



PALEOSTRAT: PALEOmodelization from a STRATospheric perspective

Recent studies have demonstrated the influence of the stratosphere on the climate. However, the limited period of instrumental observations prevents us from obtaining a clear picture of role of the stratosphere in modulating the climate responses to internal (e.g., El Niño Southern Oscillation) and external (e.g., volcanic) forcings.

In this sense, Last Millennium (LM) simulations are crucial to assess the relative roles of internal versus forced variability and the responses to natural and anthropogenic forcings. However, many open questions still remain regarding the ability of these models to reproduce the LM, since reconstructions suggest more complex patterns than those obtained from LM simulations. Among other factors, these discrepancies could be due to uncertainties in the forcings and/or in model physics. In particular, most models employed in PMIP3 did not have a well-resolved stratosphere, thus neglecting its potential contribution to explain anomalous periods before the industrial era.

PALEOSTRAT (CGL2015-69699-R) is a project funded by the Spanish Ministry of Economy and Competitiveness (MINECO) which investigates the impact of the stratosphere on the climate of the LM (850-1850 CE). This is addressed by means of a suite of LM simulations with the CESM model which only differ in the representation of the stratosphere, so that their comparisons will provide insights into the impact of the middle-atmosphere on the surface climate. Uncertainties related to external forcings will also be assessed by comparing business-as-usual LM model simulations with LM runs forced with novel external forcing histories and model implementations, which include an explicit representation of volcanic aerosols and their evolution following major eruptions. This talk will review the influence of the stratosphere on the surface climate, its potential role in explaining past changes, the main objectives of PALEOSTRAT and its experimental design.

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