



Linking the terrestrial and aquatic system across scales: The role of connectivity, landscape organization and catchment size for the dynamics of DOC

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While the production and export of DOC – dissolved organic carbon - from the terrestrial landscape has been extensively studied during the past decades, mechanistic understanding of processes that control stream water quality at the soil/water interface, across different spatial scales, are still at its infancy. To improve the process description of DOC regulation, I use data and understanding from three decades of research that has been conducted within the interdisciplinary, multi-scale Krycklan Catchment Study (KCS) in northern Sweden (www.slu.se/Krycklan). KCS consists of 17 intensively long-term monitored catchments ranging over three orders of magnitude in size, from 3 ha to over 6780 ha, to elucidate the dominate hydrobiogeophysical processes regulating the concentration and export of nutrients, metals and organic pollutants. By combining the use of detailed catchment information with natural isotopes and the dynamics of stream biogeochemistry we can directly link variability in hydrological flow pathways, catchment characteristics and scale with the spatial and temporal dynamics of DOC. Our results suggest that the contrasting spatial variability in the flow pathways among the different landscape types has a first order control on the DOC. As a result, large variations in the dynamics of DOC and its quality are observed that varies with changes in hydrological connectivity, landscape organization and catchment size.