

## Foreword

### Hydrology and biogeochemistry of forested catchments

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A Joint US–Japan Seminar on Forest Hydrology and Biogeochemistry was held on 1–4 February 2000 at the East–West Center in Honolulu, Hawaii. The purpose of the seminar was to examine the similarities and differences in catchment hydrology research between Japan and the US and to highlight some of the recent and ongoing studies from both countries. A workshop component of the meeting facilitated informal exchange of ideas and approaches to educate the participants on activities in both regions. McDonnell and Tanaka (*HPToday* Commentary, this issue) synthesize the questions and discussions that emerged from the meeting, that provides the framework for a robust quantitative description of hydrological flowpaths that control biogeochemistry at the catchment scale in forested systems.

Studies of catchment hydrology have evolved differently in the US and Japan. Much catchment research in the US has been motivated by interest in explaining stream water chemistry. In contrast, investigations on catchment hydrology in Japan have been more process oriented, initiated by geotechnical questions (Tsukamoto, 1963). As a result, the strengths of the two countries differ. Interdisciplinary approaches are common in the US but rarer in Japan. On the other hand, Japanese hydrologists have developed very sophisticated and novel hillslope and catchment monitoring approaches that aid in the interpretation of processes. Until recently, interactions between hydrological scientists in Japan and the US have not been extensive. The last formal exchange was the US–Japan Joint Seminar on Integration of Physical Insight Into New Approaches in Hydrology held in Hawaii in January 1987. Bras *et al.* (1988) synthesized these discussions and papers into a special issue of the *Journal of Hydrology* (Vol. 102). Since this 1987 seminar, the field of hydrology has grown rapidly and the scope of research within the two countries has also changed. Understanding the linkages between hydrology and biogeochemistry of small forested catchments has been highlighted in the US by recent National Research Council (NRC) reports as one of the most pressing needs in watershed research (Eagleson, 1991; Hornberger, 1997). Understanding the interactions between hydrology and biogeochemistry as a critical and under-recognized component of watershed research has also been emphasized (e.g. Cirimo and McDonnell, 1997). Several programmes at the US National Science Foundation (NSF) now promote research on these interactions.

Japan has many instrumented headwater catchments (operated by various university researchers and the Japan Forestry and Forest Products Research Institute), several of which were highlighted during the 1987 meeting. Reports of research at these sites have appeared recently in international journals such as *Water Resources Research* (e.g. Tsuboyama *et al.*, 1994), the *Journal of Hydrology* (e.g. Tani, 1997), and *Hydrological Processes* (e.g. Kondoh, 2000), but much of it remains within the main Japanese-language hydrology publications (e.g. *Journal of the Japan Society of Hydrology and Water Resources* and *Journal of the Japanese Association of Hydrological Sciences*). More exchange of information is clearly needed. This need is highlighted by the fact that many of the Japanese watersheds now have chronically high surface water nitrate concentrations (Mitchell *et al.*, 1997; Ohte *et al.*, 2001). While Japan leads the world in research of hillslope processes and preferential flowpaths of subsurface water, scientists in the US have made major advancements in catchment biogeochemical studies. To date, there has been little exchange between physical hydrologists and biogeochemically-oriented researchers in Japan and the US due to both language difficulties and the very different development of hydrology as a science in both countries.

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