CLIMATE EXTREME EVENT ATTRIBUTION and MULTIVARIATE EXTREME VALUE THEORY

Philippe Naveau*†[1]

[1]Laboratoire des Sciences du Climat et de lÉnvironnement [Gif-sur-Yvette] – Université de Versailles Saint-Quentin-en-Yvelines : UMR8212, Commissariat à l'énergie atomique et aux énergies alternatives : DRF/LSCE, Université Paris-Saclay, Institut National des Sciences de l'Univers : UMR8212, Centre National de la Recherche Scientifique : UMR8212 – France

Abstract

Numerical climate models are complex and combine a large number of physical processes. They are key tools in quantifying the relative contribution of potential anthropogenic causes (e.g., the current increase in greenhouse gases) on high-impact atmospheric variables like heavy rainfall or temperatures. These so- called climate extreme event attribution problems are particularly challenging in a multivariate context, that is, when the atmospheric variables are measured on a possibly high-dimensional grid. In addition, global climate models like any in sillico numerical experiments are affected by different types of bias.
In this talk, I will discuss about how to combine to two statistical theories to assess causality in the context of multivariate extreme event attribution. In addition, the question of uncertainties quantification that remains a challenge in any climate attribution analysis will be explored from various directions. In particular, a simple model bias correction step will described in details. To illustrate our approach, we infer emergence times in precipitation from the CMIP5 and CMIP6 archives.

Joint work with Anna Kiriliouk, Julien Worms, Soulivanh Thao, Alexis Hannart and Aurélien Ribes.

Biblio:

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*Speaker
†Corresponding author: philippe.naveau@lsce.ipsl.fr