

First approach to the relationship between recent landscape changes and temperature trends in Spanish mainland

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The recent analyses of monthly and seasonal Spanish mainland temperatures (1951-2010) at high spatial resolution using the MOTEDAS dataset shown that the monthly mean temperature values of maximum (T_{max}) have risen mostly in late winter/early spring and the summer months, while the monthly mean temperature of minimum (T_{min}) values have increased in summer, spring and autumn in southern areas. Consequently, a north-south gradient in diurnal temperature range (DTR) has been detected in summer months, with positive trends in the north and negative trends in the south, and negative pattern was found in the southeast in spring and autumn.

During the same period, the Spanish mainland has suffered dramatic changes in the landscape related to urban and industrial sprawl, transportation infrastructures development, or the extension of irrigated areas for intensive agriculture. Those changes would be consistent with factors that affect T_{min} , which are conditioned by the nature of the surfaces.

In this research, we present the first approach to the relationship of temperature trend and landscapes changes at high spatial resolution in the Spanish mainland. Thus, we have compared the spatial distribution of temperature trend with changes in accessibility index and population potential simultaneously, and its spatial redistribution as indicator of landscape changes. The significance of temperature trends was evaluated by Mann-Kendal test, and its intensity by Sen's estimator. A mix model of population potential and accessibility index weighted by route factor has been used to assess landscape changes. Crosstab analysis was applied to identify the association between temperature trends and accessibility changes.