8-2016

# A Survey to Better Understand the Use of the Terms "Colluvium" and "Alluvium"

Bradley A. Miller
*Iowa State University*, millerba@iastate.edu

Jérôme Juilleret
*Luxembourg Institute of Science and Technology*

# A Survey to Better Understand the Use of the Terms "Colluvium" and "Alluvium"

**Abstract**
We need your help to fully understand how scientists from different backgrounds define the terms "colluvium" and "alluvium." We ask that you contribute your perspective by taking the survey at http://goo.gl/forms/fV8RBWKjis. The closing deadline is October 31, 2016. The feedback so far has been positive, and many participants have described the experience as fun. Many commented on how the survey challenged their thinking about these sediments, causing them to more carefully consider potential gaps in their definitions for the terms and their strategies for identifying the materials. Others have expressed great interest in the results because they too have sometimes struggled with how to best use these terms. The following background describes why we are pursuing the question of how scientists are using the terms colluvium and alluvium.

**Disciplines**
Agricultural Science | Sedimentology | Soil Science

**Comments**
This article is published as Miller, B.A., Juilleret, J. A Survey to Better Understand the Use of the Terms "Colluvium" and "Alluvium". National Cooperative Soil Survey Newsletter 76:7-9.

# A Survey to Better Understand the Use of the Terms "Colluvium" and "Alluvium"

By Bradley Miller, assistant professor, Department of Agronomy, Iowa State University, Ames, Iowa, and Jérôme Juilleret, engineer in Soil Science and Hydrology, Department of Environmental Research and Innovation (ERIN), Luxembourg Institute of Science and Technology, Belvaux, Grand-Duchy of Luxembourg.

We need your help to fully understand how scientists from different backgrounds define the terms "colluvium" and "alluvium." We ask that you contribute your perspective by taking the survey at http://goo.gl/forms/fV8RBWKjis. The closing deadline is October 31, 2016. The feedback so far has been positive, and many participants have described the experience as fun. Many commented on how the survey challenged their thinking about these sediments, causing them to more carefully consider potential gaps in their definitions for the terms and their strategies for identifying the materials. Others have expressed great interest in the results because they too have sometimes struggled with how to best use these terms. The following background describes why we are pursuing the question of how scientists are using the terms colluvium and alluvium.

People classify things for two primary reasons: (1) to help make sense of a complex world, and (2) to improve communication. We are focusing on the latter. Communication problems occur if two people have different concepts when they are using the same word. The United States is fortunate to have national entities, such

**Figure 1.—Sediments in different locations of this landscape have been transported by different processes that also vary in magnitude. Part of the challenge in applying definitions of colluvium and alluvium is the gradient between the two, but how a sediment is classified can be very different based on the type of diagnostic criteria and associated processes emphasized by the scientist. For example, diagnostic criteria that we have found by reviewing the literature and reaching out to the Earth science community via social media include landscape position, degree of sorting, connection to stream, and distance traveled.**

as NRCS, which produce official definitions that U.S. scientists can reference for communicating with one another. When we work internationally, however, it becomes apparent that some terms (especially colluvium) can have a very different meaning from the common U.S. meaning.

As we've investigated the issue further, we've been surprised by the variety of perspectives. The differences have not been just between countries or disciplines, but also within those demographics, including within the United States. The differences also go beyond simply recognizing that the American term "colluvium" is not equivalent to the German term "kolluvium" (Kleber, 2006). These differences are the reason we initiated this survey to collect data on how Earth scientists are actually using the terms.

The terms colluvium and alluvium have had an interesting historical progression. The word parts "luvium" and "luvial" come from the Latin "luo" or "luere," which means to wash (Glare, 2010). Although this suggests an association with process, early uses of these terms had more of a connection to time periods of deposition. In the oldest literature, alluvium generally described all recent deposits formed in the Holocene. Alluvium contrasted with "diluvium," which described deposits from the last glacial period. Note that diluvium has a shared Latin etymology with deluge, reflecting the theory at that time that linked till with the biblical great flood.

It is not clear when colluvium came into use, but the Latin etymology of "co" suggests that it was intended to describe material that was with or mixed with something else. Along those lines, Foucault et al. (2014) included the etymology of colluvium as "with alluvium," but went on to define colluvium as a footslope deposit that has undergone less transportation than alluvium. The old French-Latin dictionary provides some different clues. The definition of "Colluvi-es" includes "mixing, confusion," "dirty water mixture," and "mud," whereas "Alluvi-o" includes "soil made by a river," "violent flood," and "river water or rainwater" as well as "floods the fields and completely disrupts them" (De Wailly, 1861). Despite being intriguing, the origins of these terms do not have a strong bearing on how they are applied today.

Definitions of colluvium and alluvium in modern literature tend to rely on location or process. Although the past and modern definitions can be seen to be compatible in some ways, the longer a definition is, the more likely it is to mark out exceptions to its originally stated principle and conflict with other definitions. For example, many definitions of colluvium identify it as being located at the base of hillslopes but vary in the defining process. Examples include gravitational forces (Whittow, 1984); under the influence of gravity, assisted by water (Schaetzl and Thompson, 2015); and unconcentrated surface runoff or sheet erosion (definition (b) from Neuendorf et al., 2005). Some definitions of colluvium specify that it is heterogeneous or usually unsorted (Whittow, 1984; Owen and Shaw, 2007; Schaetzl and Thompson, 2015), but definitions that include sheet flow, rainwash, or local wash are not completely compatible with that diagnostic criteria. Adding another dimension, Leopold (2003) defined the German word kolluvium as sediments deposited due to anthropogenic-induced soil erosion caused by settling, clearing, mining, grazing, and/or farming. Examining the differences between definitions highlights the variety of perspectives on what to emphasize when distinguishing these parent materials. In practice, many more perspectives may be in use as scientists adapt to the landscape in which they work. It is time to make note of all of these perspectives and look for ways to synthesize an approach that facilitates global understanding and communication.

Although we recognize that the results of this survey process will not authoritatively provide definitions for colluvium and alluvium, we believe it will make progress on two objectives. First, it will allow us to "map" how the terms are being used across countries, landscapes, and disciplines. This mapping will provide a guide for recognizing and translating meanings among people with different perspectives. Second, we hope the data will shed light on why the use of these terms varies and thereby identify some potential strategies for better describing these sediments. After

this first round of the survey, we plan to provide all of the survey participants with the results and then present to them a series of potential options for addressing issues and unifying perspectives based on the data. It is our hope that the final results will lay the groundwork for reducing confusion, facilitating better communication, and improving the description of these sediments. We look forward to your input!

## References


De Wailly, A. 1861. Nouveau dictionnaire latin-français. Paris, France.

Foucault, A., J.F. Raoult, F. Cecca, and B. Platevoet. 2014. Dictionnaire de géologie. 8th éd. Dunod, Paris, France.

Glare, P.G.W. 2010. Oxford Latin dictionary. Clarendon Press, Oxford.

Kleber, A. 2006. "Kolluvium" does not equal "colluvium." Zeitschrift für Geomorphologie, NF 50:4.

Leopold, M. 2003. Multivariate analyse von geoarchiven zur Rekonstruktion eisenzeitlicher landnutzung im umfeld der spätlaténezeitlichen viereckschanze von Poign, Lkr. Regensburg. In: J. Völkel (ed.) Regensburger Beiträge zur Bodenkunde, Landschaftsökologie und Quartärforschung. http://www.bibliothek.uni-regensburg.de/opus/volltexte/2004/336, version 2.

Neuendorf, K.K.E., J.P. Mehl, and J.A. Jackson. 2005. Glossary of geology. 5th ed. American Geological Institute, Alexandria, Virginia.

Owen, B., and R. Shaw. 2007. Hong Kong landscapes: Shaping the barren rock. Hong Kong University Press.

Schaetzl, R.J., and M.L. Thompson. 2015. Soils: Genesis and geomorphology, second edition. Cambridge University Press.

Whittow, J.B. 1984. Penguin dictionary of physical geography. Penguin Group, London, England. ■


# Mapping the Potential Impact of Sea-Level Rise

By Allison Leapard, graduate student at the University of Florida and USDA–NRCS soil conservationist, Chesapeake, Virginia.

The following briefly summarizes "Mapping the Potential Impact of Sea-Level Rise and Increased Salinity on Agricultural Land in Virginia Beach, Virginia." The full version, including references and data sources, is available from allison.leapard@va.usda.gov. The study examines how sea-level rise may impact the unprotected agricultural lands of southern Virginia Beach by the year 2100.

The Hampton Roads region of southeastern Virginia is experiencing the highest rates of sea-level rise of any area along the east coast of the United States. While global average sea level has been rising at a rate of about 1.8 mm/year, sea level at the Sewells Point tidal station in Norfolk, Virginia, has been rising at an average of 4.4 mm/year (Zervas, 2009).

Hampton Roads is at the mouth of the Chesapeake Bay (fig. 1). The region is currently the second largest population center at risk from sea-level rise in the country, second only to New Orleans (Connolly, 2015). The City of Virginia Beach, the largest city in Hampton Roads and the most populous city in Virginia, is in the southeastern most corner of the State. It is bordered by the Atlantic Ocean to the east and Chesapeake Bay to the north.

The northern sector of Virginia Beach is intensely developed. The southern

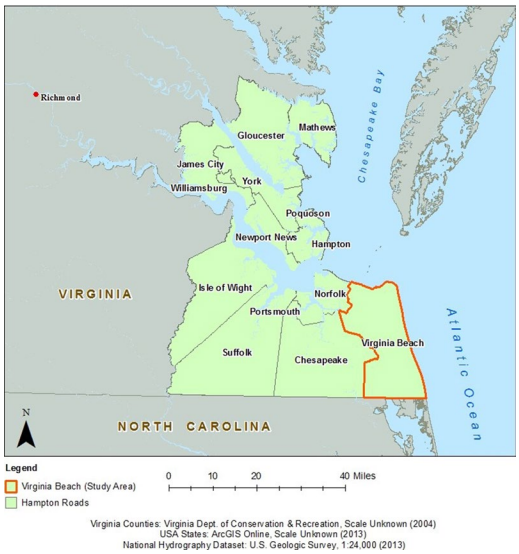


**Figure 1.—The Hampton Roads area of Virginia.**