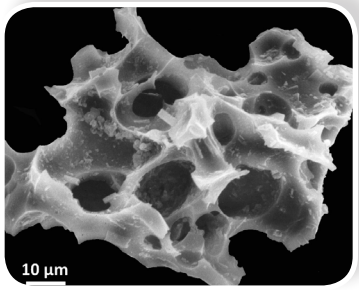
Andic Soil Properties Controlled by Environmental Gradients and Site Disturbance

Soils formed entirely or partly in volcanic ash (andic soils) comprise more than 4.7 million ha of the Northern Rocky Mountains of western Montana, northern Idaho, and northeastern Washington and support the most productive forests of the region. However, because of the rugged topography and somewhat limited access, the characteristics and ecological implications of these soils have received relatively little attention.

In an article recently published in the *Soil Science Society of America Journal*, researchers compile four decades of research describing the characteristics and distribution of these soils. In synthesizing this information, three distinct pathways by which these soils form are identified. The majority of soils develop via an allophanic pathway, producing weathering products such nanocrystalline aluminosilicates and ferrihydrite. Soils at higher elevations receiving more effective precipitation undergo podzolization and develop extremely acidic surface horizons. A third pathway involves the establishment of plant communities dominated by bracken fern that give rise to soils containing an abundance of metal-organic complexes and high aluminum activity.



Scanning electron micrograph of a Mazama glass shard collected from the very fine sand fraction of an Andisol in the northern Rocky Mountains. This glass serves as the primary parent material for andic soils of the region. The vesicular structure indicates a highly explosive eruption of silica-rich material.

The pedogenic pathways described in this study each create a unique suite of andic soil properties. Since the trajectory and end point of these pathways can be greatly altered by site disturbance, they should be an important consideration in sustainable management of andic soils of the region.

Adapted from McDaniel, P., M. Ross, J. Jimenez, D.G. Strawn, M. Valerio, M.J. Kimsey, S. Campbell, and A. Falen. 2018. Pedogenic pathways in Andic soils of the Northern Rocky Mountains (USA). Soil Sci. Soc. Am. J. 82:1308–1318. View the full article online at https://bit.ly/2FCV2G1

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Training and Calibration Key for Accurate Hand Textures

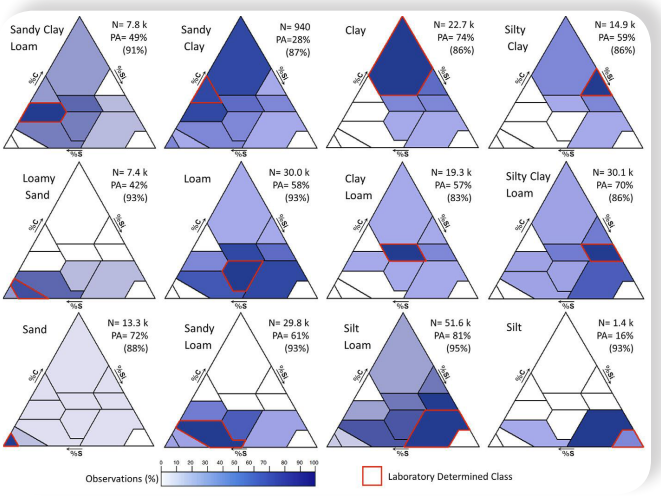
Estimating soil texture is a fundamental skill used by scientists to classify soil based on the apparent grittiness, cohesiveness, and stickiness. While texture estimates from seasoned soil scientists are generally viewed as reliable, less is known the about the accuracy of novice soil scientists.

New research in the *Soil Science Society of America Journal* summarizes soil texture estimates of scientists with a range of backgrounds, including a comprehensive analysis using the National Cooperative Soil Survey (NCSS) soil characterization database as well as seasonal data collectors working on rangeland inventory and assessment programs in the Western United States and in Namibia.

Professional soil scientists contributing to the NCSS showed higher than previously reported class accuracy (66% overall accuracy and 91% within one class) while the seasonal data collectors performed similarly to university students with limited training (27 to 41% overall accuracy with 71–78% within one class). Results also showed that when novice users misclassify texture class, it is more likely because of errors in estimating ribbon length than estimating grittiness.

These findings underscore the need for all scientists to practice hand texture skills against known samples and to calibrate for localized variability in soil texture.

Adapted from Salley, S.W., J.E. Herrick, C.V. Holmes, J.W. Karl, M.R. Levi, S.E. McCord, C. van der Waal, and J.W. Van Zee. 2018. A comparison of soil texture-by-feel estimates: Implications for the citizen soil scientist. Soil Sci. Soc. Am. J. 82:1526–1537. View the full article online at http://doi.org/10.2136/sssaj2018.04.0137



Accuracy of soil texture by class from National Cooperative Soil Survey soil scientists.

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