Modeling hydrology in a Rocky Mountain peatland

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Abstract. Peatlands are wetland ecosystems that have accumulated organic matter over relatively long periods of time. Thus, they have played a critical role as stable, long-term C sinks in the biosphere. In addition to their importance regarding ecosystem-atmosphere C exchange, peatlands often act as important regulators of groundwater flow, attenuating flow in wet conditions, and promoting flow during dry periods. In North America, tens of thousands of relatively small peatlands, dominated by boreal plant species, occur at their southernmost limit in the Rocky Mountains. Climatic warming in the Rocky Mountains has reduced snow water equivalent as a result of reduced snowfall, increased winter rainfall, and earlier melting of snow-pack. This has led to earlier spring stream flows and reduced summer flows. It is unclear how climate affects the hydrologic regime and ecosystem-atmosphere C exchange in Rocky Mountain peatlands. Because climate change could shift peatlands from C sinks to sources, and because these ecosystems play an important role in regulating water flow to semiarid regions of the US, it is critical to gain a better understanding of how hydrologic regime and C cycling in these ecosystems are linked to climate. I am currently studying the interaction between climate, hydrologic regime, and C cycling in peatlands found in different regions of the Rocky Mountains. Part of this research involves modeling hydrologic inputs and outputs for these systems. Here I present initial hydrological modeling results for a subalpine peatland located in the San Juan Mountains of southern Colorado.

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