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Flux of Organic Carbon by Rivers to the Oceans

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RIVER TRANSPORT OF ORGANIC CARBON TO THE OCEAN

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Summary: A review of literature of DOC, POC and TOC data in more than 100 rivers is presented: Inverse relationships were found between DOC/TOC ratio and river suspended matter (C_s) as well as between POC_s (organic carbon content in river particulate material) and C_s . Space variations of DOC content and of TOC specific transport rate (TOC_{exp}) are probably linked to climatic zonation. Three different world budgets of DOC, POC and TOC are computed on the basis of few data for major rivers (Arctic rivers, Mississippi, Amazon). The necessary extrapolations are realized through DOC variation with climate, POC_s variation with C_s , and TOC_{exp} variation with runoff. The resulting TOC input from rivers to oceans is estimated at $400 \cdot 10^{12} \text{gC} \cdot \text{year}^{-1}$ (i.e. an average TOC content of $10.5 \text{mg} \cdot \text{L}^{-1}$), of which around 55% is in the dissolved form. The tropical zone should account for more than 60% of this budget. The organic carbon represents 45% of the total carbon carried by rivers and corresponds to only 1% of the continental net primary production. Due to lack of data from the tropical zone and for major rivers these figures are still known with more than 30% uncertainties.

Key words: organic carbon, world budget, river input, suspended matter.