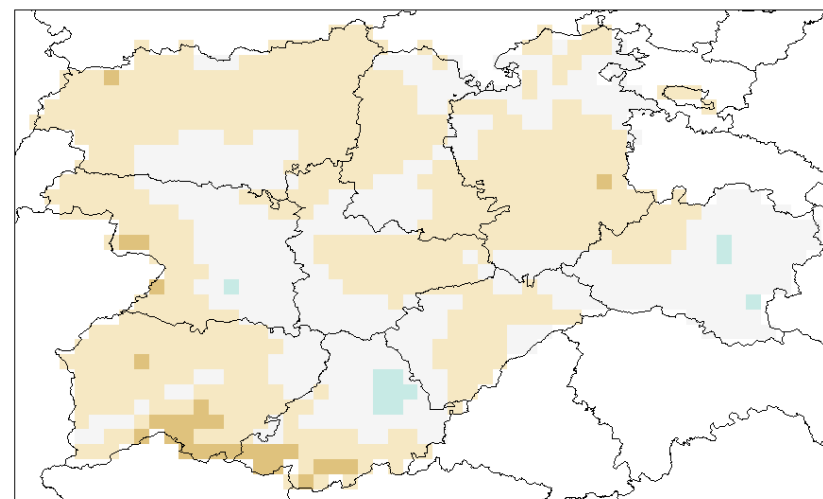
In mm

In %

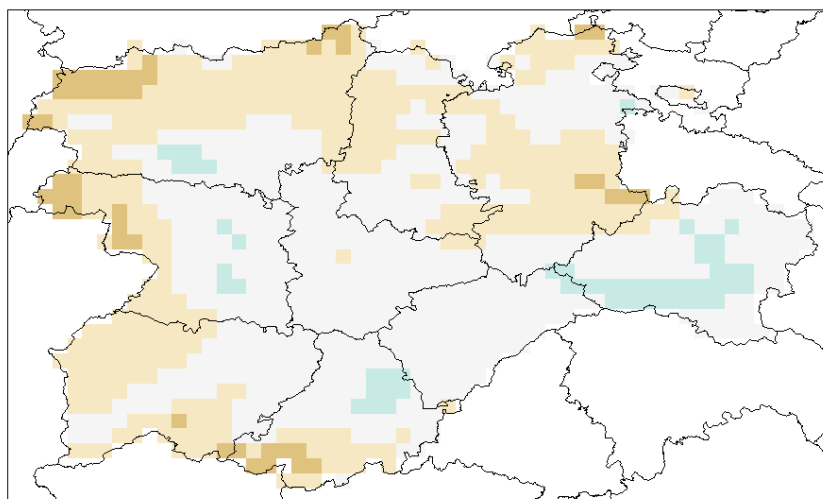
CHANGE-ABS_2020_2049_1990-2019_Ppt3_5



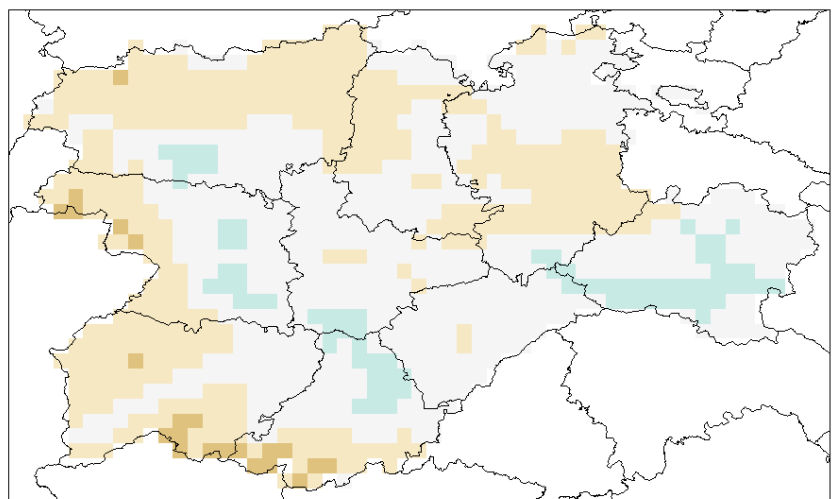
CHANGE-REL_2020_2049_1990-2019_Ppt3_5



CHANGE-ABS_2020_2049_1990-2019_Ppt3_5_plus



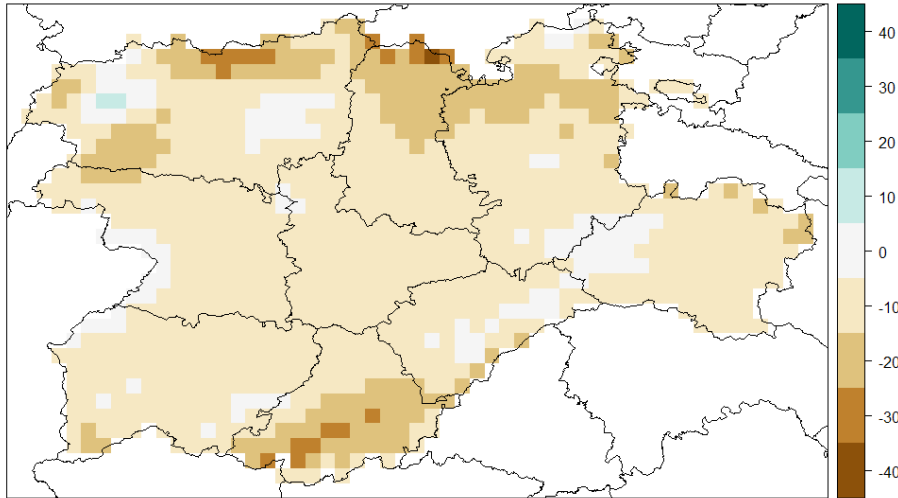
CHANGE-REL_2020_2049_1990-2019_Ppt3_5_plus



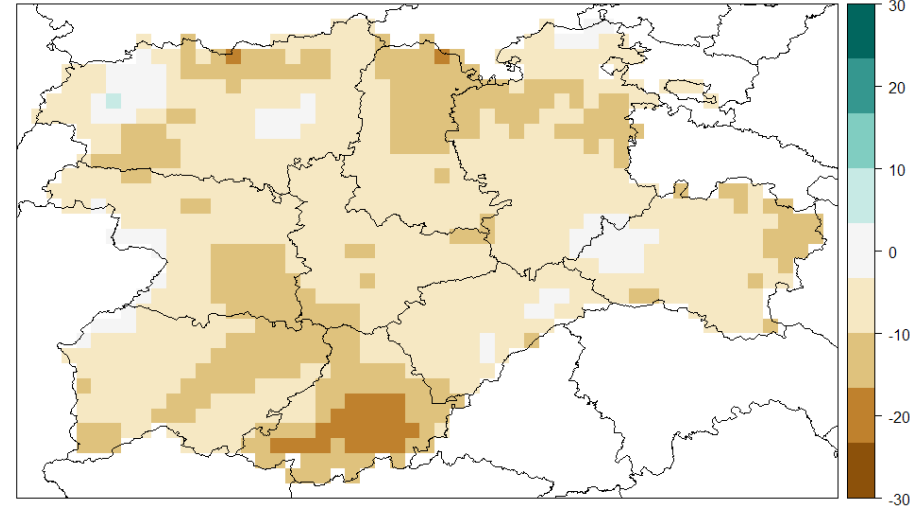
En mm

In %

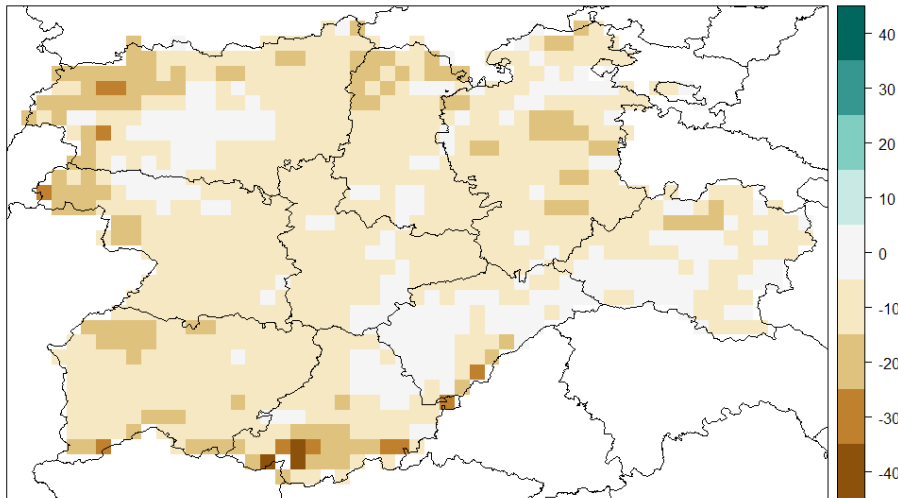
CHANGE-ABS_2020_2049_1990-2019_Ppt9_11



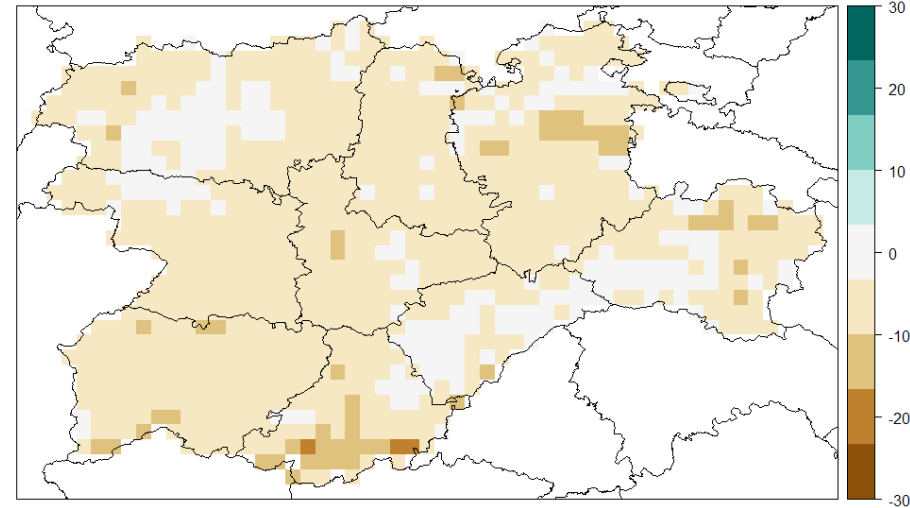
CHANGE-REL_2020_2049_1990-2019_Ppt9_11



CHANGE-ABS_2020_2049_1990-2019_Ppt12_2



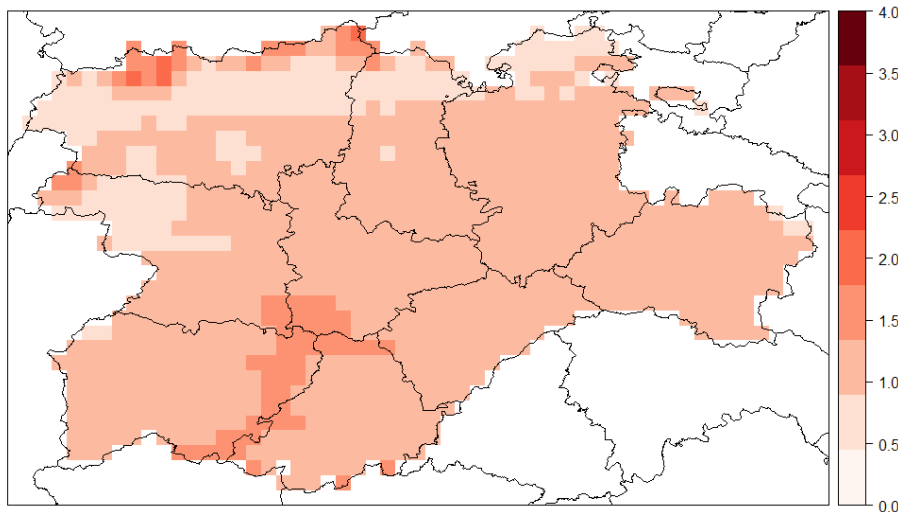
CHANGE-REL_2020_2049_1990-2019_Ppt12_2



Changes in Tx_5 & Tx_6 2020-2049 RCP8.5

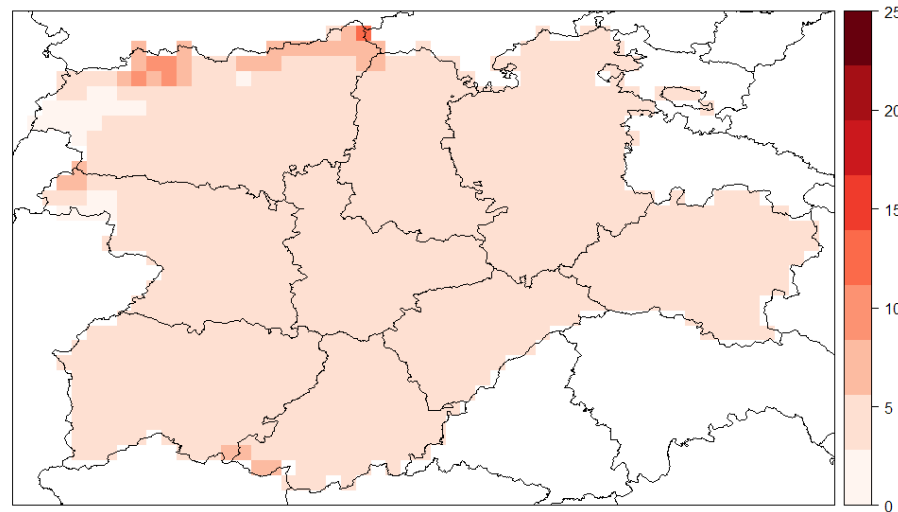
In °C

CHANGE-ABS_2020_2049_1990-2019_Tx_5

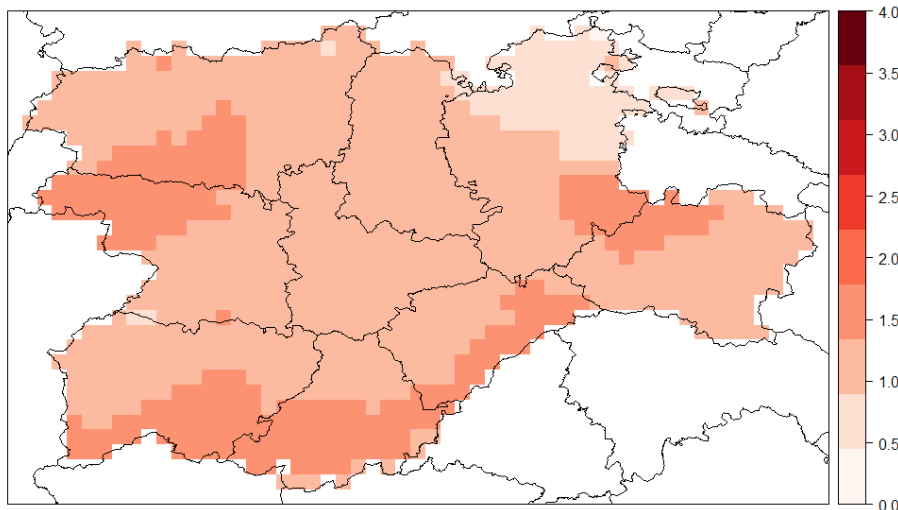


In %

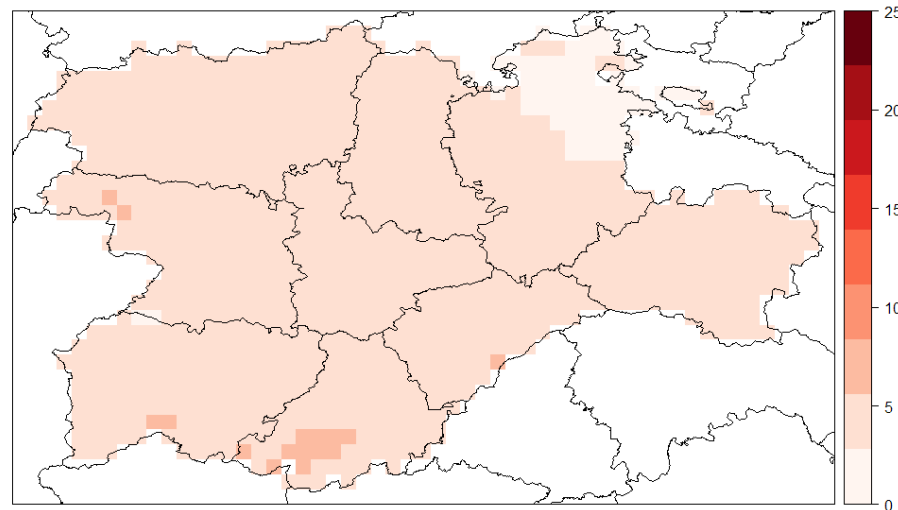
CHANGE-REL_2020_2049_1990-2019_Tx_5



CHANGE-ABS_2020_2049_1990-2019_Tx_6



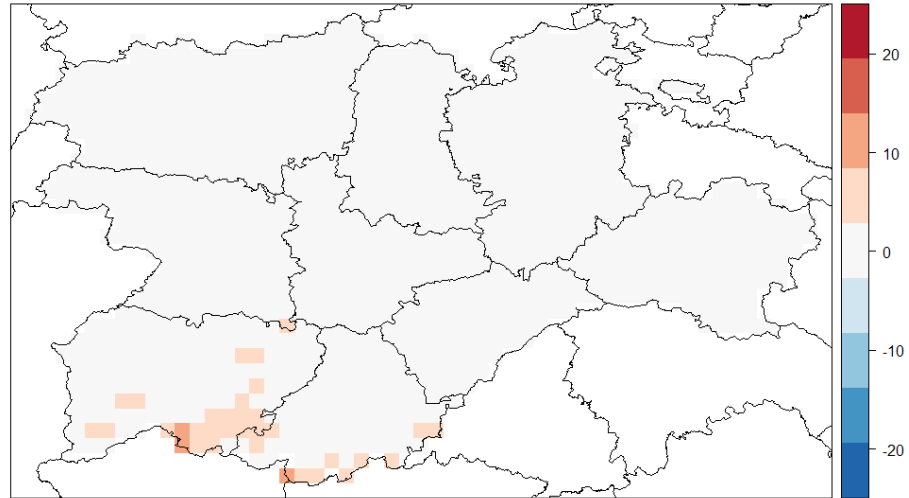
CHANGE-REL_2020_2049_1990-2019_Tx_6



Changes in Slope_102020-2049 RCP8.5

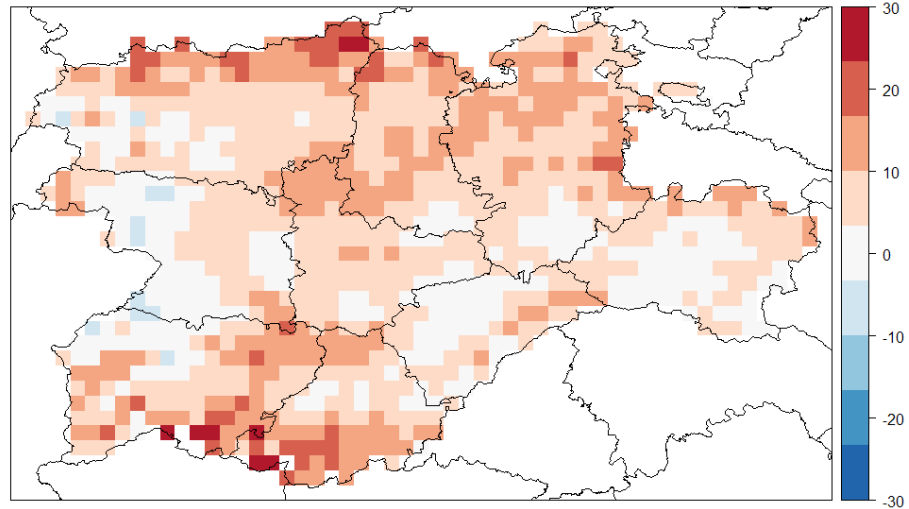
In °C/mm

CHANGE-ABS_2020_2049_1990-2019_Pendiente_10



In %

CHANGE-REL_2020_2049_1990-2019_Pendiente_10

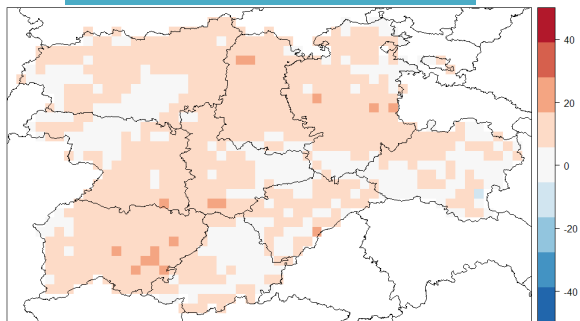


Conclusions

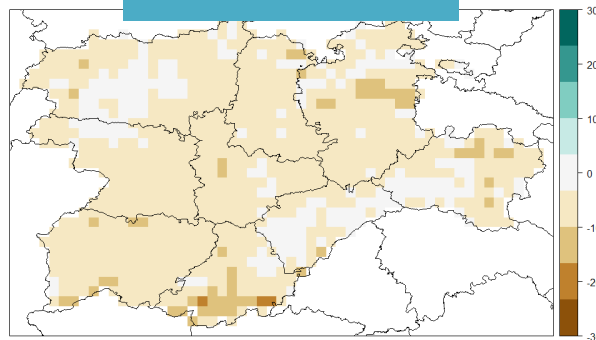
- Projections indicate a consistent increase in maximum temperatures in May and June throughout the area.
- A decrease in precipitation, although it presents greater spatial and temporal variability and uncertainty according to the climatic temperature scenarios.
- The indices related to agricultural drought show a slight increase in the optimistic scenario and moderate in the less optimistic one.
- The main problem would appear in autumn, due to a decrease in rainfall and an increase in temperatures, resulting in a dominant trend towards mild aridification of the area. This is a threat for autumn sowings.
- The problems that can appear in spring in relation to the coupling or decoupling of flowering and drought events, while still being important, are considered more manageable through a correct choice of the sowing date and cycle duration.

Change (%) under RCP8.5, 2020-2049 vs. 1990-2019

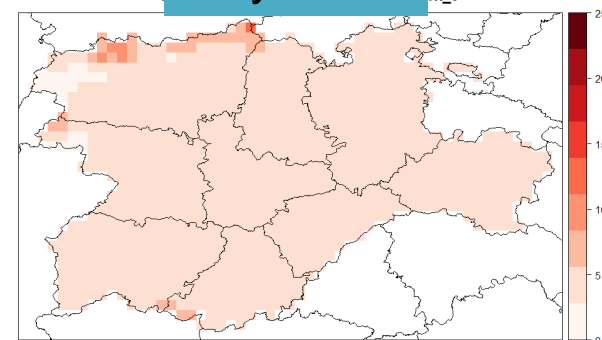
Days with no rain



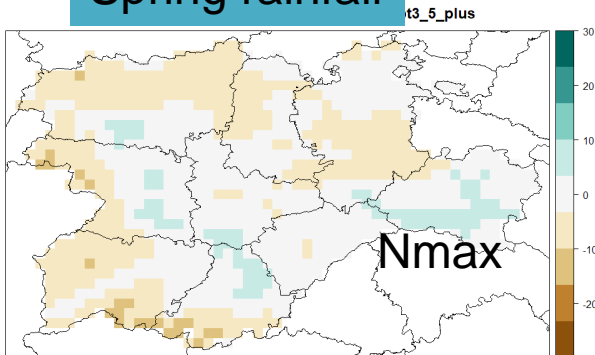
Winter rainfall



May Tmax



Spring rainfall



Increasing Tmax in May and June

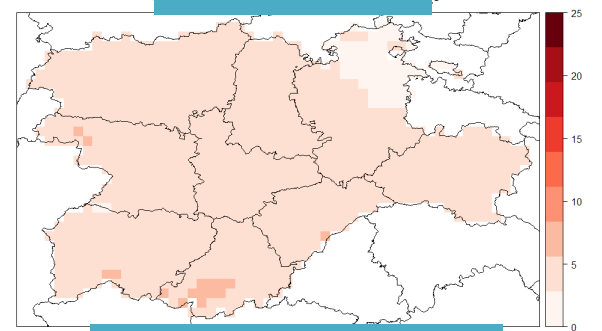
Decreasing P, high spatial and interannual variability

Increasing agricultural drought slightly in RCP4.5, more in RCP8.5

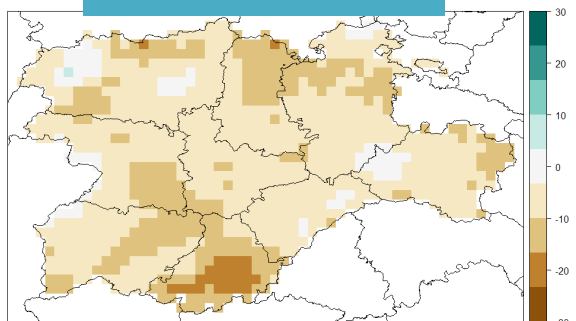
Autumn: slight aridification : sowing at risk?

Spring: manageable through matching sowing date and crop variety

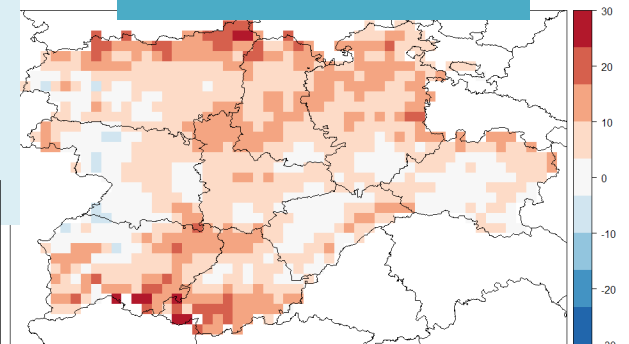
June Tmax



Autumn rainfall



Aridification trend



M. Ruiz-Ramos, A. Rodríguez, A. Saa, J.L. Valencia, M.Villete and A. Tarquis.



Thank you

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