

Caden J. Howlett

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Research interests: Tectonics, Orogenic Systems, Structure, Geologic Mapping, Thermochronology

EDUCATION

Ph.D. Geosciences, University of Arizona (2020-present)

Advising Committee: Barbara Carrapa, Peter DeCelles, Paul Kapp, Susan Beck

Dissertation: Tectonic evolution of hinterland structures in the south-central Andean thrust belt

M.S. Earth Sciences-Geology, Montana State University (2020)

Advising Committee: Andrew K. Laskowski, Devon A. Orme, David R. Lageson, Colleen Elliott

Thesis: Syn-orogenic magmatism, mid-crust exhumation, and placer gold deposition: The Anaconda metamorphic core complex of western Montana

B.S. Earth Sciences-Geology, Honors, Montana State University (2018)

Advisor: Andrew K. Laskowski

Thesis: Detrital zircon U-Pb geochronology and GIS terrain analysis to determine provenance of gold placer deposits of the Pioneer District, Flint Creek Range, SW Montana

FIELDWORK

2018 Anaconda-Pintler Wilderness, Montana. 8 weeks

2019 Flint Creek Range, western Montana. 1 week

2019 Tangra-Yumco Rift, southern Tibet. 4 weeks

2020 Northern Laramide, Montana & Wyoming. 4 weeks

2021 Little Belt Mountains, central Montana. 3 weeks

2022 South-central Andes (31-36°S). 10 weeks

2023 South-central Andes (31-36°S). 6 weeks

PUBLICATIONS

- (6) **Howlett, C.J.**, Jepson, G., Carrapa, B., DeCelles, P.G., Constenius, K.N., Late Cretaceous exhumation of the Little Belt Mountains and regional development of the Helena salient, west-central Montana, USA, *in review*, GSA Bulletin.
- (5) Reynolds, A.N., **Howlett, C.J.**, Laskowski, A.K., Orme, D.A., Sundell, K.E., Taylor, M.H., Guo, X., Ding, L., Kinematic evolution of the Tangra Yumco Rift, south-central Tibet, *in review*, Tektonika.
- (4) Sundell, K.E., Laskowski, A.K., **Howlett, C.J.**, Kapp, P., Ducea, M., Chapman, J.B., Ding, L., Episodic Late Cretaceous to Neogene crustal thickness variation in southern Tibet, *in review*, Terra Nova.
- (3) **Howlett, C. J.**, Reynolds, A. N., & Laskowski, A. K., 2021, Magmatism and extension in the Anaconda metamorphic core complex of western Montana and relation to regional tectonics. *Tectonics*, v. 40, 1-31, doi:10.1029/2020TC006431.
- (2) **Howlett, C.J.**, and Laskowski, A.K., 2021, Determining the source of placer gold in the Anaconda metamorphic core complex supradetachment basin using detrital zircon U-Pb geochronology, Pioneer District, western Montana: *Geosphere*, v. 17, 154–170, doi:10.1130/GES02226.1.
- (1) **Howlett, C.J.**, Reynolds, A.N., and Laskowski, A.K., 2020, Geologic Map of the Northern Half of the Pintler Lake 7.5' Quadrangle and the Southern Half of the Warren Peak 7.5' Quadrangle, southwestern Montana: Montana Bureau of Mines and Geology EDMAP portion of the National Geologic Mapping Program 13, 1 sheet, scale 1:24,000.

PUBLICATIONS IN PREPARATION

Howlett, C.J., Ronemus, C.B., Carrapa, B., DeCelles, P.G., Exhumation of the La Ramada Massif of western Argentina: field and thermochronological data from Cerro Mercedario (6720m), *in prep*, EPSL.

CONFERENCE PROCEEDINGS [presenting author]

- (12) **Howlett, C.J.**, Ronemus, C.B., Exhumation of the La Ramada Massif of western Argentina: field and thermochronological data from Cerro Mercedario (6720m). 51st Annual University of Arizona GeoDaze symposium. Tucson, AZ, March 2023. **Talk**
- (11) **Howlett, C.J.**, Jepson, G., Carrapa, B., DeCelles, P.G., Late Cretaceous exhumation of the Little Belt Mountains in relation to regional development of the Helena salient, west-central Montana, USA, Geological Society of America Abstracts with Programs. Vol 54, No. 5, October 2022. doi: 10.1130/abs/2022AM-382668. **Poster**
- (10) **Howlett, C.J.**, Ronemus, C.B., Building and Destroying An Orogenic Plateau in the Northern US Cordillera. 50th Annual University of Arizona GeoDaze symposium. Tucson, AZ, March 2022. **Talk**
- (9) **Howlett, C.J.**, Jepson, G., Carrapa, B., Low-temperature thermochronology of the Little Belt Mountains of central Montana with implications for models of Laramide tectonism. 14th International Conference on Thermochronology. Sante Fe, NM. doi:10.1002/essoar.10508006.1. **Talk**
- (8) **Howlett, C.J.**, Jepson, G., Carrapa, B., Low-temperature thermochronology of the Little Belt Mountains of central Montana. 49th Annual University of Arizona GeoDaze symposium. Tucson, AZ, April 2021. *Best graduate talk award*. **Talk**
- (7) **Howlett, C.J.**, Reynolds, A.N., Laskowski, A.K., Farallon slab removal as a driving force of Cordilleran metamorphic core complex formation: details from the Anaconda Range of western Montana, Geological Society of America Abstracts with Programs. Vol 52, No. 6, 2020, doi:10.1130/abs/2020AM-355195. **Talk**
- (6) **Howlett, C.J.**, and Laskowski, A.K., Using detrital zircon U-Pb geochronology to determine the source of placer gold: a case-study from the Pioneer District, western Montana, Geological Society of America, Phoenix, AZ, September 2019. doi:10.1130/abs/2019AM-335775. **Talk**
- (5) **Howlett, C.J.**, Reynolds, A.N., Laskowski, A.K., Geologic Map of the Northern Half of the Pintler Lake 7.5' Quadrangle and the Southern Half of the Warren Peak 7.5' Quadrangle, Southwestern Montana, Geological Society of America, Phoenix, AZ, September 2019. doi:10.1130/abs/2019AM-331565. **Poster**
- (4) **Howlett, C.J.**, Investigating the Anaconda Metamorphic Core Complex of western Montana—Insights into the extension dynamics of convergent orogenic belts. Himalaya-Karakorum-Tibet (HKT) Conference, Bozeman, MT, June 2019. doi:10.5281/zenodo.3238707. *Best student poster award*. **Poster**
- (3) **Howlett, C.J.**, Determining the relationship between magmatism and exhumation in the Anaconda Metamorphic Core Complex using igneous zircon U-Pb geochronology, western Montana, 2019 Montana State University Earth Sciences Colloquium. **Talk**
- (2) **Howlett, C.J.**, and Laskowski, A.K., Detrital zircon U-Pb geochronology and GIS terrain analysis to determine provenance of gold placer deposits of the Pioneer District, Flint Creek Range, SW Montana, 2018 Undergraduate Scholars Program Student Research Celebration. **Poster**
- (1) **Howlett, C.J.**, and Laskowski, A.K., Determining the source of placer gold in the Anaconda Metamorphic Core Complex supradetachment basin using detrital zircon geochronology, Pioneer District, Western Montana. Geological Society of America, Indianapolis, IN, October 2018. Abstract #286-12. **Talk**.

BOOK IN PREPARATION

Howlett, C.J., LIFE & SPACE, Philosophical and scientific fragments.

NON PEER-REVIEWED PUBLICATIONS

Howlett, C.J., 2020, Syn-orogenic magmatism, mid-crust exhumation, and placer gold deposition: the Anaconda metamorphic core complex of western Montana. MS thesis, Montana State University, 140 p.

Howlett, C., 2019-2020, recurring weekly column in MSU Exponent (university newspaper), [23 published articles](#).

Howlett, C., 2017, MSU Geology Club Bridger Canyon Exploration: *Montana Geological Society Newsletter*, v. 61, no. 10, p. 9-10.

Howlett, C., 2017, MSU Geology Club Paradise Valley Camping Trip: *Montana Geological Society Newsletter*, v. 61, no. 13, p. 5-6.

Howlett, C., 2017, MSU Geology Club South Fork Deep Creek Exploration: *Montana Geological Society Newsletter*, v. 62, no. 2, p. 6-7.

GRANTS/AWARDS

2018 **Undergraduate Scholars Program Research Grant**, Montana State University (\$900)

2019 **Foster Scholarship**, Tobacco Root Geological Society (\$1000)

2019 **Donald L. Smith Memorial Scholarship**, Montana State University Earth Sciences (\$2100)

2019 **Graduate Student Grant**, Geological Society of America (\$2000)

2019 **GSA Travel & Short Course Grants**, SGTD-Geological Society of America (\$140)

2020 **ISGC Student Travel Award**, Society for Sedimentary Geology (conference cancelled due to COVID-19)

2021 **Best Graduate Talk (GeoDaze)**, University of Arizona Department of Geosciences (\$500)

2021 **Sibanye-Stillwater/Wheaton Precious Metals Scholar**, Tobacco Root Geological Society (\$1000)

2021 **Bert Butler Scholarship**, University of Arizona Geosciences (\$1500)

2022 **Galileo Circle Scholar**, University of Arizona College of Science (\$1000)

2022 **William and Clara Sulzer Scholarship**, University of Arizona Geosciences (\$2000)

2022 **GSA Connects Travel Grant**, Geological Society of America Rocky Mountain Sector

2023 **Graduate & Professional Student Council Travel Grant**, UArizona (\$1000)

2023 **College of Science Excellence in Service Award**, UArizona College of Science

WORK EXPERIENCE

University of Arizona Fission Track Laboratory, Dec 2022-present

Department of Geosciences

- Co-manager of the UA Fission Track Laboratory. I maintain laboratory equipment/supplies and oversee the shipment and delivery of irradiations.

Teaching/Research Assistant, August 2020-present

University of Arizona

- Classes TA'd: Physical Geology (GEOS251); Historical Geology (GEOS255); Sedimentology & Stratigraphy (GEOS302); Geological Hazards (GEOS218); Oceanography (GEOS212)

Teaching Assistant, August 2018-May 2020

Montana State University

- Classes TA'd: GIS and Cartography (GPHY284, twice); Advanced GIS & Spatial Analysis (GPHY384); Sedimentary Petrology (GEO443, twice)

Science communication (blog and videography), Spring 2016-present

- Science communication platforms focused on topics in geoscience, astrophysics, field-based scientific research, and travel/exploration. [Instagram](#): 100k followers; [YouTube](#): >2.3k subscribers

Space Public Outreach Team (SPOT) Presenter, February 2016-August 2018

Montana Space Grant Consortium/NASA, Bozeman, MT

- Presentations to K-12 public schools on NASA related endeavors through the Montana Space Grant Consortium (MSGC). (~100 hours of science presentation total).

SERVICE, EXTRACURRICULAR, AND PROFESSIONAL DEVELOPMENT

University of Arizona

Department of Geosciences, director of social media (August 2021-present)

GeoDaze Research Symposium Organizing Committee, social media/public outreach (2021-2023)

Association of Women Geoscientists (AWG) Southern Arizona Outreach Coordinator (2023-present)

AWG Scholarship Committee (2023)

AWG Yoga Instructor (2023)

Epsilon Eta Earth Week Professional Panelist (2023)

Tucson High School Field Trip co-leader, Catalina Mountains (April 2023)

Hollinger K-8 School presentation: *What is a Geologist?* (May 2023)

Legacy Traditional School 7th grade: *Field Geology and Geochronology in the Andes* (May 2022)

ALFAMARS Team Member, analog astronaut program and Mars life detection team (Feb 2023-present)

Montana State University

Geology Club, President, (2015-2018)

MSU Earth Sciences Department Colloquium Committee, chair social media/marketing (2018-2020)

MSU Earth Sciences Department Party Planning Committee, public relations (2019-2020)

Quaternary Interest Group, (2016-May 2017)

Field Trips and Short Courses

Western Interior US (MT, ID, WY, UT, AZ, NM, CA)—Numerous field trips (2014-present)

2018 Charles Bradley Inaugural Field Trip (Death Valley, CA), Montana State University

ExxonMobil Petroleum Reservoir Characterization course, Boise, ID (October 2018)

Scanning Electron Microscopy Short Course, Imaging and Chemical Analysis Laboratory, Montana State University (January 2019)

Detrital Zircon Geochronology: U-Pb Data Acquisition, Reduction, Analysis, and Archiving, GSA, Phoenix, AZ (September 2019)

Thermal History Modeling Short Courses, Thermo2021, Sante Fe, NM (September 2021)

Chemical Evolution of the Earth Field Trip (UA Grad Course), Hawaiian Islands, October 2021

Member

Geological Society of America (GSA), (2018-present)

American Association of Petroleum Geologists (AAPG), (2014-2018)

Tobacco Root Geological Society (2019-present)

Arizona Geological Society (2021-present)

Montana Brewers Association, (2017-2020)

Montana State University Geology Club (2014-2020)

Certifications

Level 3 Swiftwater Rescue Certified (ACA)

Advanced first aid/CPR (American Red Cross)

TECHNICAL EXPERIENCE

ANALYTICAL AND LABORATORY

Apatite fission track, ap+zr (U-Th)/He thermochronology

Laser-ablation ICP-MS for U-Pb dating and Hf isotopes

Scanning electron microscopy for BSE and CL imaging

X-Ray diffraction, X-ray fluorescence

SCIENTIFIC SOFTWARE

Esri ArcMap & ArcGIS Pro, DZMix, DZNMF, MOVE, HeFTy, QTQt, Adobe Premiere Pro
(videography)

MEDIA (hyperlinked)

[Daily Interlake Profile](#): Daily Interlake, March 2019

[MSU Students Study North America's Middle Crust](#): Montana State University, September 2021

[UArizona College of Science Q&A](#): University of Arizona, February 2023