

Hydromorphology: Rewriting Hydrology Textbooks for a Nonstationary World

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Abstract. It is nearly impossible to find a watershed which is not influenced by human activities. Such anthropogenic influences result in changes in water infrastructure, climate, land cover and land use, all of which modify the hydrologic cycle. Current hydrology textbooks treat watersheds as if they are virgin, with little attention given to human impacts. Future hydrology texts need to accommodate humans. Here three example modifications to future hydrology texts are given concerning: (1) the water balance, (2) baseflow hydrograph recessions and (3) probabilistic and risk based hydrologic planning and design. In each case, the traditional approach for a virgin watershed is first introduced, followed by an approach which captures human influences. In all three cases incorporation of humans into the analysis leads to a much richer understanding of current hydrologic conditions. Importantly, these examples demonstrate that several ongoing scientific debates in the field hydrology are in part confounded by the fact that our understanding of the impacts of humans on hydrologic systems is limited. These examples also illustrate the tremendous challenges facing the field of hydrology in a nonstationary world which amounts to a major revision to all existing hydrology textbooks.

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