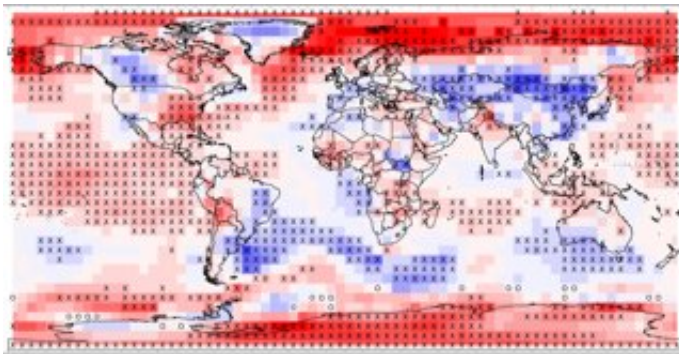


New approach to global-warming projections could make regional estimates more precise

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Credit: McGill University

A new method for projecting how the temperature will respond to human impacts supports the outlook for substantial global warming throughout this century—but also indicates that, in many regions, warming patterns are likely to vary significantly from those estimated by widely used computer models.

The new method, outlined by McGill University researchers in *Geophysical Research Letters*, is based on historical temperature increase in response to rising [greenhouse gas](#) concentrations and other [climate](#) influences. This approach could be used to complement the complex global climate models, filling a need for more reliable climate projections at the regional scale, the researchers say.

"By establishing a historical relationship, the new method effectively models the collective atmospheric response to the huge numbers of interacting forces and structures, ranging from clouds to weather systems to ocean currents," says Shaun Lovejoy, a McGill physics professor and senior author of the study.

"Our approach vindicates the conclusion of the Intergovernmental Panel on Climate Change (IPCC) that drastic reductions in [greenhouse gas emissions](#) are needed in order to avoid catastrophic warming," he adds. "But it also brings some important nuances, and underscores a need to develop historical methods for regional climate projections in order to evaluate climate-change impacts and inform policy."

In particular, the new approach suggests that for over 39% of the globe, the computer models either overestimate or underestimate significantly the pace of warming, according to Lovejoy and his co-author, Ph.D. student Raphaël Hébert (now at the Alfred-Wegener-Institut, in Potsdam).

"Global climate models are important research tools, but their regional projections are not yet reliable enough to be taken at face value," Hébert and Lovejoy asserted. "Historical methods for regional climate projections should be developed in parallel to traditional [global climate models](#). An exciting possibility for further improvements will be the development of hybrid methods that combine the strengths of both the historical and traditional approaches."

More information: Raphaël Hébert et al. Regional Climate Sensitivity- and Historical-Based Projections to 2100, *Geophysical Research Letters* (2018). [DOI: 10.1002/2017GL076649](https://doi.org/10.1002/2017GL076649)

Provided by McGill University

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