



The title (العنوان):

Anthropogenic effect on the pace of shifts in climate regions extent and its impact on primary productivity

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Abstract : Changes in precipitation and temperature, have been attributed to human influences, yet to what extent the anthropogenic forcing is reflected in the velocity on which background climate is evolving has not been assessed. Here we explore the contribution of natural and anthropogenic drivers to the pace of shifts in climate regions extent, a key indicator of the rate to which ecosystems have to adapt to a changing climatology. To this aim, multiple observational-based climate products and an ensemble of CMIP5 simulations have been combined to focus on the attribution of climate classification changes. Results support the conclusion that most of the observed changes over 1950–2005 can be attributed to human influence, prominently through warming effects induced by greenhouse gases. Projected emission scenarios are expected to induce an amplification of such trends up to twice the current rates by 2100 under the highest emission scenario RCP8.5. Future changes emerge particularly on tropical dry (expansion) and boreal moist (contraction) climates where the surface extents are already experiencing substantial changes over time. Changes in climate conditions, as quantified by shift in climate regions, have relevant impacts on vegetation primary productivity that appear generally overestimated by climate models compared to data-driven products.

Key words : Anthropogenic effect ; climate regions

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