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Earth and space climatic indices: a multivariate analysis for the identification of space forcing at different spatial and temporal scales

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The response of the climatic system to the interplay of inner chemico-physical processes and outer physical processes can be studied through the analysis of indices and proxies derived at short, mid and long time scales as well as at local, regional and global spatial scales.
Due to the highly nonlinear coupling of such processes, some of which acting via an amplifying process, and to the chaotic nature of the climatic system, it is quite challenging the identification and the quantitative evaluation of the specific contributions in the relevant time series.
In this work, we focus on a multivariate analysis of climatic indices at different spatio-temporal scales relevant to both the terrestrial and the spatial environments, carried out with different techniques and aimed at pointing out the possible multi-scale space forcing.
The selection of indices and adopted techniques are commented on in the framework of the related outcomes to emphasize the criticality of the methodological approach and the difficulty in the interpretation of the results.
Despite of that, such an approach reveals quite promising, but deserves an in-depth application to a varied and homogeneous set of indices and proxies.