Dr. Jessie Cable, one of the newest members of IARC’s science faculty, conducts a wide range of research into the dynamics of the Arctic and boreal water cycles. Cable studied ecology in the southwestern United States before becoming interested in the unique conditions that face plants and water in Alaska.

Jessie Cable was interviewed recently by IARC’s Publications team regarding her current work and interests.

What do you find compelling about practicing your science in Alaska?

As an ecohydrologist, I am focused on the way water moves through an ecosystem, and the interior of Alaska provides opportunities and sites for ecohydrology study not available elsewhere. A major and unique hydrological factor here is the varying existence of permafrost, which affects water that is usable to plants and increases the water that is stored near the surface for plants to use. For anyone interested in how water moves into and out of the ground, through ecosystems, and into the atmosphere, this feature transforms how the process occurs.

What would people be interested to know about your current work?

I’m primarily interested in the role of plants in the water cycle, and to investigate this, I’ve worked to classify ways that different types of plants use water. One important distinction that I’ve been studying is between coniferous (cone-bearing, such as black spruce) and deciduous (leafy, such as birch and aspen) plants. By placing sensors in these trees, I’ve been able to identify with some precision how much and how quickly water moves through them. The conifers, which dominate the areas underlain by permafrost and the stable water source it represents, are much less active in the water cycle than are the deciduous trees, which cover ground that seasonally thaws and which process water at a much higher rate and volume.

Further, because ground ice is able to trap and store, and then release, water over very long periods of time, we can study a mix of water from different time periods and geographic origins, by comparing H_2O isotopes. These isotopes, which act as “signatures” of water molecules, can be observed in the water and vapor that is used and “breathed out” by the plants. In these groundwater studies, I am then able to identify where the water these plants are using comes from—that is, which underground layer is providing water to these plants. These characteristics can also be used to construct theoretical ecosystem “memory” models that display past conditions, which continue to have effects on the water cycle of today.

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What impacts might your work have on broader scientific discussions?

Because plants don’t use 100% of the water they take in during their process of transpiration (“breathing”), water vapor (in addition to carbon dioxide and oxygen) is also a byproduct. And because water vapor is among the most potent and prevalent greenhouse gases, the role of plant transpiration is very important when discussing greenhouse effects upon the earth’s climate. By understanding the specifics of how these trees and plants are using and releasing water, we can more accurately assess and predict their effects.

What other interests do you have, outside of your research?

I’ve always liked to spend time outdoors and in nature, and I run and ski here as much as I can. I also draw and paint, activities that have found their way into my professional work by way of research illustrations and visual components. And I feel strongly that it’s important for the science community to maintain strong ties with the larger public, so I take part in a wide range of outreach activities, including teacher training and classroom workshops, and public lectures.