

ALASKA GEOLOGY

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Arctic Alaska Deepwater Carbon Burial During Mid-Cretaceous Oceanic Anoxia Events

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The Hue Shale comprises condensed, organic-rich black shale and volcanic ash that blanketed the eastern Colville foreland basin in the Aptian–Maastrichtian (~115–70 Ma), reflecting deepwater conditions in the western Arctic Ocean. The Arctic occupied a unique position during the Cretaceous–Paleogene greenhouse phase as a newly-formed, partially-enclosed polar ocean basin with periods of high carbon burial but variable oxygenation, stratification, and productivity. Multidisciplinary Hue Shale research by a team of 15 USGS geologists over the past five years on the eastern North Slope provides a framework for Arctic source rock and paleoclimate studies. This talk presents new insights on the timing of Hue Shale organic carbon burial during global Oceanic Anoxic Events (OAEs) via correlation of carbon isotope chemostratigraphy and ash zircon U-Pb dates. Hue total organic carbon (TOC) increased by >30-100% during multiple Albian-Campanian OAEs (i.e., OAE1d, OAE2, Hitch Wood, OAE3a, b, c), and was accompanied by increases in marine carbon and productivity proxies. However, geochemical proxies suggest a long-term shift from marine salinity, oxygen minimum zone-like conditions to an increasingly brackish, restricted euxinic basin. I integrate these productivity, redox, and salinity records with the timing of sea level and shelf margin dynamics to examine changing environmental controls on polar greenhouse marine carbon burial.

AGS Meeting

Date & Time: Wednesday, May 31; Doors open 11:30 am, announcements 11:45 am, talk 12:00 – 1:00 pm
Program: Arctic Alaska deepwater carbon burial during mid-Cretaceous oceanic anoxia events
Speaker: Richard Lease, U.S. Geological Survey, Anchorage, AK
Place: Live presentation at the Energy Center and virtually online; 1014 Energy Court, Anchorage, AK
Reservations: Reservations are not required
Login: For instructions on how to log in see AGS website: <http://www.alaskageology.org/events.html>
How to Join: Join with Google Meet: meet.google.com/msf-onof-noj
or join by phone: (US) +1 262-468-7209, PIN: 158 151 062#

HEROES OF ALASKAN PALEONTOLOGY – A TRIBUTE TO VINCENT L. SANTUCCI, THE “PISTOL-PACKING PALEONTOLOGIST” AND “FATHER OF NATIONAL FOSSIL DAY”

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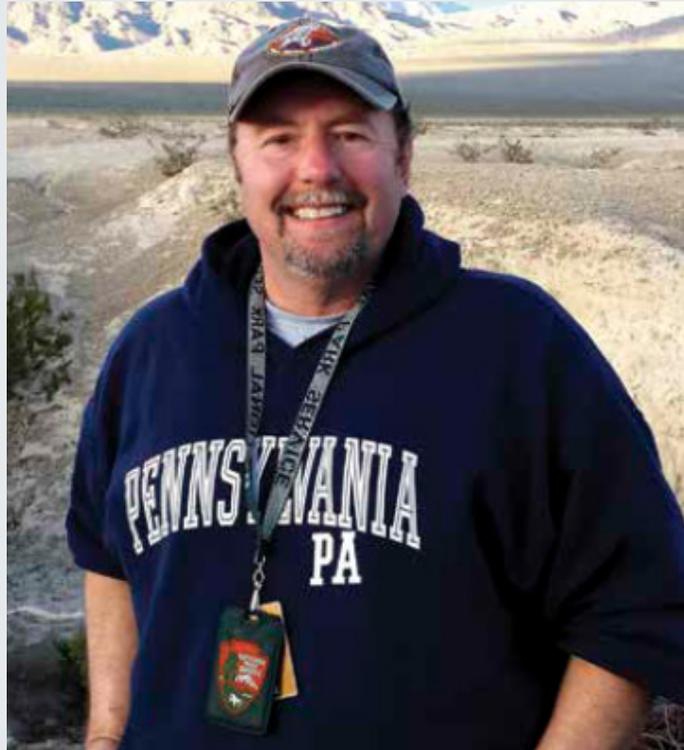
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Vincent Santucci is the senior Paleontologist and Paleontology Program coordinator at the National Park Service

This note honors Vincent L. Santucci, an outstanding paleontologist who has done much to further the knowledge of paleontological resources throughout the U.S. National Park Service (NPS) including the national parks in Alaska. Vince was born 1958 in Pittsburgh, Pennsylvania and is of Sicilian and Scotch-Irish ancestry. He is currently the NPS Senior Paleontologist and Paleontology Program Coordinator based in NPS head-quarters in Washington, D.C. Vince lives in Gettysburg, Pennsylvania, fittingly for a great American Civil War buff. He lives on edge of the battlefield, and gives a superb walking tour of both the Park and Battlefield. His research background in paleontology focused on Cenozoic vertebrates and biostratigraphy, however he has become a generalist to support the diverse fossils across the NPS.

Vince joined the NPS in 1985 at Badlands National Park, South Dakota, where he completed his graduate field research. Santucci returned to the University of Pittsburgh to complete his master’s

degree and complete training to obtain a federal law enforcement commission. Santucci has served as the federal government's only sidearm-carrying paleontologist, helping protect our nation's fossil resources while stationed at seven different national parks during his more than 30 year career (earning him the sobriquet "The Pistol-Packing Paleontologist."). In recognition of his strong support of the paleontological sciences, two fossil species – *Androcycas santuccii* (from Petrified National Park) and *Sapelnikoviella santuccii* (from Glacier Bay National Park & Preserve) – have been named in his honor.

Santucci has also strongly encouraged cooperation with many non-NPS paleontologists to work on NPS park units in the State of Alaska, including Robert B. Blodgett, David M. Rohr, Anthony Fiorillo, Roland Gangloff, Pat Druckenmiller, and Montana S. Hodges. He has actively been collaborating on Alaska-based NPS studies since 2000. Through Santucci's advocacy and collaboration, he has helped to better understand the scope, significance, distribution (both temporal and geospatial) and management issues associated with fossils in the Alaska national parks. A synoptic summary follows on his professional background.

EDUCATION

Ph.D. Candidate – Recreation, Parks & Tourism Management, Penn State University

M.S. Geology & Paleontology, University of Pittsburgh, 1991

B.S. Anthropology / Biology; University of Pittsburgh, 1981

WORK EXPERIENCE: Thirty-year career with the National Park Service including assignments in seven parks including: Badlands National Park, Petrified Forest National Park, Grand Canyon National Park, Yellowstone National Park, Fossil Butte National Monument, George Washington Memorial Parkway, and Tule Springs Fossil Beds National Monument as well as the NPS Geologic Resources Division. He has supported paleontological resource work in 286 NPS park areas. He has also served in a wide range of professional positions involving science, stewardship and resource management including:

- Senior Paleontologist / Geologist, NPS Geologic Resources Division, 2011–date;
- Superintendent (detail), Tule Springs Fossil Beds National Monument, 2015;
- Chief Ranger, George Washington Memorial Parkway, 2003–2011;
- Chief Ranger and Acting Superintendent, Fossil Butte National Monument, 1997-2003;
- Inventory & Monitoring Network Coordinator (detail), Greater Yellowstone I&M Network, 2002;
- Natural Resources Training Manager (detail), Horace Albright Training Center, 2002;
- Park Ranger (Law Enforcement), Yellowstone National Park, 1996;
- Faculty Instructor, Department of Parks & Recreation, Slippery Rock University, 1994-1995;
- Resource Management Specialist (Planning), Grand Canyon National Park, 1993-1994;

- Chief Natural / Cultural Resource Management / Paleontologist / Curator, Petrified Forest, 1991-1993;
- Park Ranger (Interpretation), Badlands National Park, 1985-1986;

TEACHING EXPERIENCE: In addition to Vince's teaching experience working for the National Park Service, he has served as an instructor at the Federal Law Enforcement Training Center and an instructor at Slippery Rock University in Slippery Rock, Pennsylvania. He has held a number of part-time instructor positions including Allegheny Community College, Harrisburg Area Community College, Northland Pioneer College, Western Wyoming Community College, University of Pittsburgh, Carnegie Museum of Natural History and Yellowstone Institute. One of his favorite courses to teach was Geology of the National Parks taught as an honors course at the University of Pittsburgh.

VINCE'S PROFESSIONAL SOCIETY MEMBERSHIPS:

- Society of Vertebrate Paleontology (SVP)
- Paleontological Society (PS)
- George Wright Society (GWS)
- Gamma Sigma Epsilon – Honorary Earth Science Society
- Association of National Park Service Rangers (ANPR)

AWARDS:

Received a number of recognitions and awards for accomplishments and contributions to the NPS including: Superior Service Award, George Hartzog Award, George Wright Society Resource Management Award, Intermountain Region's Small Park Resource Management Award, Brunton Compass Award, Hecht Safety Award, Leave No Trace Public Hero Award, various performance and STAR awards, and nominated for the NPS Harry Yount Award.

NATIONAL FOSSIL DAY:

In addition to his normal professional duties as an NPS Paleontologist, Vince was instrumental in the establishment of National Fossil Day (NFD). Wikipedia provides the following discussion of this day:

“National Fossil Day was established in the United States by the National Park Service during 2010 as a celebration and partnership to promote the scientific and educational values of fossils. The first annual National Fossil Day was hosted on October 13, 2010, as a fossil-focused day during Earth Science Week. The National Park Service, the American Geosciences Institute, and more than 420 partners, including museums, institutions, science and teacher organizations, agencies, fossil sites, amateur fossil groups and other entities, joined together in a partnership to educate the public about fossils, the science of paleontology and America's Paleontological Heritage. There are National Fossil Day partners in all 50 states providing opportunities for educational outreach and hosting hundreds of fossil-themed activities at the local level.

National Park Service senior paleontologist Vincent L. Santucci is considered the “Father of National Fossil Day” and first proposed the concept of National Fossil Day in 2009 as a nationwide celebration for fossils in the United States. Santucci reached out to Geoff Camphire and Ann Benbow at the American Geosciences Institute (AGI) seeking support to establish National Fossil Day as a dedicated day during Earth Science Week. Once the idea of National Fossil Day was approved, dozens of organizations and museums joined this partnership including the Geological Society of America, Paleontological Society, Society of Vertebrate Paleontology, Smithsonian, and American Museum of Natural History. The National Fossil Day Celebration on the National Mall in Washington, D.C., was the kickoff event hosted on October 13, 2010. The event captured widespread media and public attention throughout the U.S.”

Today, National Fossil Day has become an important celebration of our national fossil heritage and promotes public educational outreach of paleontology to American citizens. National Fossil Day Partners each year put on special NFD events and programs as part of their annual planning. National Fossil Day has been critical in promoting the importance of stewardship of fossil resources in our country to people of all ages.

PUBLICATIONS

Vince has a very impressive publication record, including over 270 peer reviewed publications and reports; 15 edited volumes; and over 154 conference abstracts. He established Park Paleontology Newsletter in 1988, while a graduate student to communicate the importance for the management and protection of paleontological resources from public lands, including national parks. Vince’s publications involving Alaskan paleontology are provided below:

Alaskan Publications, Reports, and Abstracts

Blodgett, R.B., Baranov, V.V., and V.L. Santucci, 2022, Two new late Emsian (latest Early Devonian) pentameridine brachiopods from the Shellabarger Limestone (new formation), Shellabarger Pass, Denali National Park & Preserve, south-central Alaska, in Lucas, S.G., Blodgett, R.B., Lichtig, A.J., and Hunt, A.P., eds., Fossil Record 8: New Mexico Museum of Natural History and Science Bulletin 90, p. 73-83.

Blodgett, R.B., Santucci, V.L., and Tweet, J.S., 2016, An Inventory of Paleontological Resources from Katmai National Park and Preserve, Southwest Alaska. in Sullivan, R.M. and Lucas, S.G., eds., 2016, Fossil Record 5. New Mexico Museum of Natural History and Science Bulletin 74, p. 41-50.

Blodgett, R.B., Hults, C.P., Stromquist, L., Santucci, V.L., and Tweet, J.S., 2015, An inventory of Middle Jurassic fossils and their stratigraphic setting at Fossil Point, Tuxedni Bay, Lake Clark National Park and Preserve, Alaska. Natural Resource Report NPS/LACL/NRR—2015/932. National Park Service, Fort Collins, Colorado.

Blodgett, R.B., and Santucci, V.L., 2014, Fossil Point (Lake Clark National Park & Preserve): Alaska’s “Jurassic Park” for Middle Jurassic Invertebrate Fossils. Proceedings of the 10th Conference on Fossil Resources, Dakoterra 6: 98-106.

Blodgett, R.B. and Santucci, V.L., 2015. *Alaskothyris frosti*, A recently named Devonian brachiopod genus and species from the Brooks Range of Alaska. Alaska Geology: Newsletter of the Alaska Geological

Society 45(9): 4-5.

- Blodgett, R.B., Santucci, V.L., Rasic, J., and Tweet, J., 2023, Upper Triassic fossil fauna from craton-bound strata of the eastern part of the Yukon-Charley Rivers National Preserve, east-central Alaska. *Alaska Geology: Newsletter of the Alaska Geological Society*, v. 53, no. 4, p. 4-7.
- Blodgett, R.B., Santucci, V.L., Baranov, V.V., and Capps, D. 2023, New Devonian brachiopods and a new Devonian formation from the Shellabarger Pass area, Denali National Park & Preserve, south-central Alaska: *Alaska Geology: Newsletter of the Alaska Geological Society*, v. 53, no. 7, p. 4-10.
- Blodgett, R.B., Santucci, V.L., Baranov, V.V., and Hodges, M.S., 2021, The gypidulid brachiopod genus *Carinagypa* in late Emsian (latest Early Devonian) strata of the Shellabarger Pass area (Farewell terrane), Denali Park & Preserve, south-central: *New Mexico Museum of Natural History and Science, Bulletin 82*, p. 19-28.
- Blodgett, R.B., Santucci, V.L., and Sharman, L., 2012, An inventory of paleontological resources from Glacier Bay National Park and Preserve, Alaska. In *Rethinking Protected Areas in a Changing World: Proceedings of the 2011 George Wright Society Biennial Conference on Parks, Protected Areas, and Cultural Sites*. Samantha Weber, ed. Hancock, Michigan, The George Wright Society. p. 43-47.
- Blodgett, R.B., Baranov, V.V., and Santucci, V.L., 2015, *Alaskothyris* new genus (Family Stringocephalidae, Subfamily Rensselandiinae) from the Givetian (Upper Middle Devonian) of the Northwestern Brooks Range, Northern Alaska. *Fossil Record 4*. *New Mexico Museum of Natural History and Science Bulletin No. 68*, p. 5-8.
- Elder, W.P, Santucci, V.L., Kenworthy, J.P., Blodgett, R.B., and McKenna, R.T.P., 2009, Paleontological Resource Inventory and Monitoring-Arctic Network. *Natural Resources Technical Report NPS/NRPC/NRTR-2009/276*. National Park Service, Fort Collins, Colorado, TIC# D-157.
- Fiorillo, A.R., Santucci, V.L., Gangloff, R.A., Armato, P.J., and Kucinski, R., 2001, Establishing paleontological baseline data for research and management needs: Lessons learned from the National Park Service Alaska Region. in Santucci, V.L. and L. McClelland, (eds.), *Proceedings of 6th Fossil Resource Conference*. National Park Service Geologic Resources Division Technical Report NPS/NRGRD/GRDTR-01/01, P.123-129.
- Henderson, T. C., Santucci, V.L., Connors, T., and Tweet, J.S., 2021, National Park Service geologic type section inventory: Southwest Alaska Inventory & Monitoring Network. *Natural Resource Report. NPS/SWAN/NRR—2021/2296*. National Park Service. Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2287220>.
- Henderson, T. C., Santucci, V.L., Connors, T.L., and Tweet, J.S., 2021, National Park Service geologic type section inventory: Southeast Alaska Inventory & Monitoring Network. *Natural Resource Report. NPS/SEAN/NRR—2021/2309*. National Park Service. Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2287534>.
- Henderson, T. C., Santucci, V.L., Connors, T., and Tweet, J.S., 2022, National Park Service geologic type section inventory: Arctic Inventory & Monitoring Network. *Natural Resource Report NPS/ARCN/NRR—2022/2832*. National Park Service, Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2293381>. 81 p.
- Henderson, T.C., Santucci, V.L., Connors, T., and Tweet, J.S., 2022. National Park Service geologic type section inventory: Central Alaska Inventory & Monitoring Network. *Natural Resource Report NPS/CAKN/*

NRR—2022/2369. National Park Service, Fort Collins, Colorado. <https://doi.org/10.36967/nrr-2293137>. 81 p.

Hults, C.P, Blodgett, R.B., Stromquist, L., Santucci, V.L., Tweet, J.S., Schraer, C.D., Schraer, D.J., and Wood, J.R., 2015, An inventory of Middle Jurassic mollusks and their stratigraphic setting at Fossil Point, Lake Clark National Park and Preserve, Alaska. GSA Cordilleran Section Meeting, Anchorage, Alaska. Geological Society of America – Abstracts with Programs, 47(4): 19.

Kenworthy, J.P. and Santucci, V.L., 2003, Paleontological Resource Inventory and Monitoring -Southwestern Alaska Network. National Park Service TIC# D-93, 27 pp.

Rohr, D.M., Blodgett, R.B., Santucci, V.L., and Slavik, L., 2013, Shallow and deep water origins of Silurian rocks at Glacier Bay, Alaska. Alaska Park Science 12(1): 38-43.

Rohr, D.M., Blodgett, R.B., and Santucci, V.L., 2023. “Kissing Clams” from the Silurian of Glacier Bay, Southeast Alaska: Alaska Geology: Newsletter of the Alaska Geological Society, v. 53, no. 8, p. 5-11.

Santucci, V.L., Blodgett, R.B., Elder, W.P., and Kenworthy, J.P., 2011, Paleontological Resource Inventory and Monitoring—Central Alaska Network. Natural Resource Technical Report NPS/NRPC/NRTR—2011/510. National Park Service, Fort Collins, Colorado, 111 p.

Santucci, V.L. and Kenworthy, J.P., 2008. Paleontological Resource Inventory and Monitoring, Southeast Alaska Network. Natural Resources Technical Report NPS/NRPC/NRTR- 2008/108.

Santucci, V.L., Wall, W.P., and Mead, A., 1995, A Preliminary Survey of Paleontological Resources from the Alaska Region National Parks. in V.L. Santucci and L. McClelland, eds., National Park Service Paleontological Research, Volume 2, NPS/NRPO/NRTR-95/16, p. 8-10

Abstracts / Conference Presentations

Blodgett, R.B., Rohr, D.M., Santucci, V.L., and Sharman, L., 2011, A paleontologic resource assessment of Glacier Bay National Park and Preserve, Southeast Alaska - Providing data for future geologic mapping. Geological Society of America, Abstracts with Programs 42(5):564.

Blodgett, R.B. and Santucci, V.L., 2013, The utility of museum collections for paleontologic research in Alaskan national parks. Geological Society of America, Abstracts with Programs 45(7): 843.

Blodgett, R.B., Santucci, V.L., and Sharman, L., 2011, Glacier Bay National Park and Preserve Paleontological Resource Inventory. The George Wright Society Conference on Parks, Protected Areas and Cultural Sites, Abstracts Volume, New Orleans, Louisiana, p. 146.

Hults, C.P, Blodgett, R.B., Stromquist, L., Santucci, V.L., Tweet, J.S., Schraer, C.D., Schreyer, D.J., and Wood, J.R., 2015, An inventory of Middle Jurassic mollusks and their stratigraphic setting at Fossil Point, Lake Clark National Park and Preserve, Alaska. GSA Cordilleran Section Meeting, Anchorage, Alaska. Geological Society of America – Abstracts with Programs, 47(4): 19.

Biographic Source Material on Vince Santucci

Pistol-Packing Paleontologist: New York Times, June 22, 1999, Section F, p. 3.

Cook, Terri, 2018, Down to Earth With: National Park Service senior paleontologist Vincent Santucci: Earth Magazine, April 10, 2018, American Geoscience Institute (AGI) publication: URL: <https://www.earthmagazine.org/article/down-earth-national-park-service-senior-paleontologist-vincent-santucci/>

Vince Santucci in various field settings



Vince in Yellowstone National Park, 1998



Vince on the Yukon River in Yukon-Charley Rivers National Park & Preserve



Dave Rohr (left) and Vince Santucci (right) in Glacier National Bay Park & Preserve



Vince Santucci (left) and Denny Capps (right) at dinosaur track site in Denali National Park & Preserve



Vince (in blue shirt) sitting atop horse leading a field trip in Death Valley

National Fossil Day posters with Alaskan themes - Every year a different cover is released depicting prehistoric organisms from various National Parks

