



## **Hydrological response of forest change across multiple spatial scales-a global review**

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Forest-water relationships are highly variable among watersheds due to differences in topography, climate, soil, vegetation, geology, and landscape. These interactions are also being altered by climate change and anthropogenic activities, resulting in a non-stationary forest-water relationship. Though interactions between forest and water have been studied for over a century, there still lacks a comprehensive understanding of hydrological responses to forest change and associated mechanisms across multiple spatial scales or the impacts of climate change on forest-water relationships. Thus, this talk aims: 1) to provide a generalized relationship to evaluate hydrological responses to forest change and to identify the role of spatial scale, climate, forest type and hydrological regime in determining hydrological responses to forest change in both small ( $<1000 \text{ km}^2$ ) and large watersheds ( $\geq 1000 \text{ km}^2$ ) based on a global review; 2) to identify knowledge gaps in the scientific community and to highlight future research challenges such as well-designed long-term monitoring networks of forest-water interactions across multiple spatial and temporal scales, the modelling of non-stationary forest-water interactions, and the development of new theories and techniques to explain the variations in hydrological responses to forest change across scales; 3) to provide scientific supports for strategies designs of forest and water management in the context of climate change and anthropogenic disturbances.

**Keywords:** Forest change, hydrological response, spatial scale, forest type, hydrological regime