



## **Andrew C. WHITAKER, Ph.D.**

Associate Professor

Program: Environmental Science and Technology

Area: Environmental Science for Agriculture and Forestry

Undergraduate: Dept. of Prod. & Environmental Science

<http://www.agr.niigata-u.ac.jp/profile/whitaker/index.html>

### **Professional Expertise**

- Specialist of catchment hydrology, hydrological modeling, forest and snow hydrology, forest and environmental management, climatology, sediment transport and channel stability
- Field researcher monitoring in hydrology and water resources, including flow gauging, sediment and water quality monitoring, stream channel surveying, weather stations and snow survey

### **Research Fields of Interest**

#### *1. Influence of climate change on the hydrological regime in headwater basins*

Climate change scenarios published by IPCC show a winter warming of 2-3°C by 2100, which will mean reduced spring snowpack and less snowmelt during the season when irrigation demand is high. I am using hydrological and snowmelt modeling techniques to predict the likely changes in the seasonal flows of rivers due to climate change.

#### *2. Estimation of snowpack water and energy balance under forest canopies*

Forest canopies strongly control the water and energy balance of the snowpack, which in turn determines the amount and rate of snowmelt and river runoff. What happens to snow caught in the forest canopy? How is the water and energy balance different between species and between different forest management plans? These are the questions I am researching through field monitoring and snow lysimeter measurements.

#### *3. Suspended sediment and bed load dynamics in gravel bed streams*

Over several years I have been monitoring the suspended sediment yield in the Takiya River, northern Niigata Prefecture. We have tracked changes in the magnitude of sediment yield after the occurrence of extreme summer floods. Extreme rainfall and flooding trigger landslides, and these in turn lead to channel instability as the river adjusts to transport the sediment downstream.

### **Education**

1997: Ph.D. in Forest Hydrology, School of Forestry, University of Montana, USA

1992: M.Sc. in Engineering Hydrology, School of Civil Engineering, University of Newcastle Upon Tyne, UK

1991: B.Sc. in Geography, School of Geography, University of Bristol, UK

### **Professional Societies and Activities**

1. American Geophysical Union
2. International Association of Hydrological Sciences (IAHS)
3. Japan Society of Hydrology and Water Resources

## Reviewer Activities

1. Hydrological Processes
2. Hydrological Research Letters
3. J. American Water Res. Assoc.
4. Annals of Glaciology
5. Catena

## Major Publications

### Papers

- [1] "Polarimetric SAR Response of Snow-Covered Area Observed by Multi-Temporal ALOS PALSAR Fully Polarimetric Mode." *IEEE Transactions on Geoscience and Remote Sensing* 52(1), 329-340. DOI: 10.1109/TGRS.2013.2240000, 2014.
- [2] "Climate change impacts on the seasonal distribution of runoff in a snowy headwater basin, Niigata." *Hydrological Research Letters* 6, 7-12. DOI: 10.3178/HRL.6.7, 2012.
- [3] "Changing suspended sediment dynamics due to extreme flood events in a small pluvial-nival system in northern Japan." In: *Sediment Dynamics in Changing Environments* (Proceedings of symposium held in Christchurch, New Zealand, December 2008). IAHS Publ. 325, 192-199, 2008.
- [4] "Effect of snow cover conditions on the hydrologic regime: case study in a pluvial-nival watershed, Japan." *J. of American Water Resources Association (JAWRA)* 44(4):814-828. DOI: 10.1111/j.1752-1688.2008.00206.x, 2008.
- [5] "Coarse bed load transport in an alluvial gravel bed stream, Dupuyer Creek, Montana." *Earth Surface Processes and Landforms* 32(13), 1984-2004. DOI: 10.1002/esp.1512, 2007.
- [6] "Analysis of flow competence in an alluvial gravel bed stream, Dupuyer Creek, Montana." *Water Resources Research* 43, W07433. DOI:10.1029/2006WR005289, 2007.
- [7] "Seasonal snowpack dynamics and runoff in a cool temperate forest: lysimeter experiment in Niigata, Japan." *Hydrological Processes* 19, 4179-4200. DOI: 10.1002/hyp.6059, 2005.
- [8] "Stochastic flow duration curves for evaluation of flow regimes in rivers." *J. of American Water Resources Association (JAWRA)* 39(1), 1-12, 2003.
- [9] "Application of the Distributed Hydrology Soil Vegetation Model to Redfish Creek, British Columbia: model evaluation using internal catchment data." *Hydrological Processes* 17, 199-224. DOI: 10.1002/hyp.1119, 2003.
- [10] "Evaluating peak flow sensitivity to clear-cutting in different elevation bands of a snowmelt-dominated mountainous catchment." *Water Resources Research* 38(9), 1172. DOI: 10.1029/2001WR000514, 2002.

