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# Some thoughts on a new hydrological theory.

Hydrology has traditionally been fragmented into numerous sub-disciplines. There are different concepts for different parts of the hydrologic cycle and different spatial and temporal scales. The various branches of hydrology, however, do show remarkable parallels. The nature of hydrological variability is remarkably similar for different processes - organised variability at many scales - and the measurement techniques available to probe them have similar characteristics as well. In this paper, these common threads will be used in discussing concepts that may help shape a theory of hydrology. Given the presence of variability at many scales, linking hydrological processes at different space and time scales is a possible starting point. In the time domain, event scale processes can be linked to the seasonal water balance and vice versa; seasonal processes to long term behaviour etc.. The important thing here would be to formulate processes simultaneously at various scales and then link them, rather than to upscale small scale processes all the way to obtain aggregate behaviour. The scale links will be controlled by the type of variability to be captured. A new theory may involve an increased focus on interactions and feedbacks between different processes such as those involving vegetation. Much of the exiting research in hydrology, currently, focuses on the interfaces between media, between macropores and the matrix in soils, streams and aquifers, the land and the atmosphere to name only a few. Connecting these domains may become instrumental in shaping a new theory. There is, however, a tendency for arriving at an exceedingly large complexity as one builds together candidate components of a model or a theory. The level of complexity of a theory will clearly be an important consideration. An elegant, parsimonious theory may be favoured over a more complex one provided it captures the essential complexity. Observed space-time patterns of hydrological variables are becoming available by novel measurement techniques and these may greatly assist in defining the structure of the essential processes to be dealt with. Detailed process knowledge has been obtained in numerous research catchments which is difficult to generalise to parts of the landscape where less detailed information is available. To address this generalisation issue, a theory may use comparative hydrology to bring order in a seemingly chaotic collection of observational results.