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## The land-to-ocean loops of the global carbon cycle: How much do we know about long-term trends and drivers of changes in CO<sub>2</sub> fluxes ?

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This contribution presents a new view of the global carbon cycle which accounts for the land-to-ocean transport of carbon through inland waters, estuaries, tidal wetlands and continental shelf waters—the ‘land-to-ocean aquatic continuum’ (LOAC). We highlight how biogeochemical and ecological processes from land-to-ocean have been perturbed by human interventions, including atmospheric composition change, climate change and land-use change. The extend to which these anthropogenic perturbations have altered regional and global CO<sub>2</sub> budgets and trends along the LOAC are also presented and the knowledge gaps that are key to reduce uncertainties in future assessments of LOAC fluxes are identified. Finally, broader implications regarding the quantification of the terrestrial and open ocean sinks of anthropogenic carbon are briefly discussed