

VITA - STEPHEN PAUL ALTANER

Mailing Address

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Education

B.S., magna cum laude, Colgate Univ., Geology, 1979
Ph.D., Univ. of Illinois, Geology, 1985

Professional Experience

2022 - Present	Associate Professor Emeritus - Dept. of Earth Science & Environ. Change, Univ. of Illinois
2013 - 2022	Associate Professor & Associate Head - Dept. of Geology, Univ. of Illinois
1990 - 2013	Associate Professor - Dept. of Geology, Univ. of Illinois
1985 - 1990	Assistant Professor - Dept. of Geology, Univ. of Illinois
1984 - 1985	Post-doctoral Research Scientist - USGS, Reston, VA

Professional Societies

Clay Minerals Society

Research Experience and Interests

Principal research interests lie in the fields of the petrology (occurrence, origin, and geological significance), geochemistry, and mineralogy of clays. Research experience includes ammonium (NH₄) in illite (tobelite); understanding of the origin of anthracite primarily through analysis of associated clay minerals including tobelite; ammonium in geologic environments; mechanism of the smectite to illite reaction; silicate diagenesis in hydrothermal and burial diagenetic environments; Monte Carlo simulations of mixed-layer clay mineral structures; rates of clay mineral transformations; nuclear magnetic resonance characterization of structural environments of interlayer and framework cations in clays; origin of K-bentonite and diffusion in clay-rich strata.

Selected Recognitions

2009	Outstanding Teacher of Freshmen Award, Alpha Lambda Delta Honor Soc., Univ. of Illinois
2004	Dean's Award for Excellence in Undergraduate Teaching, LAS College, Univ. of Illinois
2004	Campus Award for Excellence in Undergraduate Teaching, Univ. of Illinois
1998 - 2001	Associate Editor for Clays & Clay Minerals
1998	Prokasy Award for Excellence in Undergraduate Teaching, LAS College, Univ. of Illinois
1991	University Scholar's Award, Univ. of Illinois
1989 - 1991	Elected to Council of Clay Minerals Society
1982 - 1985	Exxon Graduate Student Fellowship, Univ. of Illinois
1979 - 1982	Graduate College Fellowship, Univ. of Illinois
1979	Phi Beta Kappa, Colgate Univ.

Invited talks in France, Italy, Japan, Spain, and Switzerland. Chair of numerous symposia and general sessions for many national and international scientific meetings.

Grants Received (SPA = Principal Investigator for all grants except first listed one)

National Science Foundation, teaching (Co-PI)	2014-2016	\$2,000,000
National Science Foundation - research	1995 - 1997	\$205,000
National Science Foundation - research	1994 - 1997	\$20,000
Univ. of Illinois Research Board - equipment	1995	\$6,900
American Chemical Society - research	1994 - 1996	\$50,000
Univ. of Illinois Research Board - research	1993 - 1994	\$4,900
National Science Foundation - research	1992 - 1994	\$144,000
National Science Foundation - equipment	1990	\$15,000
Univ. of Illinois Research Board - equipment	1990	\$7,500
National Science Foundation - research	1990 - 1993	\$165,000
National Science Foundation - research	1987 - 1989	\$65,000
American Chemical Society - research	1987 - 1989	\$18,000

Gifts Received

Arco Oil + Gas	1991	\$5,000
Marathon Oil	1989	\$4,000
Ralph Grim (SEM donation)	1987	\$150,000

Equipment Donations

Exxon Production Research (X-ray diffractometer)	1999	\$50,000 (estimated fair market value)
Marathon Oil (X-ray diffractometer)	1991	\$50,000 (estimated fair market value)

Teaching Experience (Altaner's instruction in all courses listed below was consistently rated as "very good to excellent" by students and he usually is named to Univ. of Illinois List of Teachers Ranked Excellent by Students)

Geology 100	Planet Earth
Geology 101	Introduction to Physical Geology
Geology 110	Exploring Geology in the Field
Geology 118	Natural Disasters
Geology 333	Earth Materials and the Environment
Geology 380	Environmental Geology
Geology 415/515	Field Geology - Central California
Graduate course	Mineralogy of Clays
Graduate course	Petrology of Clays
Graduate course	Sedimentary Geochemistry
Graduate course	Physical Geochemistry
Short Course (20 hr) on Clay Minerals: Mineralogy, Geology, and Identification by X-ray Diffraction (Given to Illinois State Geological Survey, Champaign, IL)	
ESE 445	Earth Resources Sustainability (online)

Altaner has taught around 25,000 students and led over 100 geology field trips during his 37-year career.

Service Experience

Served on dozens of departmental, university, and external committees. Most significant experience includes: at Departmental level - Advisory, Courses & Curriculum, Graduate Studies, and Undergraduate Studies Committees as well as Coordinator of Earth Science Teaching degree program and Annual Departmental Field Trip; at LAS College level - Junior Faculty Mentor in LAS College Teaching Academy, Courses & Curriculum Committee, Committee on Admissions and Academic Standards; at U of I Campus level - General Education Board, Awards Selection Committee; at Clay Minerals Society - Chair of Student Research & Travel Grants Committee, Bailey Award Committee, Organizing Committee for 50th Annual meeting of Clay Minerals Society.

Consulting Experience

Characterized whole sample and clay mineralogy for many hundreds of samples for ~12 different geotechnical engineers and several oil company geologists; served as technical consultant for several companies including UniMin (now Covia), Westinghouse, and Delta Chemicals; reviewed ~10 geology textbooks for a variety of publishing companies.

Publications

* = Ammonium/NH₄ in minerals publication, ** = Ammonium/NH₄ in illite/tobelite publication

A. Journal Articles

1. Altaner, S.P. (1983) Zoned K-bentonites, evidence for the effect of solution chemistry on the smectite to illite reaction: Proc. of workshop on smectite alteration, D.M. Anderson, ed., Wash. D.C., 19-21.
2. April R., Selleck B., Altaner S. (1984) Clay mineralogy of the Onondaga limestone, central and western New York: *Northeastern Geology*, **6**, 83-87.
3. Altaner, S.P., Hower, J., Whitney G., Aronson J.L. (1984) Model for K-bentonite formation, evidence from zoned K-bentonites in the disturbed belt, Montana: *Geology*, **12**, 412-415.
4. Whitney G., Altaner S. (1985) The low-grade metamorphic transformation of clay minerals in sedimentary rocks within the Montana disturbed belt: Guidebook of field trip for 1985 International Clay Conference, 32 pp.
5. Bethke, C.M., Altaner, S.P. (1986) Layer-by-layer mechanism of smectite illitization and application to a new rate law: *Clays and Clay Minerals*, **34**, 136-145.
6. Bethke, C.M., Vergo, N., Altaner, S.P. (1986) Pathways of smectite illitization: *Clays and Clay Minerals*, **34**, 125-135.
7. Altaner, S.P. (1986) Comparison of rates of smectite illitization to rates of K-feldspar alteration: *Clays and Clay Minerals*, **34**, 608-611.
8. * Krohn, M. D., Altaner, S.P. (1986) Near-infrared detection of ammonium minerals: *Geophysics*, **52**, 924-930.
9. Weiss, C.A., Altaner, S.P., Kirkpatrick, R.J. (1987) High resolution ²⁹Si NMR spectroscopy of 2:1 layer silicates: Correlations among chemical shift, structural distortions, and chemical variations: *American Mineralogist*, **72**, 735-742.
10. * Altaner, S.P., Fitzpatrick, J.J., Krohn, M.D., Bethke, P.M., Hayba, D.O., Gross, J., Brown, Z.A. (1988) Ammonium in alunites: *American Mineralogist*, **73**, 145-152.
11. Bethke, C.M., Harrison, W.J., Upson, C., Altaner, S.P. (1988) Supercomputer analysis of sedimentary basins: *Science*, **239**, 261-267.
12. Altaner, S.P., Weiss, C.A., Jr., Kirkpatrick, R.J. (1988) Evidence from ²⁹Si NMR for the structure of mixed-layer illite/smectite clay minerals: *Nature*, **331**, 699-702.
13. Altaner, S.P., Bethke, C.M. (1988) Interlayer order in illite/smectite: *American Mineralogist*, **73**, 766-774.
14. * Krohn, M.D., Altaner, S.P. (1988) Distribution of ammonium minerals at Hg/Au-bearing hot springs deposits: Initial evidence from near-infrared spectral properties: in, *Bulk Mineable Precious Metal Deposits of the Western United States, Symposium Proceedings*, Schafer R.W., Cooper J.J. and Vikre P.G., ed., Geol. Soc. Nevada, 661-679.

15. Altaner, S.P., Vergo, N. (1988) Sericite from the Silverton caldera, Colorado: Discussion: *American Mineralogist*, **73**, 1472-1474.
16. Altaner, S.P. (1988) ^{29}Si and ^{27}Al NMR spectroscopy of clay minerals: in Workshop Notes of shortcourse on Magnetic Resonance Methods in Clay Science, Grand Rapids, MI, 11-67.
17. Altaner, S.P. (1989) Calculation of K diffusional rates in bentonite beds: *Geochimica et Cosmochimica Acta*, **53**, 923-931.
18. ** Daniels, E. J., Altaner, S.P., Marshak, S., Eggleston, J.R. (1990) Hydrothermal alteration in anthracite from eastern Pennsylvania: Implications for mechanisms of anthracite formation: *Geology*, **18**, 247-250.
19. Altaner, S.P., Grim, R.E. (1990) Mineralogy, chemistry, and diagenesis of tuffs in the Sucker Creek Formation (Miocene), eastern Oregon: *Clays and Clay Minerals*, **38**, 561-572.
20. Weiss, C.A., Kirkpatrick, R.J., Altaner, S.P. (1990) The structural environments of cations adsorbed onto clays: ^{133}Cs variable-temperature MAS NMR spectroscopic study of hectorite: *Geochimica et Cosmochimica Acta*, **54**, 1655-1669.
21. ** Daniels, E.J., Altaner, S.P. (1990) Clay mineral authigenesis in coal and shale from the Anthracite region, eastern Pennsylvania: *American Mineralogist*, **75**, 825-839.
22. Weiss, C.A., Jr., Kirkpatrick, R.J., Altaner, S.P. (1990) Variations in interlayer cation sites of clay minerals as studied by ^{133}Cs MAS nuclear magnetic resonance spectroscopy: *American Mineralogist*, **75**, 970-982.
23. Altaner, S.P., Kirkpatrick, R.J., Weiss, C.A. (1990) Magic-angle spinning nuclear magnetic resonance investigation of phyllosilicates: Proceedings of 9th International Clay Conference, Strasbourg, France, 1989, V.C. Farmer and Y. Tardy, eds., *Sci. Geol. Mem.*, **89**, 159-168.
24. ** Daniels, E.J., Altaner, S.P., Marshak, S., Eggleston, J.R. (1991) Hydrothermal alteration in anthracite from eastern Pennsylvania: Implications for mechanisms of anthracite formation - Reply: *Geology*, **19**, 189.
25. ** Daniels, E.J., Altaner, S.P. (1993) Inorganic nitrogen in anthracite from eastern Pennsylvania, USA: *Internat. J. Coal Geol.* **22**, 21-35.
26. Altaner, S.P., Teague, G. (1993) Mineralogy, chemistry, and genesis of tuffs in the Sucker Creek Formation (Miocene), eastern Oregon: in *ZeoTrip 93, An Excursion to Selected Zeolite and Clay Deposits in Southeastern Oregon and Southwestern Idaho, June 26-28, 1993*, Mumpton, F.A., ed., Int. Committee on Zeolites, Brockport, NY, 14 - 29.
27. ** Hower, J.C., Levine, J.R., Skehan, J.W., Daniels, E.J., Lewis, S.E., Davis, A., Gray, R.J., Altaner, S.P. (1993) Appalachian anthracites: *Organic Geochemistry*, **20**, 619-642.
28. ** Daniels, E.J., Aronson, J.L., Altaner, S.P., Clauer, N. (1994) Late Permian age of NH_4 -bearing illite in anthracite from eastern Pennsylvania: Temporal limits on coalification in the central Appalachians: *Geological Society of America Bulletin*, **106**, 760-766.
29. Ylagan, R.F., Altaner, S.P., Pozzuoli, A. (1996) Hydrothermal alteration of a rhyolitic hyaloclastite from Ponza island, Italy: *J. Volcanology Geothermal Research*, **74**, 215-231.
30. ** Marshak, S., Daniels, E.J., Altaner, S.P. (1996) Use of clay-mineral alteration patterns to define syntectonic permeability of joints (cleat) in Pennsylvania anthracite coal: *Tectonophysics*, **263**, 123-136.
31. Cuadros, J., Altaner, S.P. (1996) Crystal-chemical features of bentonitic illite/smectite: In, ed., Ortega-Huertas M., Lopez-Galindo A., Palomo-Delgado I., *Advances in Clay Minerals, Sociedad Espanola de Arcillas*, 68-69.

32. Altaner, S.P., Ylagan, R.F. (1997) Comparison of structural models of mixed-layer illite/smectite and reaction mechanisms of smectite illitization: *Clays & Clay Minerals*, **45**, 517-533.
33. Wisseman, S., De Sena, E., Landsberger, S., Ylagan, R., Altaner, S., Moore, D. (1998) Compositional analyses of ceramics from Serres and Thessaloniki: *in* *Materials Analysis of Byzantine Pottery*, Maguire, H., ed., *Dumbarton Oaks Research Library and Collection*, 157-166.
34. Cuadros, J., Altaner, S.P. (1998) Compositional and structural features of the octahedral sheet in mixed-layer illite/smectite from bentonites: *European J. Mineralogy*, **10**, 111-124.
35. Cuadros, J., Altaner, S.P. (1998) Characterization of mixed-layer illite-smectite from bentonites using microscopic, chemical, and X-ray methods: Constraints on the smectite-to-illite transformation mechanism: *American Mineralogist*, **83**, 762-774.
36. Finkelstein, D.B., R.L. Hay, S.P. Altaner (1999) Origin and diagenesis of lacustrine sediments of the Oligocene Creede Formation, southwestern Colorado: *Geological Society of America Bulletin*, **111**, 1175-1191.
37. Ylagan, R.F., Altaner, S.P., Pozzuoli, A. (2000) Reaction mechanisms of smectite illitization associated with hydrothermal alteration from Ponza island, Italy: *Clays & Clay Minerals*, **48**, 610-631.
38. Finkelstein, D.B., Altaner, S.P., Hay, R.L. (2000) Alteration history of volcanoclastic sediments in the upper Oligocene Creede Formation, southwestern Colorado: *in* *Ancient Lake Creede - Its volcano-tectonic setting, history of sedimentation, and relation to mineralization in the Creede Mining District, Colorado*, P.M. Bethke and R.L. Hay, eds., *Geological Society of America Special Paper 346*, 209-232.
39. Finkelstein, D.B., R.L. Hay, S.P. Altaner (2001) Origin and diagenesis of lacustrine sediments upper Oligocene Creede Formation, southwestern Colorado: Reply: *Geological Society of America Bulletin*, **113**, 541-544.
40. Altaner, S.P., Ylagan, R.F., Savin, S.M., Aronson, J.L., Belkin, H., Pozzuoli, A. (2003) Geothermometry, geochronology and mass transfer associated with hydrothermal alteration of a rhyolitic hyaloclastite from Ponza Island, Italy: *Geochim. et Cosmochim. Acta*, **67**, 275-288.
41. Altaner, S.P. (2003) Smectite Group: *in* *Encyclopedia of Sediments and Sedimentary Rocks*, Middleton, G.V., ed., *Kluwer*, 675-677.
42. Altaner, S. (2012) Physical Resources: Water, Pollution, and Minerals: *in* *Sustainability: A Comprehensive Foundation*, Theis T., Tomkin J., ed. < <https://archive.org/details/cnx-org-col11325>>
43. Altaner, S.P., Demosthenous, C., Pozzuoli, A., Rolandi, G. (2013) Alteration history of Mount Epomeo Green Tuff and a related polymictic breccia, Ischia Island, Italy: evidence for debris avalanche: *Bull. Volcanol.*, **75**, 718-730.
44. Altaner S., Butler S. (2013) Geologic Field Trip to the Starved Rock State Park Area, LaSalle County, Illinois: Guidebook for field trip held on October 6, 2013 in conjunction with the 50th Anniversary Annual Meeting of The Clay Minerals Society held at the University of Illinois at Urbana-Champaign, The Clay Minerals Society, 26 p.
45. Altaner S., Butler S. (2013) Geologic Field Trip to the Fithian Illite, Fithian, Illinois: Guidebook for field trip held on October 6, 2013 in conjunction with the 50th Anniversary Annual Meeting of The Clay Minerals Society held at the University of Illinois at Urbana-Champaign, The Clay Minerals Society, 21 p.
46. Altaner S., Butler S. (2018) Geologic Field Trip to the Starved Rock State Park Area, LaSalle County, Illinois: Guidebook for field trip held on June 10, 2018 in conjunction with the 55th Anniversary Annual Meeting of The Clay Minerals Society held at the University of Illinois at Urbana-Champaign, The Clay Minerals Society, 25 p.

47. Altaner S., Butler S. (2018) Geologic Field Trip to the Fithian Illite, Fithian, Illinois: Guidebook for field trip held on June 10, 2018 in conjunction with the 55th Anniversary Annual Meeting of The Clay Minerals Society held at the University of Illinois at Urbana-Champaign, The Clay Minerals Society, 24 p.

B. Other

1. Altaner, S.P. (1991) Distinguished member award - Citation to John Hower: *Clays Clay Minerals*, **39**, 110-111.
2. Altaner, S.P. (1999) Book Review: X-ray Diffraction and the Identification and Analysis of Clay Minerals, 2nd ed., by Moore and Reynolds: *American Mineralogist*, **84**, 689-690.
3. Marshak, S., Long, A., and Altaner, S.P. (1994 - 2023) Planet Earth Discussion Guide, 30 editions, Stipes, ~130 pp.