

CURRICULUM VITAE

Chris Holmden

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Education

Ph.D. October 1995, Geology,
 University of Alberta
 B.Sc. April 1990, Geology
 McMaster University

Professional experience

2015–2020 McLeod Enhancement Chair, Geological Sciences, University of Saskatchewan
 2015 – Visitor in Geochemistry, Caltech
 2015 – Visiting Scientist, University of California, Riverside
 2007 – Full Professor, University of Saskatchewan
 2003 – Visiting Scholar, Universidad de Nacional de Mexico, Institute de Ciencias de Limnologia del Mar
 2004 – Visitor in Geochemistry, Caltech
 1998 – Associate Professor, University of Saskatchewan
 1996 – Assistant Professor, University of Saskatchewan
 1995 – Post-doctoral Scholar, Caltech

Professional Affiliations

Geochemical Society
 American Geophysical Union
 Geological Society of America
 Geological Association of Canada, Mineralogical Association of Canada

Research Interests

Isotope science (U, Nd, Sr, H, C, O, Ca, Mg and Cr), isotope proxy development for earth system science applications, oceanography, global change, paleoclimate, isotope hydrology, C and Cr cycling in ancient oceans, chemical weathering, geochronology and Ca and Sr cycling in soils and forests. Dolomitization and paleofluid flow in the Williston Basin. Mg tracing of carnallite diagenesis and K-Ca dating of potash deposits.

Publications using Mg and Ca isotopes (*student author)

Kimmig SR*, Nadeau MD*, Swart PK, Holmden C (2021) Mg and Sr isotopic evidence for basin wide alteration of early diagenetic dolomite in the Williston Basin by ascending crustal fluids. *Geochimica et Cosmochimica Acta*: 311 198-225
 Murray S*, Higgins JA, Holmden C, Lu C, Swart PK (2020) Geochemical fingerprints of dolomitization in Bahamian carbonates: Evidence from sulphur, calcium, magnesium, and clumped isotopes. *Sedimentology*: 1–29 doi: 10.1111/sed.12775.

- Nadeau MD*, Kimmig SR* and **Holmden C** (2020) Basin-wide gradients in dolomite $\delta^{26}\text{Mg}$ and $^{87}\text{Sr}/^{86}\text{Sr}$ identify the deep structural center of the Williston Basin as a source of magnesium for dolomitization of the Middle Devonian Winnipegosis Formation. In *Summary of Investigations 2019*, Volume 1, Saskatchewan Geological Survey, Saskatchewan Ministry of Energy and Resources. Miscellaneous Report 2019-4.1 Paper A-1, 21pages
- Higgins J, Blättler* C, Lundstrom E*, Santiago-Ramos* D, Akhtar* A, Crüger A, Ahm* A, Bialik* O, **Holmden C**, Bradbury H, Murray S, and Swart P. (2018). Mineralogy, early marine diagenesis, and the chemistry of shallow-water carbonate sediments. *Geochimica et Cosmochimica Acta*. 220: 512-534.
- Kimmig S.R.* and **Holmden C**. (2017) Multi-proxy evidence for primary aragonite precipitation in a tropical-shelf 'calcite sea' during the Hirnantian glaciation *Geochimica et Cosmochimica Acta*: 206, 254–272.
- Holmden, C**. (2005) Measurement of $\delta^{44}\text{Ca}$ using a ^{43}Ca - ^{42}Ca double-spike TIMS technique. In Summary of Investigations 2003, volume 1, Saskatchewan Geological Survey, Saskatchewan Industry and Resources, Miscellaneous Report 2005-1, CD-ROM, Paper A-4 7p.

Other recently published articles

- *Nana Yobo L., **Holmden C.**, Brandon AD, Lau KV, Eldrett JS, Bergman S. (2022) LIP volcanism (not anoxia) tracked by Cr isotopes during Ocean Anoxic Event 2 in the proto-North Atlantic region. *Geochimica et Cosmochimica Acta*: 332, 138–155.
- *McDonald BS, Partin CA, Sageman B., **Holmden C**. (2022) Uranium isotope reconstruction of ocean deoxygenation during OAE 2 hampered by uncertainties in fractionation factors and local U–cycling. *Geochimica et Cosmochimica Acta*: 331, 143–164.
- Greenfield TL, McMahon AM, O'Connell TC, Reade H, **Holmden C**, Fletcher AC, Zettler RL, Petrie CA (2022) Were there royal herds? Understanding herd management and mobility using isotopic characterizations of cattle tooth enamel from Early Dynastic Ur. *Plos One*: 17 (6), e0265170. Impact factor 3.75.
- *Davidson AB, **Holmden C**, Nomosatryo S, Henny C, Francois R, Crowe SA (2021) Cr isotopes and the engineered attenuation of Cr(VI)-rich runoff. *Environmental Science and Technology*: 55, 14938-14945.
- *Nana Yobo L, Brandon AD, **Holmden C**, Lau KV, Eldrett J. (2021) Changing inputs of continental and submarine weathering sources of Sr to the oceans during OAE 2 *Geochimica et Cosmochimica Acta*: 303, 205-225.
- * Shao Y, Farkas J, Mosley L., Tyler J., Wong H., Chamberlayne B., Raven M., Samanta M., **Holmden C.**, Gillanders B.M., Kolevica A., Eisenhauer A. (2021) (2021) Impact of salinity and carbonate saturation on stable Sr isotopes ($\delta^{88/86}\text{Sr}$) in a lagoon-estuarine system *Geochimica et Cosmochimica Acta*: **293**, 461-476. *Geochimica et Cosmochimica Acta*: 230, 60–82.
- Davidson AB*, Semeniuk DM*, Koh J, **Holmden C**, Jaccard SL, Francois R (2020) A $\text{Mg}(\text{OH})_2$ coprecipitation method for determining chromium speciation and isotopic composition in seawater. *Limnology and Oceanography: Methods*: **18** (1).
- Murray S.*, Higgins JA, **Holmden C**, Lu C, Swart PK (2020) Geochemical fingerprints of dolomitization in Bahamian carbonates: Evidence from sulphur, calcium, magnesium, and clumped isotopes. *Sedimentology*: 1–29 doi: 10.1111/sed.12775.
- Novak M, **Holmden C**, Farkaš J, Kram P, Hruska J, Curik J, Veselovsky F, Stepanova M, Kochergina YV, Erban V, Fottova D, Simecek M, Bohdalkova L, Prechova Eva, Voldrichova P, Cernohous V (2020) Calcium and strontium isotope dynamics in three polluted forest ecosystems of the Czech Republic, Central Europe. *Chemical Geology*: 536, 1–12, 119472

- Toma J*, **Holmden C**, Shakotko P, Pan Y, Oates, L (2019). Cr isotopic insights into ca. 1.9 Ga oxidative weathering of the continents using the Beaverlodge Lake paleosol, Northwest Territories. *Geobiology*: 17, 467-489.
- Shao Y*, Farkas J, **Holmden C**, Mosley L, Kell-Duivesteyn I, Izzo C, Rei-Santos P, Tyler J, Torber P, Fryda J, Taylor H, Haynes D, Tibby J, Gillanders B. (2018). Calcium and strontium isotope systematics in the lagoon-estuarine environments of South Australia: Implications for water source mixing, carbonate fluxes and fish migration. *Geochimica et Cosmochimica Acta*. 239: 90-108.
- Kimmig S*, **Holmden C**, Belanger N. (2018). Biogeochemical cycling of Mg and its isotopes in a sugar maple forest in Quebec. *Geochimica et Cosmochimica Acta*: 230: 60-82.
- Holmden C.**, Jacobson A.D., Sageman B., and Hurtgen M. Response of the Cr isotope proxy to Cretaceous Ocean Anoxic Event 2 (2016) *Geochimica et Cosmochimica Acta*: 186, 277–295.
- Farkas J., Fryda J. and **Holmden C.** (2016) Calcium isotope constraints on the marine carbon cycle and CaCO₃ deposition during the late Silurian (Ludfordian) positive $\delta^{13}\text{C}$ excursion. *Earth Planet Sci. Lett.*: 452, 31–40
- Schoenberg R., Merdian A.*, **Holmden C.**, Kleinhamns I.C., Habler K., Wile M., and Reitter E. (2016) The stable Cr isotopic compositions of chondrites and silicate planetary reservoirs. *Geochimica et Cosmochimica Acta*: 183, 14–30.
- Scheiderich, K.*, Amini M.*, **Holmden, C.**, and Francois R. (2015) Global variability of chromium isotopes in seawater demonstrated by Pacific, Atlantic and Arctic Ocean samples. *Earth Planet. Sci. Lett.* 423, 87–97
- Jacobson A.D., Andrews M.G., Lehn G.O., and Holmden C. (2015) Silicate versus carbonate weathering in Iceland: New insights from Ca isotopes. *Earth Planet. Sci. Lett.* 416, 132–142.
- Holmden C.**, Amini M.*, and Francois R. (2015) Uranium isotope fractionation in Saanich Inlet: a modern analog study of a paleoredox tracer. *Geochimica et Cosmochimica Acta*: 153, 202–215