A conceptual model of vegetation–hydrogeomorphology interactions within river corridors (Gurnell et al. 2015) [1]

We propose a conceptual model of vegetation–hydrogeomorphology interactions and feedbacks within river corridors (i.e. river channels and their floodplains) that builds on previous similar hydrogeomorphologically centred models. The model is illustrated using three example reaches from rivers within different biogeographical zones of Europe, and its potential application in the context of river management and restoration/rehabilitation is discussed.

By ...

(i) incorporating hydrogeomorphological constraints on river corridor vegetation from region to reach scales;

(ii) defining five dynamic river corridor zones within which different hydrogeomorphological processes are dominant so that plants and physical processes interact in different ways, and considering the potential distribution of these zones longitudinally from river headwaters to mouth, laterally across the river corridor, and in relation to different river planform styles;

(iii) considering the way in which vegetation-related landforms within each zone may reflect processes of self-organization and the role of particular plant species as physical ecosystem engineers within the context of the dominant hydrogeomorphological processes;

(iv) focussing, in particular, upon a ‘critical zone’ at the leading edge of plant–hydrogeomorphological process interactions that is located somewhere within the area of the river corridor perennially inundated by flowing water (zone 1) and the area that is frequently inundated and subject to both sediment erosion and deposition processes (zone 2). Within the critical zone some plant species strongly influence the position and character of the margin between the river channel and floodplain, affecting channel width, channel margin form and dynamics, and the transition from one river planform type to another; and

(v) considering the vegetated pioneer landforms that develop within the critical zone and how their morphological impact needs to be scaled to the river size.

Key words: hydrogeomorphology; fluvial processes; biogeomorphology; riparian vegetation; aquatic vegetation

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[1] https://reformrivers.eu/conceptual-model-vegetation%E2%80%93hydrogeomorphology-interactions-within-river-corridors-gurnell-et-al
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