

Vitae of DAVID A. CLAGUE

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Career Experience

- 1/99-present Monterey Bay Aquarium Research Institute, Senior Scientist. Develop and execute scientific research related to submarine volcanic and hydrothermal processes. Research activities focus on the Gorda, Juan de Fuca, and East Pacific Rise mid-ocean ridges, seamounts offshore central California, and the submarine flanks of the Hawaiian Islands.
- 6/96-12/98 Monterey Bay Aquarium Research Institute, Chair of Science, Director of Research and Development, Director of Research.
- 10/91-6/96 U.S.G.S. Scientist-in-charge of Hawaiian Volcano Observatory.
- 9/88-10/91 U.S.G.S. Menlo Park. Program coordinator for GLORIA surveys in the Exclusive Economic Zone around the Hawaiian Islands and chain.
- 12/86-10/91 U.S.G.S. Menlo Park. Scientist in Ridge Processes, Geologic Processes on Seamounts, Hawaii GLORIA, and Hawaiian Petrology Projects.
- 10/82-12/86 U.S.G.S. Menlo Park. Project Coordinator for Marine Metallogenesis Program.
- 10/84-10/91 U.S.G.S. Menlo Park. Chief of Hawaiian Petrology project to assess the geothermal potential and volcanic hazards of Hualalai Volcano, Hawaii.
- 7/79-10/82 U.S.G.S. Menlo Park. Chief of Linear Island Chains and then Oceanic Volcanism Project.
- 9/77-6/78 Acting Chairman of Geology Department, Middlebury College.
- 9/75-6/79 Assistant Professor of Geology, Middlebury College, Middlebury, Vermont. Taught undergraduate courses in planetary geology, igneous petrology, and advanced petrology/geophysics. Research on origin of linear island chains in the Pacific Ocean, particularly the Emperor Seamounts.
- 8/74-8/75 NRC post-doctoral associateship at the USGS, Menlo Park with ED Jackson. Research on evolution of linear volcanic chains and Pacific Plate motion.

Education

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| Univ. California San Diego | 9/66-6/68 | Physics | |
| Univ. California Santa Barbara | 9/68-6/70 | Geology | B.A., 1970 |
| Univ. California San Diego | 9/70-9/74 | Earth Science | Ph.D., 1974 |

Honors and Awards

- 1970 Woodhouse Scholar at University of California at Santa Barbara.
1973 ALCOA Fellowship at Scripps Institution of Oceanography.

- 1974 National Research Council Post-Doctoral Fellow at the U.S. Geological Survey.
- 1984 Fellow of the Geological Society of America.
- 1994 Fellow of the American Geophysical Union for contributions to geology and petrology of mid-ocean ridges and linear volcanic chains.
- 1995 Department of the Interior's Meritorious Service Award
- 1996 Community Service Award from the House of Representatives, State of Hawaii, for community education on geologic hazards in Hawaii
- 1996 Commendation from the County of Hawaii for public education about the local environment and "making the Big Island a better place to live."
- 2000 Fellow of the California Academy of Sciences
- 2003 Distinguished Alumnus Award, Department of Geological Sciences, University of California at Santa Barbara
- 2003 Information Sciences Institute (ISI) Highly Cited Researcher
- 2015 Distinguished Career Award from the Mineralogy, Geochemistry, Petrology, and Volcanology Division of the Geological Society of America

Oceanographic Field Experience

I have led, participated, or planned the following oceanographic cruises, mapping AUV cruises, and submersible or ROV dive programs:

- 1970 Technician on Deep Sea Drilling Project Leg 12, D/V *Glomar Challenger* to the north Atlantic.
- 1971 Graduate student on Scripps Institution of Oceanography (SIO) cruise on R/V *T. Washington*, Aries Leg 6 to Hess Rise, Hawaiian-Emperor bend, and Musician Seamounts.
- 1973 Graduate student on SIO cruise on R/V *T. Washington*, Tasaday Leg 3 to the western Hawaiian Ridge.
- 1974 Graduate student on SIO cruise on R/V *T. Washington*, Southtow Leg 12 to the Manihiki Plateau.
- 1977 Invited scientist on USGS cruise on R/V *S.P. Lee* Leg 5 to the Emperor Seamounts and Hawaiian Ridge.
- 1978 Invited scientist on D/V *Glomar Challenger* Deep Sea Drilling Project Leg 55 to Emperor Seamounts.
- 1980 Co-chief scientist on USGS cruise on R/V *S.P. Lee* to Taney Seamounts and Juan de Fuca Ridge.
- 1981 Invited scientist on University of Washington R/V *Thomas Thompson* cruise to Juan de Fuca Ridge.
Co-chief scientist on USGS cruise on R/V *S.P. LEE* to Central California seamounts.
Co-chief scientist on USGS cruise on R/V *Kane Keoki* to Loihi Seamount and Hualalai's submarine northwest rift zone.
- 1983 Chief scientist on USGS cruise on R/V *Kane Keoki* for lava and water sampling along Gorda Ridge.
Invited diver on HURL/USGS *Makali'i* submersible program on 1877 Mauna Loa eruption in Kealakakua Bay.

- 1984 Chief scientist on USGS cruise on R/V *S.P. Lee* to western Hawaiian Ridge, Hess Rise, Aleutian abyssal plain.
- 1985 Chief scientist on USGS/Oregon State cruise on R/V *S.P. Lee* to Gorda Ridge, President Jackson Seamounts, and Blanco Transform Fault.
Co-chief scientist and diver on 11-dive HURL/USGS *Makali'i* submersible program on lava flows draping the -150 m reef offshore Kona, Hawaii.
- 1986 Chief scientist on USGS/NOAA cruise on R/V *S.P. Lee* to Gorda Ridge in support of DSRV *Seacliff* submersible program on hydrothermal vent sites.
Co-chief scientist and diver on HURL/USGS *Pisces* submersible program offshore Hualalai and Mauna Loa volcanoes.
- 1988 Chief scientist on USGS cruise on R/V *Farnella* around Hawaii and Maui to sample landslides, coral reefs, and submarine rift zones.
Co-chief scientist and diver on HURL/USGS *Pisces* submersible program to Hualalai and Mahukona volcanoes.
Chief scientist on USGS cruise on R/V *Farnella* north of Oahu to sample giant lava field.
- 1990 Invited scientist on University of Washington R/V *T. Thompson* cruise offshore Hawaii to test rock drill.
- 1991 Co-chief scientist on USGS cruise on R/V *Farnella* along Hawaiian Ridge to collect GLORIA data north of Necker Island.
Chief scientist on Navy's R/V *Laney Chouest*/DSRV *Seacliff* submersible and SeaBeam mapping program on Kilauea submarine rift zone and south flank.
- 1992 Co-chief scientist and diver on USGS/HURL *Pisces* submersible program to reefs offshore Lanai and Kahoolawe.
- 1993 Co-chief scientist and diver on USGS/HURL *Pisces* submersible program to reefs offshore Lanai and Molokai.
- 1996 Invited scientist and diver on UH/HURL *Pisces* submersible program to Loihi Seamount to sample hydrothermal vents.
- 1997 Invited scientist and diver on UH/HURL *Pisces* submersible program to Loihi Seamount to sample hydrothermal vents.
- 1998 Chief scientist on MBARI-funded Simrad EM300 mapping surveys around Hawaii on the R/V *Ocean Alert*
Chief scientist on MBARI-funded Simrad EM300 mapping surveys on Gorda and Juan de Fuca Ridges on the R/V *Ocean Alert*
Chief scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 3-dive program to Guide and Gumdrop Seamounts offshore central California on the *Western Flyer*.
Co-chief scientist and diver on MBARI/UH/HURL *Pisces* submersible 3-dive program to Loihi Seamount to map and sample submarine explosive eruptive products.
Chief scientist and diver on MBARI/HURL *Pisces* submersible and RCV remote operated vehicle 3-dive program to Kohala Volcano to map and collect lava samples from flat-topped cones.
- 1999 Invited scientist and diver on JAMSTEC R/V *Yokosuka*/HOV *Shinkai 6500* submersible 9-dive program to the Nu`uanu landslide and North Arch volcanic field, Hawaii.
Invited scientist on MBARI R/V *Western Flyer*/ROV *Tiburon*, 2-dive ATOC recovery effort at Pioneer Seamount.

- 2000 Co-chief scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 7-dive program to Pioneer, Guide, Gumdrop and the Taney Seamounts offshore central California.
Chief scientist on combined MBARI/NURP R/V *Western Flyer*/ROV *Tiburon* 10-dive program to Davidson Seamount offshore Central California
Chief scientist on combined MBARI/NURP R/V *Western Flyer*/ROV *Tiburon* 17-dive program to the Gorda Ridge
- 2001 Chief scientist on two legs and participant and Cruise Coordinator on third leg of MBARI R/V *Western Flyer*/ROV *Tiburon* 36-day, 57 dive program around Hawaii
Invited scientist and diver on JAMSTEC R/V *Kairei*/ROV *Kaiko* 4-dive program to southwest Oahu lava field and Waianae landslide
- 2002 Invited scientist on NOAA/MBNMS R/V *Western Flyer*/ROV *Tiburon* 6-dive program to Davidson Seamount
Chief scientist on combined MBARI/NURP R/V *Western Flyer*/ROV *Tiburon* 10-dive program to Gorda Ridge
Invited scientist on JAMSTEC R/V *Yokosuka*/HOV *Shinkai 6500* submersible 7-dive program to Oahu, Kauai, and the North Arch Volcanic Field
- 2003 Invited scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 12-dive program to the Gulf of California and East Pacific Rise.
Invited scientist and faculty on Stanford at SEA program on SSV *Robert C. Stevens* around the Hawaiian Islands, collected Chirp seismic data and grab samples from drowned coral reefs.
Chief scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 5-dive program to Pioneer and Rodriguez Seamounts.
- 2004 Invited scientist on University of Hawaii R/V *Kilo Moana* cruise to collect EM1002 and EM120 swath bathymetric data on drowned reefs around Lanai, Molokai, and Maui.
Chief scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 10-dive program to the Patton Escarpment and San Juan, San Marcos, Little Joe, and Northeast Bank seamounts.
- 2005 Invited scientist on Scripps Institution of Oceanography R/V *Melville*, bathymetric mapping and sampling of deep rift zones and drowned coral reefs around Hawaii.
Invited scientist on University of Hawaii R/V *Kilo Moana* cruise to collect EM1002 and EM120 swath bathymetric data on drowned reefs around Niihau, Kaula Bank, and Middle Bank.
Chief scientist on MBARI/NURP R/V *Western Flyer*/ROV *Tiburon* 10-dive program to the Juan de Fuca Ridge.
Chief scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 9-dive program to the Gorda Ridge.
- 2006 Invited scientist on Scripps Institution of Oceanography student cruise on the R/V *Revelle* to dredge drowned coral reefs offshore Oahu.
Chief Scientist on MBARI R/V *Western Flyer*/ROV *Tiburon* 9-dive program to NESCA, Axial Seamount, the Vance Seamounts.
Invited Scientist on NOAA R/V *Thompson*/ROV *ROPOS*/MBARI Mapping AUV cruise to Endeavor Ridge and Axial Seamount.

- Co-PI for UCSC/MBARI/HURL *Pisces* submersible and RCV remote vehicle program to explore and sample drowned coral reefs off Hilo, Hawaii (missed the dive program due to illness).
- Invited scientist on University of Hawaii R/V *Kilo Moana* cruise to collect EM1002 and EM120 swath bathymetric data on drowned reefs around Hawaii and Penguin Bank.
- 2007 Chief Scientist on joint MBARI/NURP R/V *Western Flyer*/ROV *Tiburón* 9-dive program to the Patton Escarpment and Southern California Seamounts.
- Invited Scientist on NOAA R/V *Atlantis*/ROV *JASON II*/MBARI Mapping AUV cruise to Endeavor Ridge and Axial Seamount.
- 2008 Supervising scientist for one week R/V *Zephyr*/MBARI Mapping AUV cruise to Davidson Seamount and another week to Rodriguez Seamount.
- Invited Scientist on NOAA/NSF funded R/V *Atlantis*/*ALVIN*/MBARI Mapping AUV cruise to Axial Seamount and Endeavour Ridge
- 2009 Co-PI on NSF/NOAA/MBARI-funded Rapid Response Cruise on the R/V *T. Thompson* to the Lau Basin with ROV *JASON II* and the MBARI Mapping AUV.
- Supervising scientist for two one-week R/V *Zephyr*/MBARI Mapping AUV cruises to Juan de Fuca and Gorda Ridges.
- Chief scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 6-dive program to Axial Seamount.
- Chief scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 9-dive program to the Juan de Fuca and Gorda Ridges, President Jackson and Pioneer Seamounts.
- 2010 Supervising scientist for one week R/V *Zephyr*/ MBARI Mapping AUV cruise to map the Taney Seamounts.
- Chief scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 6-dive program to the Taney Seamounts.
- 2011 Co-Chief scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 9-dive program to Axial Seamount and the North Cleft 1986 eruption site
- Chief Scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 9-dive program to Endeavour Ridge, CoAxial 1993 eruption site, and Axial Seamount 2011 eruption site
- Supervising scientist for three one week R/V *Zephyr* MBARI Mapping AUV cruises to map Axial Seamount and Endeavour Ridge.
- Co-Chief Scientist on NOAA/HURL *Pisces* submersible 7-dive and bathymetric mapping program to Gardner Pinnacles drowned coral reefs.
- 2012 Supervising scientist for three one week R/V *Zephyr* MBARI Mapping AUV cruises to map the Alarcon Rise and Alarcon Seamount.
- Chief Scientist on MBARI R/V *Western Flyer*/ROV *Doc Ricketts* 9-dive program to the Alarcon Rise and Alarcon Seamount, Gulf of California.
- 2013 Chief Scientist on R/V *Western Flyer*/ROV *Doc Ricketts* 9-dive and 8-dive programs to Axial Seamount and the CoAxial segment of the Juan de Fuca Ridge.
- 2014 Chief Scientist on R/V *Western Flyer*/ROV *Doc Ricketts* 8-dive program to Axial Seamount.
- Supervising scientist for three one week R/V *Carson*/ MBARI Mapping AUV cruises that completed 11 surveys mapping parts of Axial Seamount and the Escanaba Trough of the Gorda Ridge.

- 2015 Supervising scientist for 9-day R/V *Carson*/MBARI Mapping AUV cruise mapping Pescadero Basin, Alarcon Rise and Alarcon Seamount.
Chief Scientist on R/V *Western Flyer*/ROV *Doc Ricketts* 10-dive program to Pescadero Basin, Alarcon Rise and Alarcon Seamount, Gulf of California.
- 2016 Supervising scientist for three 8-day R/V *Carson*/MBARI Mapping AUV cruises to map Axial Seamount and Gorda Ridge.
Chief Scientist for two R/V *Western Flyer*/ROV *Doc Ricketts* 5- and 6-dive programs to South Cleft on the Juan de Fuca Ridge and Axial Seamount.

Publications (journal and book articles)

- 2016** Chadwick, WW, JB Paduan, DA Clague, BM Dreyer, SG Merle, AM Bobbitt, DW Caress, BT Philip, DS Kelley, SL Nooner, Voluminous eruption from a zoned magma body after and increases in supply rate at Axial Seamount, *Geophysical Research Letters*, doi: 10.1002/2016GL071327.
- Clague DA, FA Frey, MO Garcia, S Huang, M McWilliams, M Beeson, Compositional Heterogeneity of the Sugarloaf Melilite Nephelinite Flow, Honolulu Volcanics, Hawaii, *Geochemica Cosmochemica Acta*, **185**, 251-277, doi: [10.1016/j.gca.2016.01.034](https://doi.org/10.1016/j.gca.2016.01.034).
- Coumans JP, J Stix, DA Clague, WG Minarik, GD Layne, N Shimizu, Melt-rock interactions at the Moho: Evidence from crystal cargo in lavas from near-ridge seamounts, *Geochemica Cosmochemica Acta*, **191**, 139-164.
- Gao R, JC Lassiter, J.C., Barnes, JD, DA Clague, W Bohrsen, Geochemical investigation of gabbroic xenoliths from Hualalai Volcano: Implications for lower oceanic crust accretion and Hualalai Volcano magma storage system, *Earth Planet. Sci. Lett.*, **442**, 162-172.
- Gill JB, P Michaels, J Woodcock, F Ramos, BM Dreyer, DA Clague, J Kela, S Scott, K Konrad, D Stakes, Origins of enriched MORB at the Endeavour Segment, Juan de Fuca Ridge, *J. Petrology*, doi: 10.1093/petrology/egwo24, 33p.
- Puga-Bernabéu, Á, JM Webster, JC Braga, DA Clague, A Dutton, S Eggins, S Fallon, G Jacobsen, JB Paduan, DC Potts, Morphology and evolution of drowned carbonate terraces during the last two interglacial cycles, off Hilo, Hawaii, *Marine Geol.*, **37**, 57-81.
- 2015 Coumans JP, J Stix, DA Clague, WG Minarik, The magmatic architecture of Taney Seamount-A, northeast Pacific Ocean, *J. Petrology*, **56 (6)**, 1037-1067, doi: 10.1093/petrology/egvo27.
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- Helz RT, DA Clague, LG Mastin, TR Rose, Evidence for large compositional ranges in coeval melts erupted from Kilauea's summit reservoir, in *Hawaiian Volcanoes: From Source to Surface*, edited by R. Carey, V. Cayol, M. Poland, and D. Weis, Am. Geophys. Union Monograph, **208**, 125-145.
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- Portner RA, DA Clague, BD Dreyer, C Helo, JF Martin, JB Paduan, Contrasting styles of deep-marine explosive eruptions revealed from Axial Seamount push core records, *Earth Planetary Science Letters*, doi: [10.1016/j.epsl.2015.03.043](https://doi.org/10.1016/j.epsl.2015.03.043)
- 2014 Clague DA, BM Dreyer, JB Paduan, JF Martin, DW Caress, JB Gill, DS Kelley, H Thomas, RA Portner, TP Guilderson, ML McGann, Eruptive and tectonic history of the Endeavour segment of the Juan de Fuca Ridge based on AUV mapping and lava flow ages, *Geochemistry, Geophysics, Geosystems*, **15**, doi: 10.1002/2014GC005415, 1-28.
- Clague DA, D Sherrod, The growth and degradation of Hawaiian volcanoes, *U.S. Geological Survey Professional Paper*, **1801**, Chapter 3, 1-50.
- Helz RT, DA Clague, T Sisson, CT Thornber, Petrologic insights into basaltic volcanism , *U.S. Geological Survey Professional Paper*, **1801**, Chapter 8, 237-289.
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- Walz KR, DA Clague, JP Barry, RC Vrijenhoek, First records and range extensions for two *Acesta* clam species (Bivalvia, Limidae) in the Gulf of California, Mexico, *Marine Biodiversity Record*, **7**, 1-6, doi:10.1017/S1755267214000165.
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- 2013 Chadwick Jr WW, DA Clague, RW Embley, MR Perfit, DA Butterfield, DW Caress, JB Paduan, JF Martin, P Sasnett, SG Merle, AM Bobbitt, The 1998 eruption of Axial Seamount: New insights on submarine lava flow emplacement from high-resolution mapping, *Geochemistry, Geophysics, Geosystems*, doi: 10.1002/ggge.20202, 30 p.
- Clague DA, BM Dreyer, JB Paduan, JF Martin, WW Chadwick Jr, DW Caress, RA Portner, TP Guilderson, ML McGann, DA Butterfield, H Thomas, RW Embley, Geologic history of the summit of Axial Seamount, Juan de Fuca Ridge, *Geochemistry, Geophysics, Geosystems*, doi: 10.1002/ggge.20240, 41 p.
- Dreyer BM, DA Clague, J Gill, Petrological variability of recent magmatism at Axial Seamount summit, Juan de Fuca Ridge, *Geochemistry, Geophysics, Geosystems*, doi: 10.1002/ggge.20239, 28 p.
- Helo C., DA Clague, DB Dingwell, J Stix, High and highly variable cooling rates during pyroclastic eruptions at Axial Seamount, Juan de Fuca Ridge, *J. Volcanology and Geothermal Research*, **253**, 54-64.

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- 2012 Caress DW, DA Clague, JB Paduan, JF Martin, BM Dreyer, WW Chadwick Jr, A Denny, D Kelley, Repeat bathymetric surveys at 1-metre resolution of lava flows erupted at Axial Seamount in April 2011, *Nature Geoscience*. doi: 10.1038/NGEO1496, 4 p.
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- 2011 Clague DA, JB Paduan, DW Caress, H Thomas, WW Chadwick Jr, SG Merle, Volcanic morphology of West Mata Volcano, NE Lau Basin, based on high-resolution bathymetry and depth changes, *Geochemistry, Geophysics, Geosystems*, 12, Q0AF03, doi:10.1029/2011GC003791, 21 p.
- Faichney IDE, JM Webster, DA Clague, JC Braga, W Renema, DC Potts, The impact of the mid-Pleistocene Transition on the composition of submerged reefs of the Maui-Nui Complex, Hawaii, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 299, 493-506.
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- Clague DA, L Lundsten, J Hein, J Paduan, A Davis, Spotlight: Davidson Seamount, *Oceanography*, **23**, 126-127.
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- Staudigel H, C Moyer, MO Garcia, A Malahof, DA Clague, AAP Koppers, Spotlight: Loihi Seamount, *Oceanography*, **23**, 72-73.
- Webster JM, DA Clague, IDE Faichney, CK Paull, JC Braga, JR Hein, JG Moore, PD Fullagar, Early Pleistocene age for the deep, submerged coral reefs off Lanai (Hawaii), *Earth Planet. Sci. Lett.*, **290**, 331-339.
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