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Estimating global dissolved carbon fluxes from soil to groundwater

Joep Langeveld (1), Wim Joost van Hoek (1), Lauriane Vilmin (1), José Mogollon (1), Arthur Beusen (1,2), Lex Bouwman (1,2), and Jack Middelburg (1)

(1) Geochemistry department, Earth Sciences, Utrecht University, Utrecht, Netherlands (j.j.langeveld@uu.nl), (2) PBL Netherlands Environmental Assessment Agency, PO Box 30314, 2500 GH The Hague, The Netherlands

The transport of dissolved carbon in water leaching from soils to groundwater may play an important role in connecting the terrestrial and aquatic carbon budgets. However, it has not been previously quantified on a global scale. Therefore large uncertainties remain regarding the size and drivers of the dissolved carbon flux from soil solution to groundwater. In order to make a first estimate of the fluxes of dissolved carbon leaching from soils, an extensive database on the current available data is set up. It involves both sampling studies and monitoring results on fluxes and concentrations of both dissolved organic (DOC) and inorganic carbon (DIC) in soil solution (leaching water). Related environmental, biological and physical circumstances are also included. Data on hydrology is provided through a hydrological model, PCR-GLOBWB. An analysis of the database is done to make a first global spatially explicit distribution of yearly DOC and DIC leaching from deeper soil layers to the groundwater. Our first estimate of the carbon leaching flux from soils enables not only to better understand but also quantify this 'missing link' between the global terrestrial and aquatic carbon budgets.