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**Workingpaper :Assessing the sustainability of optimal pollution paths in a world
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Abstract

Most formal optimal pollution control models assume a constant natural assimilative capacity, despite the biophysical evidence on feedback effects that can degrade this environmental function, as it is the case with the reduction of ocean carbon sinks in the context of climate change. The few models that do consider this degradation establish a bijective relation between the pollution stock and the assimilative capacity, thus ignoring the inertia mechanism at stake. Indeed the level of assimilative capacity is not solely determined by

the current pollution stock but by the history of this stock and by the time the ecosystem remains above the degradation threshold. We propose an inertia assessment tool that tests the sustainability of any benchmark optimal pollution path when the inertia of the assimilative capacity degradation process is taken into account. Our simulations show a strong sensitivity to both the inertia degradation speed and the discount rate.

Keywords: Optimal pollution control, Assimilative Capacity, Inertia, Ecosystem Services, Climate Change

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