Environmental Tracers: Historical Perspectives And Future Trends

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Over the past 25 years an exponential increase in the use of environmental tracers has occurred in disciplines such as oceanography, hydrogeology, catchment hydrology, and atmospheric sciences. In part, this is due to advances in analytical methods such as cavity ring-down spectroscopy resulting in large and in some cases global data sets. However, very few validations experiments in controlled settings have been reported. While environmental tracers have many potential strengths such as the integration of fluid velocities into meaningful average values, many challenges exist when quantitatively relating measuresments to process-based numerical models. Of particular importance is the role of environmental tracer measurements in evaluating global resources. This presentation will review some of the major advances in environmental tracers, and then address some of the major gaps in both the theoretical and practicle use of tracers. There is a need for globally coordinated efforts to validate interpretation methodologies, to regulate indescriminant use of some injected tracers, and to fortify global data sets.