

## Biography of Dr. J. Dungan Smith

AB and MS in Geological Sciences, Brown University 1962, 1963

PhD in Geophysical Sciences, University of Chicago 1968

Department of Theoretical Oceanography & Meteorology, Woods Hole Oceanographic Institute, 1966-67

Professor, Department of Oceanography and Geophysics Program, University of Washington, 1967-1980



Professor, Geophysics Program and Department of Geological Sciences, University of Washington, 1980-1991

Chairman, Geophysics Program, University of Washington, 1980-1985

Research Hydrologist, US Geological Survey, Boulder Colorado Laboratory, 1991-2011

Retirement years: 2011-2021. Loving father, grandfather, husband, nature photographer, traveler, explorer, avid hiker and steward of nature.

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Professor J. Dungan Smith was trained as a sedimentologist, paleoecologist and physical oceanographer. He attended Brown University where he obtained his BA with a major in Geology and a minor in Mathematics, and his MS in Sedimentology with minors in Paleontology and Fluid Mechanics. At the University of Chicago, he pursued further interests in multiple fields including ecology, evolutionary biology, applied mathematics, classical and geophysical fluid mechanics and oceanography; he obtained his PhD in Physical Oceanography, Geophysical Fluid Mechanics and Sedimentology with minors in Geomorphology and Paleontology. His goal at the time was to generate expertise in fluid dynamics and sediment transport necessary to construct mathematical models of marine depositional systems. In 1963 he was awarded a 3-year NASA fellowship.

In the summer of 1964 Smith participated in a unique course of Marine Geophysics given by the Woods Hole Oceanographic Institute. This course included 2 two-week field excursions on the *Atlantis I* during which students were able to carry out research using state-of-the-art geophysical equipment. For several years following, he remained in residence in the Department of Theoretical Oceanography and Meteorology at the WHOI doing field, laboratory, and theoretical research on the dynamics of sand waves and sand shoals subjected to strong tidal currents in Nantucket and Vineyard Sounds. His doctoral thesis on this topic was completed in 1967.

Although asked to remain at WHOI as a faculty member Smith joined the Oceanography Department at the University of Washington in 1967 to teach coastal and estuarine oceanography and sediment transport mechanics. A year into his Oceanography appointment, he and seven other scientists founded the Geophysics Program. He retained

half time appointments in Geophysics and Oceanography until 1980. During this early period, he instigated major research efforts in the area of continental shelf oceanography, marine physical oceanography and marine sediment transport. Some of his projects included: physical oceanographic and sediment transport on the Washington Continental Shelf, in the Columbia River, and in Puget Sound; the turbulent structure of the density stratified planetary boundary layer underneath the sea ice in the Arctic Ocean; and bed load and suspended load transport over sand waves in the Columbia River. In the mid 1970s he also began comprehensive investigations of salt-wedge estuaries (Duwamish River, Washington), fjords (Knight Inlet, British Columbia) and meandering rivers (Muddy Creek, Wyoming) and developed fully predictive mathematical models for the initial motion and the bed load and suspended load transport of non-cohesive sediment.

In 1980, during a Senior Queens Fellowship in Australia, Mt St Helens erupted. Upon returning to the University of Washington shortly thereafter, Smith was appointed Chair of the Geophysics Program which became the primary unit working on the geophysical aspects of the volcano. At that time, he also began research on the debris flow in the Toutle River which resulted from the eruption. Later he built a unique continuously circulating mud flume to investigate this phenomena. At the same time, he went on to extend his affiliation into the Department of Geological Sciences. His teachings thereafter focused on educating students in fluid and sediment transport mechanics.

Smith quickly became recognized as one of the top coastal, estuarine, and arctic oceanographers in the country leading to his involvement as a leader in many national and international oceanographic activities. These included: participating in and chairing NSF panels, organizing NSF and ONR sponsored workshops, serving as a scientific advisor to the Office of Naval Research on major ocean and boundary layer sediment transport programs, serving on the scientific advisory committee of several major oceanographic experiments, and planning multi-ship, international, coastal, and estuarine experiments. Owing to his joint expertise in fjord mechanics and suspended sediment transport, he was recruited by Bechtel to examine the feasibility and environmental safety of depositing tailing in the bottom of the Boca de Quatro Inlet.

Soon after, due to his now international expertise in physical oceanography and marine hydrodynamics of salt wedge estuaries and fjords, he was asked by the Danish Government in 1987 to serve on the Panel of World Experts in Fjord Oceanography. He was recruited by Storebaelt Forbindelsen to design and review implementation of the law of the Danish Parliament that the new bridge and tunnel across the Great Baelte between Zealand and Funen specifically not impact the Baltic Sea. It was the task of the Panel of Experts to ensure this requirement was satisfied as well as mitigate any short-term environmental effects that might arise during construction. In June 1988 Smith and his colleagues were invited to the opening of the Link and to a reception by the Queen of Denmark.

In 1988-89 Smith was chosen by the Japanese Government as an advisor to study pre-existing and post tsunami effects. This work continued on into the next couple decades.

In 1987 Smith took a sabbatical leave from the University of Washington to the National Research Program of the Water Resources Division of the USGS in Denver to learn more about morphological adjustments in rivers. There he extended his research in hydrology, sediment transport in gravel-bedded streams and hill slope processes. In 1991 he relocated to Colorado and went to work for the Boulder Office of the National Research Program (NRP). His efforts in hydrology focused on large scale issues of critical social importance, especially on generating a scientific approach to flash flood prediction. His first project with the USGS involved measuring and modeling flow and suspended load transport in the Colorado River between the Glen Canyon Dam and Lake Mead. In 1996 Smith and his research group modeled a "controlled flood" and made stage measurements at approximately 40 sites along the River through the Grand Canyon. From the difference between the calculated and measured hydrography they were able to determine the amount of suspended sand deposited on the edges of the rivers thus enabling them to re-establish the ecological system of this sacred wonder. In 1999 he was awarded a Certificate of Excellence from the Department of the Interior for his work on the Grand Canyon Project.

In 1995, Smith became involved with an EPA Superfund site on the Clark Fork of the Columbia River through the Deer Lodge Valley. The goal of the project was to stop water contamination caused by meandering cuts in the tailings. The project was successful and led to the development of new fully predictive algorithms to calculate bank and floodplain erosion in streams with variously vegetated surrounds. These algorithms subsequently became the foundation for a more accurate, less expensive method of gaging rivers.

During this same time due to his expertise of the meteorological conditions of the Washington-Oregon coast, and as a Research Advisor for Geomorphology and Sediment Transport at NRP, he was asked to join the US Weather Research Program (USWRP) Prospectus Development Team (PDT) on Coastal Meteorology. He became an original three-year member of the Science Steering Committee focusing on coastal processes, tropical storms at and after landfall, and flash flood hydrology. He co-chaired this committee for several years.

Smith went on to focus on the environmental impact of the 1963 Plumb Creek Flood in Colorado as well as the important impact of beavers on stabilizing the riparian environment in Rocky Mountain National Park.

In 2007 he was awarded the Hans Albert Einstein Award from the American Society of Civil Engineers.

Dr Smith retired from the USGS in 2011. His passion for investigating, questioning, exploring, photographing and protecting the environment continued on until his death, May 2, 2021.

Like all scientists, Smith's career involved the collaboration of many gifted students, colleagues, and grants. The [J. Dungan Smith Google Scholar page](#) acknowledges those who co-authored publications; and those publications acknowledge the funding agencies.