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Water Resource Research Is Evolving in An Interdisciplinary Manner

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Editorial

Hydrology has advanced greatly as a scientific discipline since its formal recognition in the mid-twentieth century. There have been some concerns raised regarding modern water supplies. forced interdisciplinary history from purely physical or engineering research perspectives. Many of the eventual manifestations of this evolution were predicted by influential expert hydrologists over the last few decades. Their narrative explanations, on the other hand, lacked substantial quantification.

Hydrology was born out of chemistry in the mid-twentieth century as a distinct physical geoscience. The newly recognized status of hydrology as a separate scientific discipline was marked by the establishment of two prominent hydrology journals, Journal of Hydrology and Water Resources Research, respectively, in 1963 and 1965. More than two decades later, hydrology was still regarded as a "add-on" to physics and engineering, a discipline to be dabbled in but one that had not yet reached its full potential. In 1991, a study from the National Academy of Sciences called for an interdisciplinary approach to hydrology that considered a variety of global perspectives and influences.

Hydrology and water resource research have progressed significantly since then, with prominent intersections with geology, ecology, climate science, and social sciences. These overlaps have resulted in hydrologic subdisciplines that offer scientists a wide range of possible self-identification options. Even though this may lead to a “lack of synthesis” in the area, these apparently unrelated studies extend hydrology to account for a required broader scale background. Many definitions and explanations of hydrology's advancement have already been written, typically by well-known experts in the area. However, rather than conclusions derived from quantitative observations, these are most often qualitative narratives guided by personal experience and observation.

This research is focused on the evolution of hydrology and water resource science, with the aim of identifying past, current, and possibly future evolutionary patterns using measurable data. We hypothesized that hydrology has become more interdisciplinary and refined as a discipline, with emerging subdisciplines reflecting either interfaces between conventional hydrology and other completely different disciplines or a narrowing of hydrologic inquiries within the field.

The titles of publications provide a clear view into what is being said in a scientific field. Linkages between research subjects and disciplines may be examined by looking at the frequency and cooccurrence of terms used in article titles. Coward study of words used together in titles exposes research patterns that arise and fade over time, giving insight into a discipline's primary concerns. Title analysis will reveal how and when research focuses are related, as well as whether promoting cross-specialty communication is beneficial. Furthermore, a network of words that often occur together can be used as the basis for applied network metrics using the lens of co word analysis. Weighted metrics express the topology of the coward network, accounting for differing magnitudes of cooccurrence over time, and are then used to evaluate the most central and dominant themes of a scientific discipline.

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