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HIATUS: Hiatus en temperatura de superficie del siglo XXI: Investigación, Atribución, comprensión Teórica y experimentos Únicos de Sensibilidad

Description

Producing trustworthy interannual to decadal climate predictions constitutes a societal challenge with numerous socio-economic applications (agriculture, energy, health, water resources, insurance). Climate is, for example, one of the key factors that influences grape and wine production affecting the suitability of certain grape varieties to a particular region as well as the type and quality of the wine produced, which will be the main application of the results of this project. Taking up the challenge of predicting the climate on interannual to decadal timescales relies on both the predictability of the internally generated climate variability and the externally forced rate of global warming. Whereas most of the climate oscillations around the long-term warming trend over the last 50 years are relatively well understood, the XXIst century has been marked by an intriguing pause of the near surface global warming despite a sustained buildup of atmospheric greenhouse gas levels. This so-called hiatus has triggered an intense scientific debate on its causes and has drawn considerable media attention. The applying team has recently achieved a robust identification of the enhanced ocean heat absorption as a main cause for the recent hiatus, published in *Nature Climate Change*, through the exploitation of successful retrospective climate predictions of the hiatus until 5 years ahead. However, these retrospective climate predictions were not fully explored to understand the complete mechanisms leading to the recent hiatus, and as a result part of the recent hiatus signal was not captured. The HIATUS project proposes a deeper investigation of these simulations and similar climate predictions generated with a newer model version. Complete regional heat budgets, thorough dynamical analyses and information-denial sensitivity experiments are planned, combined with a validation against innovative observational data sources. Other hypotheses suggested in the literature, such as the role of stratospheric aerosol concentrations, will additionally be explored to explain the uncaptured part of the hiatus signal. The knowledge gathered during the HIATUS project will allow us to determine whether the global warming slowdown experienced in the last fifteen years should be expected to last in the coming decade or whether we should observe a rebound effect with an intensified global warming. Finally, the impact of decadal temperature variability on agriculture yield over the last 50 years and the coming decade will be estimated, with a focus on the wine sector, exploiting the most reliable climate information that can be provided within the HIATUS project. This project will be carried out with the Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS, Toulouse, France), the Mediterranean Institute of Oceanography (MIO, Toulon, France), the Universidad Complutense de Madrid (UCM, Madrid) and the Universidad Politécnica de Madrid (UPM, Madrid).

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