

References

- Alberta Environment and Parks, 2014. Air Photos, RGB Ortho Southern Alberta Post Flood 2013. [online] <https://maps.alberta.ca/genesis/rest/services>.
- Bavay, M., Grünewald, T., & Lehning, M., 2013. Response of snow cover and runoff to climate change in high Alpine catchments of Eastern Switzerland. *Advances in Water Resources*, 55, 4-16.
- Beierle, B.D., Smith, D.G., & Hills, L.V., 2003. Late quaternary glacial and environmental history of the Burstall Pass area, Kananaskis Country, Alberta, Canada. *Arctic, Antarctic, and Alpine Research*, 35, 391-398.
- Bencala, K.E., 1983. Simulation of solute transport in a mountain pool-and-riffle stream with a kinetic mass transfer model for sorption. *Water Resources Research*, 19, 732-738.
- Benyahya, L., Caissie, D., El-Jabi, N., & Satish, M.G., 2010. Comparison of microclimate vs. remote meteorological data and results applied to a water temperature model (Miramichi River, Canada). *Journal of Hydrology*, 380, 247-259.
- Brown, L.E., Hannah, D.M., & Milner, A.M., 2005. Spatial and temporal water column and streambed temperature dynamics within an alpine catchment: implications for benthic communities. *Hydrological Processes*, 19, 1585-1610.
- Brown, L.E., Hannah, D.M., & Milner, A.M., 2006. Thermal variability and stream flow permanency in an alpine river system. *River Research and Applications*, 22, 493-501.
- Brown, L.E., Milner, A.M., & Hannah, D.M., 2007. Groundwater influence on alpine stream ecosystems. *Freshwater Biology*, 52, 878-890.
- Brown, L.E., & Hannah, D.M., 2007. Alpine stream temperature response to storm events. *Journal of Hydrometeorology*, 8, 952-967.
- Caissie, D., 2006. The thermal regime of rivers: a review. *Freshwater Biology*, 51, 1389-1406.
- Caissie, D., & Luce, C.H., 2017. Quantifying streambed advection and conduction heat fluxes. *Water Resources Research*, 53, 1595-1624.
- Christensen, C.W., Hayashi, M., & Bentley, L.R., 2020. Hydrogeological characterization of an alpine aquifer system in the Canadian Rocky Mountains. *Hydrogeology Journal*, 28, 1871-1890.
- Constantz, J., 1998. Interaction between stream temperature, streamflow, and groundwater exchanges in alpine streams. *Water Resources Research*, 34, 1609-1615.
- Coplen, T.B., 1995. Reporting of stable carbon, hydrogen, and oxygen isotopic abundances. *Reference and Intercomparison Materials for Stable Isotopes of Light Elements*, 825, 31-34.
- Crawler M, Labelle C, Mark D, Mark W, Willie K. 1987. Ozade – Mmnotha Wapta Makochi, Stoney Place Names. Chiniki Band Council, Morley, Alberta, 109 pp.
- Dingman, S.L., 2002. Physical Hydrology Waveland Press. *Long Grove, Illinois*.
- DMTI Spatial Inc., 2017. CanMap Water. Markham, Ontario: DMTI Spatial Inc. [Accessed 2020, June 5th] <https://library.ucalgary.ca/sands>
- Dripps, W., & Granger, S.R., 2013. The impact of artificially impounded, residential headwater lakes on downstream water temperature. *Environmental Earth Sciences*, 68, 2399-2407.
- Dunne, T., & Leopold, L.B., 1978. *Water in environmental planning*. Macmillan.

- Ebersole, J.L., Liss, W.J., & Frissell, C.A., 2001. Relationship between stream temperature, thermal refugia and rainbow trout *Oncorhynchus mykiss* abundance in arid-land streams in the northwestern United States. *Ecology of Freshwater Fish*, 10(1), 1-10.
- Escher-Vetter, H., & Siebers, M., 2007. Sensitivity of glacier runoff to summer snowfall events. *Annals of Glaciology*, 46, 309-315.
- Evans, E.C., McGregor, G.R., & Petts, G.E., 1998. River energy budgets with special reference to river bed processes. *Hydrological Processes*, 12, 575-595.
- Fang, X., & Pomeroy, J.W., 2020. Diagnosis of future changes in hydrology for a Canadian Rockies headwater basin. *Hydrology and Earth System Sciences*, 24, 2731-2754.
- Gariglio, F.P., Tonina, D., & Luce, C.H., 2013. Spatiotemporal variability of hyporheic exchange through a pool-riffle-pool sequence. *Water Resources Research*, 49, 7185-7204.
- Garner, G., Malcolm, I.A., Sadler, J.P., Millar, C.P., & Hannah, D.M., 2015. Inter-annual variability in the effects of riparian woodland on micro-climate, energy exchanges and water temperature of an upland Scottish stream. *Hydrological Processes*, 29, 1080-1095.
- Garner, G., Malcolm, I.A., Sadler, J.P., & Hannah, D.M., 2017. The role of riparian vegetation density, channel orientation and water velocity in determining river temperature dynamics. *Journal of Hydrology*, 553, 471-485.
- Garrett, J.D., 2010. Pervasive thermal consequences of stream-lake interactions in small Rocky Mountain watersheds, USA. M.Sc. Thesis. Utah State University, Logan, Utah.
- Glose, A., Lautz, L.K., & Baker, E.A., 2017. Stream heat budget modeling with HFLUX: Model development, evaluation, and applications across contrasting sites and seasons. *Environmental modelling & software*, 92, 213-228.
- Gravelle, J.A., & Link, T.E., 2007. Influence of timber harvesting on headwater peak stream temperatures in a northern Idaho watershed. *Forest Science*, 53, 189-205.
- Harder, P., Pomeroy, J.W., & Westbrook, C.J., 2015. Hydrological resilience of a Canadian Rockies headwaters basin subject to changing climate, extreme weather, and forest management. *Hydrological Processes*, 29, 3905-3924.
- Harrington, J.S., Mozil, A., Hayashi, M., & Bentley, L.R., 2018. Groundwater flow and storage processes in an inactive rock glacier. *Hydrological Processes*, 32, 3070-3088.
- Harrington, J.S., Hayashi, M., & Kurylyk, B.L., 2017. Influence of a rock glacier spring on the stream energy budget and cold-water refuge in an alpine stream. *Hydrological Processes*, 31, 4719-4733.
- Hayashi, M., 2020. Alpine hydrogeology: The critical role of groundwater in sourcing the headwaters of the world. *Groundwater*, 58, 498-510.
- Hayashi, M., & Rosenberry, D.O., 2002. Effects of ground water exchange on the hydrology and ecology of surface water. *Groundwater*, 40, 309-316.
- Hebert, C., Caissie, D., Satish, M.G., & El-Jabi, N., 2011. Study of stream temperature dynamics and corresponding heat fluxes within Miramichi River catchments (New Brunswick, Canada). *Hydrological Processes*, 25, 2439-2455.
- He, J., 2021. The properties and hydrogeological function of alpine surficial deposits in a headwater watershed., University of Calgary, M.Sc. Thesis, University of Calgary, Calgary, Canada.
- Hood, J.L., & Hayashi, M., 2015. Characterization of snowmelt flux and groundwater storage in an alpine headwater basin. *Journal of Hydrology*, 521, 482-497.

- Hood, J.L., Roy, J.W., & Hayashi, M., 2006. Importance of groundwater in the water balance of an alpine headwater lake. *Geophysical Research Letters*, 33.
<https://doi.org/10.1029/2006GL026611>
- Isaak, D.J., Wollrab, S., Horan, D., & Chandler, G., 2012. Climate change effects on stream and river temperatures across the northwest US from 1980–2009 and implications for salmonid fishes. *Climatic Change*, 113, 499–524.
- Johnson, A.N., Boer, B.R., Woessner, W.W., Stanford, J.A., Poole, G.C., Thomas, S.A., & O'Daniel, S.J., 2005. Evaluation of an inexpensive small-diameter temperature logger for documenting ground water–river interactions. *Groundwater Monitoring & Remediation*, 25, 68–74
- Kurylyk, B.L., MacQuarrie, K.T., & McKenzie, J.M., 2014. Climate change impacts on groundwater and soil temperatures in cold and temperate regions: Implications, mathematical theory, and emerging simulation tools. *Earth-Science Reviews*, 138, 313–334.
- Lautz, L.K., & Siegel, D.I., 2007. The effect of transient storage on nitrate uptake lengths in streams: An inter-site comparison. *Hydrological Processes*, 21, 3533–3548.
- Leach, J.A., & Moore, R.D., 2019. Empirical stream thermal sensitivities may underestimate stream temperature response to climate warming. *Water Resources Research*, 55, 5453–5467.
- Leach, J.A., & Moore, D., 2017. Insights on stream temperature processes through development of a coupled hydrologic and stream temperature model for forested coastal headwater catchments. *Hydrological Processes*, 31, 3160–3177.
- Leach, J.A., & Moore, R.D., 2010. Above-stream microclimate and stream surface energy exchanges in a wildfire-disturbed riparian zone. *Hydrological Processes*, 24, 2369–2381.
- Liu, F., Williams, M.W., & Caine, N., 2004. Source waters and flow paths in an alpine catchment, Colorado Front Range, United States. *Water Resources Research*, 40.
<https://doi.org/10.1029/2004WR003076>.
- Magnusson, J., Jonas, T., & Kirchner, J.W., 2012. Temperature dynamics of a proglacial stream: Identifying dominant energy balance components and inferring spatially integrated hydraulic geometry. *Water Resources Research*, 48. <https://doi.org/10.1029/2011WR011378>.
- Marcotte, N., & Duong, V.L., 1973. Le calcul de la température de l'eau des rivières. *Journal of Hydrology*, 18, 273–287.
- Marks, D., Winstral, A., Reba, M., Pomeroy, J., & Kumar, M., 2013. An evaluation of methods for determining during-storm precipitation phase and the rain/snow transition elevation at the surface in a mountain basin. *Advances in Water Resources*, 55, 98–110.
- MathWorks, 2020a. fminunc. [Accessed 2020, March 23rd]
<https://www.mathworks.com/help/optim/ug/fminunc.html>
- MathWorks, 2020b. MATLAB, R2019a [computer software]. Natick, Massachusetts, USA.
- Mellina, E., Moore, R.D., Hinch, S.G., Macdonald, J.S., & Pearson, G., 2002. Stream temperature responses to clearcut logging in British Columbia: the moderating influences of groundwater and headwater lakes. *Canadian Journal of Fisheries and Aquatic Sciences*, 59, 1886–1900.
- McMechan ME. 2012. Geology, Spray Lakes Reservoir, Alberta - British Columbia: Geological Survey of Canada, Canadian Geoscience Map 14. Ottawa: Natural Resources Canada. 1 sheet. DOI: 10.4095/288954.
- Moore, R.D., Sutherland, P., Gomi, T., & Dhakal, A., 2005. Thermal regime of a headwater stream within a clear-cut, coastal British Columbia, Canada. *Hydrological Processes*, 19, 2591–2608.

- Moore, R., Spittlehouse, D.L., & Story, A., 2005. Riparian microclimate and stream temperature response to forests harvesting: a review. *Journal of the American Water Resources Association*, 41, 813-834.
- Mote, P.W., Hamlet, A.F., Clark, M.P., & Lettenmaier, D.P., 2005. Declining mountain snowpack in western North America. *Bulletin of the American meteorological Society*, 86, 39-50.
- Natural Resources Canada, 2015. Canadian Digital Elevation Model. [Accessed 2020, June 5th] <https://open.canada.ca/en>
- Oke, T.R., 1987. Boundary layer climates Routledge. London: Mathuem & CO.
- O'Neil, H.C.L., Prowse, T.D., Bonsal, B.R., & Dibike, Y.B., 2017. Spatial and temporal characteristics in streamflow-related hydroclimatic variables over western Canada. Part 1: 1950–2010. *Hydrology Research*, 48, 915-931.
- Pomeroy, J.W., Marks, D., Link, T., Ellis, C., Hardy, J., Rowlands, A., & Granger, R., 2009. The impact of coniferous forest temperature on incoming longwave radiation to melting snow. *Hydrological Processes*, 23, 2513-2525.
- Prechsl, U.E., Gilgen, A.K., Kahmen, A., & Buchmann, N., 2014. Reliability and quality of water isotope data collected with a low-budget rain collector. *Rapid Communications in Mass Spectrometry*, 28, 879-885.
- Roesky, B. J. 2020. The Thermal Regime and Groundwater-Surface Water Exchange in a Sub Alpine Headwater Stream. M.Sc. Thesis. University of Calgary, Calgary, AB.
- Runkel, R.L., 1998. One-dimensional transport with inflow and storage (OTIS): A solute transport model for streams and rivers. *US Department of the Interior, US Geological Survey*, (Vol. 98, No. 4018).
- Smart, P.L., & Laidlaw, I.M.S., 1977. An evaluation of some fluorescent dyes for water tracing. *Water resources research*, 13, 15-33.
- Somers, L.D., Gordon, R.P., McKenzie, J.M., Lautz, L.K., Wigmore, O., Glose, A., Glas, R., Aubry-Wake, C., Mark, B., Baraer, M., & Condom, T., 2016. Quantifying groundwater–surface water interactions in a proglacial valley, Cordillera Blanca, Peru. *Hydrological Processes*, 30, 2915-2929.
- Stewart, I.T., Cayan, D.R., & Dettinger, M.D., 2005. Changes toward earlier streamflow timing across western North America. *Journal of climate*, 18, 1136-1155.
- Webb, B.W., & Zhang, Y., 1997. Spatial and seasonal variability in the components of the river heat budget. *Hydrological Processes*, 11, 79-101.