ABINASH BHATTACHAN
Department of Geography,
University of California – Los Angeles, Los Angeles, CA 90095
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Email: abhattachan@g.ucla.edu

EDUCATION

Ph.D., Environmental Sciences, University of Virginia	2013
M.S., Environmental Sciences, Indiana University	2008
B.S., Watershed Science, Utah State University	2006

PROFESSIONAL APPOINTMENTS

Postdoctoral Research Associate, Department of Geography University of California - Los Angeles	09/2017 -
Postdoctoral Research Associate, Department of Forestry and Environmental Resources, North Carolina State University	09/2015-08/2017
Research Scientist, Department of Environmental Sciences, University of Virginia	06/2013-08/2015

RESEARCH INTERESTS

Land degradation, Air quality, Sea level rise, Geospatial analytics, Coupled natural-human systems.

SELECT AWARDS AND HONORS

- Award for Academic Excellence, International Studies Office, University of Virginia — 2013
- Fred Holmsley Moore Graduate Teaching Award, Department of Environmental Sciences, University of Virginia — 2012
- Outstanding Graduate Teaching Award, Teaching Resource Center, University of Virginia — 2012
- Best Graduate Student Publication Award, Department of Environmental Sciences, University of Virginia — 2012
- Outstanding first year student in hydrology, Department of Environmental Sciences, University of Virginia — 2010
- S. J. and Jessie E. Quinney Scholarship, College of Natural Resources, Utah State University — 2004

PUBLICATIONS

Papers in review

25. Tatlhego M, **Bhattachan A***, Okin GS, D'Odorico P. Mapping areas of the Southern Ocean where productivity likely depends on dust-delivered iron. Revision submitted to *Journal of Geophysical Research – Atmospheres* (*corresponding author)

Published

24. **Bhattachan A**, Okin GS, Zhang J, Vimal S, Lettenmaier DP (2019). Characterizing the role of wind and dust in traffic accidents in California. *GeoHealth*, doi: 10.1029/2019GH000212

23. **Bhattachan A,** Jurjonas MD, Morris PR, Smart LS, Taillie PJ, Emanuel RE, Seekamp EL (2019). Linking residential saltwater intrusion risk perceptions to physical exposure of climate change impacts in rural communities of North Carolina. *Natural Hazards*, doi: 10.1007/s11069-019-03706-0

22. Webb NP, Okin GS, **Bhattachan A**, D'Odorico P, Dintwe K, Tatlhego M (2019). Ecosystem dynamics and aeolian sediment transport in the southern Kalahari. *African Journal of Ecology*, doi: 10.1111/AJE.12700

21. Yu K, D'Odorico P, Collins SC, Carr DE, Porporato A, Wang L, Gilhooly WP, **Bhattachan A**, Hartzell S, Bartlett MS, Yin J, Anderegg WRL, He Y, Li W, Tatlhego M, Fuentes JD (2019). The competitive advantage of a constitutive CAM species over C_4 grass species under drought and CO_2 enrichment. *Ecosphere*, 10(5), doi: e0271.10.1002/ecs2.2721

20. **Bhattachan A,** Jurjonas MD, Moody A, Morris PR, Sanchez GM, Smart LS, Taillie PJ, Emanuel RE, Seekamp EL (2018) Sea level rise impacts on rural coastal socio-ecological systems and the implications for decision making. *Environmental Science and Policy*, 90, 122-134, https://doi.org/10/1016/j.envsci.2018.10.006

19. **Bhattachan A**, Emanuel RE, Ardon M, Bendor TK, Bernhardt ES, Wright JP (2018) Evaluating the effects of climate and land-use changes on vulnerability of coastal landscapes to saltwater intrusion. *Elementa Science of the Anthropocene*, 6(1):62, https://doi.org/10.1525/elementa.316

    - Salt water seeps into coastal ecosystems, Dispatches - Frontiers in Ecology and the Environment https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/fee.1967

18. Okin GS, Sala OE, Vivoni ER, Zhang J, **Bhattachan A** (2018) The interactive role of wind and water in functioning drylands: what does the future hold? *BioScience*, 68(9), 670-677, doi: 10.1093/biosci/biy067.

17. Davis KF, **Bhattachan A**, D'Odorico P, Suweis S (2018) A universal model for predicting human migrations under climate change: examining future sea level rise in Bangladesh. *Environmental Research Letters*, 13, 064030, https://doi.org/10.1088/1748-9326/aac4d4

    - Featured by the Earth Institute: http://blogs.ei.columbia.edu/2018/06/13/how-will-people-move-as-climate-changes/
    - Press release: http://ioppublishing.org/universal-migration-predicts-human-movements-climate-change/

16. Van Pelt RS, Baddock M, Zobeck T, D'Odorico P, Ravi S, **Bhattachan A** (2017) Total vertical sediment flux and PM_{10} emissions from disturbed Chihuahuan Desert surfaces. *Geoderma*, https://dx.doi.org/10.1016/ j.geoderma.2017.01.031

15. **Bhattachan A**, Reche I, D'Odorico P (2016) Soluble ferrous iron (Fe(II)) enrichment in airborne dust. *Journal of Geophysical Research – Atmospheres*, 121, 10153-10160, doi: 10.1002/2016JD0250025

14. Yu K, D'Odorico P, **Bhattachan A**, Okin GS, Evan AT (2015) Dust-rainfall feedbacks in West-African Sahel. *Geophysical Research Letters*, 42, 7563-7571, doi: 10.1002/2015GL065533

13. O'Donnell FC, Caylor KK, **Bhattachan A**, Dintwe K, D'Odorico P, Okin GS (2015). A quantitative description of the interspecies diversity of belowground structure in savanna woody plants. *Ecosphere*, 6(9): 154, http://dx.doi.org/10.1890/ES14-00310.1

12. **Bhattachan A,** Wang L, Miller MF, Licht K, D'Odorico P (2015). Antarctica's Dry Valleys: a potential source of iron to the Southern Ocean. *Geophysical Research Letters*, 42, 1912-1918, doi: 10.1002/2015GL063419

11. **Bhattachan A**, D'Odorico P, Okin GS (2015). Biogeochemistry of dust sources in Southern Africa. *Journal of Arid Environments*, 117, 18-27, doi:10.1016/j.jaridenv.2015.02.013

10. Dintwe K, Okin GS, D'Odorico P, Hrast T, Mladenov N, Handorean A, **Bhattachan A**, Caylor KK (2014). Soil organic carbon and total nitrogen pools in the Kalahari: potential impacts of climate change. *Plant and Soil*, doi: 10.1007/s11104-014-2292-5

9. **Bhattachan A**, D'Odorico P, Dintwe K, Okin GS, Collins SC (2014). Resilience and recovery potential of duneland vegetation in the southern Kalahari. *Ecosphere*, 5(1):2, http://dx.doi.org/10.1890/ES13-00268.1

    - Featured in the Ecological Society of America Blog article 'Water rises, cattle graze, dunes walk on the Kalahari' (Oct 14, 2014)
    - Featured in the National Science Foundation Spotlight story 'Sleeping sands of the Kalahari awaken after more than 10,000 years' (Oct 8, 2014).

8. **Bhattachan A**, D'Odorico P (2014). Can land-use intensification in the Mallee, Australia increase the supply of soluble iron to the Southern Ocean? *Nature Scientific Reports*, 4, 6009, doi:10.1038/srep06009

7. Meyer T, D'Odorico P, Okin G, Shugart H, Caylor K, O'Donnell F, **Bhattachan A**, Dintwe K (2014) An analysis of structure: Biomass structure relationships for characteristic species of the western Kalahari, Botswana. *African Journal of Ecology*, 52(1), 20-29, doi: 10.1111/aje.12086

6. D'Odorico P, **Bhattachan A**, Davis KF, Ravi S, Runyan CW (2013) Global Desertification: Drivers and feedbacks. *Advances in Water Resources*, 51**,** 326-344, doi: 10.1016/j.advwatres.2012.01.013

5. **Bhattachan A**, D'Odorico P, Okin GS, Dintwe K (2013) Potential dust emissions from the southern Kalahari's dunelands. *Journal of Geophysical Research - Earth Surface*, 118, 307-314, doi: 10.1002/jgrf.20043

4. **Bhattachan A**, Tatlhego M, Dintwe K, O'Donnell FC, Caylor KK, Okin GS, Perrot DO, Ringrose S, D'Odorico P (2012) Ecohydrologic controls on root biomass and depth in southern African savannas. *PloS One*, 7(3), e33996, doi:10.1371/journal.pone.0033996.

3. **Bhattachan A**, D'Odorico P, Baddock M, Zobeck T, Okin GS, Cassar N (2012) The Southern Kalahari: A potential new dust source in the southern hemisphere? *Environmental Research Letters*, 7 024001, doi: 10.1088/1748-9326/7/2/024001

2. D'Odorico P, **Bhattachan A** (2012) Hydrologic variability in dryland regions: impacts on ecosystem dynamics and food security. *Philosophical Transactions of Royal Society of London B*, 367, 3145-3157. doi: 10.1098/rstb.2012.0016.

1. D'Odorico P, Scanlon TM, Runyan CW, Abshire K, Barrett P, **Bhattachan A**, Coloso JJ, Erler A, Miller J, Mitchell N, Mobley J, Van Vleet D, Whitman E (2009) Dryland Ecohydrology: Research perspectives. *Annals of Arid Zone*, 48(3-4), 1-29.

Book chapter

D'Odorico P, Rosa L, **Bhattachan A**, Okin GS (In Press) Desertification and Land Degradation. In D'Odorico P, Porporato A, & Runyan CW (Editors), Dryland Ecohydrology (2019), Springer, Dordrecht.

PRESENTATIONS

Invited Talks

- Department of Ecosystem Science and Management, Texas A&M University, October 2017

- Department of Geography, University of Alabama, Tuscaloosa, November 2014

Contributed Oral Presentations

14. Ban Z, Vimal S, **Bhattachan A**, Cucchi K, Hoover C, Skaff N, Remais J, Lettenmaier DP. Assessing inundation in the Central Valley, CA and its implications for West Nile Virus transmission using remote sensing and hydrological modeling. AGU Fall Meeting, 2018. Abstract GH31A-08.

13. D'Odorico P, Tatlhego M, **Bhattachan A**, Okin GS. Connecting the dots: the possible distance impacts of Kalahari dune mobilization. International Conference on Geomorphology 2017, New Delhi, India.

12. Emanuel RE, Bernhardt E, Ardon M, Wright JP, BenDor T, **Bhattachan A**. Salinization of freshwater-dependent coastal ecosystems: understanding landscapes in transition along the leading edge of climate change. AGU Fall Meeting 2015, Abstract H31O-05.

11. Dintwe K, Gilhooly W, Wang L, O'Donnell FC, **Bhattachan A**, D'Odorico P, Okin GS. Variations of soil $\delta_{13}C$ and $\delta_{15}N$ across a precipitation gradient in a savanna ecosystem: implications for climate change on the carbon cycle, AGU Fall Meeting 2015, Abstract GC11I-08

10. D'Odorico P, **Bhattachan A**, Yu K, Okin GS. Land degradation and environmental change in dryland ecosystems: irreversibility and long-range effects. AGU Fall Meeting 2014, Abstract H34B-01. [Invited Presentation]

9. Okin GS, Webb NP, **Bhattachan A**, Dintwe K, D'Odorico P. The Southern Kalahari as a dust source: results from the field. AGU Fall Meeting 2014, Abstract A43L-01. [Invited Presentation]

8. D'Odorico P, **Bhattachan A**, Dintwe K, Tathlhego M, Okin GS. Determinants and indicators of dune stabilization by grasses in overgrazed regions of the Southern Kalahari. International Conference on Aeolian Research (ICAR VIII), Lanzhou, China July 2014.

7. Okin GS, Webb NP, **Bhattachan A**, Dintwe K, D'Odorico P. The Southern Kalahari as a dust source: Preliminary results from the field. International Conference on Aeolian Research (ICAR VIII), Lanzhou, China July 2014.

6. O'Donnell FC, Caylor KK, **Bhattachan A**, Dintwe K, D'Odorico P, Okin GS. Root structure and water-use diversity of Kalahari savanna woody plant communities. Ecological Society of America Annual Meeting, Minneapolis, August 2013.

5. **Bhattachan A**, Tatlhego M, D'Odorico P, O'Donnell FC, Caylor KK, Okin GS, Dintwe K. Evaluating the patterns of below ground woody biomass along the Kalahari rainfall gradient. ESA Annual Meeting, Minneapolis, August 2013 [Invited Presentation]

4. D'Odorico P, **Bhattachan A**, Tathlhego M, Dintwe K, O'Donnell FC, Caylor KK, Okin GS, Perrot D, Ringrose S. Hydrologic controls on patterns of below ground woody biomass in savannas. AGU Fall Meeting 2012, Abstract H52A-03.

5. D'Odorico P, **Bhattachan A**, Zobeck TM, Baddock M, Dintwe K, Okin GS. Dust emissions and dune mobilization in the southern Kalahari: possible effects on biotic-abiotic interactions in the Earth system. AGU Fall Meeting 2010, Abstract B42A-02. [Invited Presentation]

3. D'Odorico P, **Bhattachan A**, Zobeck TM. Potential for new dust emissions from the Southern Kalahari. International Conference on Aeolian Research (ICAR VII), Santa Rosa, Argentina, July 2010.

2. Baddock M, Zobeck TM, D'Odorico P, Van Pelt S, Ravi S, **Bhattachan A**. Hoof, Teeth and Fire: the effects of different simulated forms of disturbance on wind erosion in a desert scrub grassland. International Conference on Aeolian Research (ICAR VII), Santa Rosa, Argentina, July 2010.

1. Bhattachan A, Caylor KK. Characterizing 33-year shifts in vegetation pattern of southern African savannas using high-resolution declassified satellite imagery. Association of American Geographers, Boston, MA, April 2008.

Poster Presentations

19. **Bhattachan A**, Okin GS, Zhang J, Vimal S, Lettenmaier DP. Dust and accidents in California. AGU Fall Meeting, 2018. Abstract GH33B-1249.

18. Emanuel RE, **Bhattachan A**, Ardon M, Bernhardt, Anderson SM, Stillwagon MG, Ury EA, BenDor TK, Wright JP. Artificial Drainage and the altered vulnerability of freshwater dependent coastal landscapes to saltwater intrusion. AGU Fall Meeting 2018, Abstract B43L-2997.

17. **Bhattachan A**, BenDor T, Ardon M, Bernhardt E, Wright JP, Emanuel RE. Re-plumbing the coast: Untangling the effects of climate change and water management on vulnerability of coastal landscapes to saltwater intrusion. AGU Fall Meeting 2016, Abstract GC23F-1294

16. Tatlhego M, D'Odorico P, **Bhattachan A**, Okin GS. Mapping regions of the Southern Ocean likely to remain limited in supply of dust-delivered iron from terrestrial sources. AGU Fall Meeting 2016, Abstract A21E-0118.

15. Smart L, **Bhattachan A,** Jurjonas M, Moody A, Morris P, Sanchez G, Taillie P, Emanuel R, Seekamp E (2016) Sea level rise impacts in rural coastal regions of the southeastern US: Implications for resilience and adaptation. Challenges of Natural Resource Economics and Policy, 5th National Forum on Socioeconomic Research in Coastal Systems, New Orleans, Louisiana, March 2016.

14. **Bhattachan A**, Emanuel RE, Moody AC. An index for assessing salt-water vulnerability in coastal regions. AGU Fall Meeting 2015, Abstract B21D-0473.

13. **Bhattachan A,** Wang L, Miller MF, Licht K, D'Odorico P. Antarctica's Dry Valleys: a potential source of iron to the Southern Ocean. Interdisciplinary Antarctic Earth Sciences Meeting and Shackleton Camp Planning Workshop, Loveland, Colorado, September 2015.

12. **Bhattachan A,** D'Odorico P, Dintwe K, Okin GS, Collins SL. Resilience and recovery of duneland vegetation in the southern Kalahari. AGU Fall Meeting 2013, Abstract B13I-0632.

11. **Bhattachan A**, D'Odorico P, Okin GS, Dintwe K. Dust from Southern Africa: rates of emission and biogeochemical properties. AGU Fall Meeting 2012, Abstract A33E-0217.

10. O'Donnell FC, Gerlein C, **Bhattachan A**, Caylor KK. Ground penetrating radar measurements show a spatial relationship between coarse root biomass and soil carbon biomass. AGU Fall Meeting 2012, Abstract B23A-0431.

9. Masteller C, Jerolmack DJ, **Bhattachan A**. Response of vegetation stability and groundwater depth to spatial variability in sediment transport; White Sands National Monument, New Mexico. AGU Fall Meeting 2012, Abstract EP31B-0813.

8. O'Donnell FC, Caylor KK, D'Odorico P, Okin GS, **Bhattachan A**, Dintwe K. Inter-annual rainfall variability supports coexistence of savanna tree and shrub species with dimorphic rooting strategies. ESA Annual Meeting, Portland, August 2012.

7. **Bhattachan A**, D'Odorico P, Okin GS, Dintwe K. Effect of land-use on sediment fluxes, dune mobilization, and soil nutrient loss in the southern Kalahari. AGU Fall Meeting 2011, Abstract B21G-0349.

6. O'Donnell FC, Caylor KK, D'Odorico P, Okin GS, Tatlhego M, **Bhattachan A**, Dintwe K. Influence of rainfall climatology and coarse root structure on water use and carbon uptake by savanna trees. AGU Fall Meeting 2011, Abstract B11A-0467.

5. Dintwe K, Okin GS, D'Odorico P, Caylor KK, O'Donnell FC, **Bhattachan A**. Soil organic carbon and nitrogen content in savannas: Potential impacts of climate change. AGU Fall Meeting 2011, Abstract B11A-0452.

4. O'Donnell FC, Caylor KK, D'Odorico P, Okin GS, **Bhattachan A**, Dintwe K. Coarse root structure in water-limited ecosystems: Results of large-scale tree and shrub excavations across a rainfall gradient in Southern Africa. AGU Fall Meeting 2010, Abstract B41A-0291.

3. Baddock M, Zobeck TM, D'Odorico P, Van Pelt S, Ravi S, Over TM, **Bhattachan A**. Responses of wind erosion to disturbance in a desert scrub grassland: grass vs. bush cover, and a snapshot into recovery. AGU Fall Meeting 2010, Abstract B33B-0408.

2. **Bhattachan A,** D'Odorico P, Okin GS, Zobeck TM. Assessing the dust generation potential of soils/sediments in Southern Kalahari. AGU Fall Meeting 2009, Abstract EP21A-0562.

1. **Bhattachan A,** D'Odorico P, Okin GS, Caylor KK, O'Donnell FC, Perrot D, Dintwe K, Tatlhego M. Tree Root Profiles along the Kalahari rainfall gradient. AGU Chapman Conference on Examining Ecohydrological Feedbacks of Landscape Change along Elevation Gradients in Semiarid Regions, Sun Valley, ID, October 2009.

TEACHING AND MENTORING

Instructor of record, University of Virginia,
EVSC 1600: Water on Earth, Summer 2014

Teaching assistant, University of Virginia,
EVSC 3601: Physical Hydrology (undergraduate course), Spring & Fall 2009, Spring & Fall 2010, Spring & Fall 2011, served as head TA for 3 semesters,
EVHY 5700: Forest Hydrology (graduate course), Spring 2012.

Guest lecturer, University Seminar: Collapse of ecosystems, EVHY 5700 (Forest Hydrology), EVSC 4260 (Ecology of grasslands and tundra), EVSC 3600 (Physical Hydrology), FOR 420/520 (Watershed Hydrology).

Undergraduate Teaching Fellow, Utah State University,
AWER 3820: Climate Change, Spring 2006

Undergraduate Research Mentor, 2010-2015, Department of Environmental Sciences (EVSC), University of Virginia

- Mr. Matthew Loman, EVSC, 2014-2015, Project: Evaluating the effect of soil salinization on erodibility.
- Ms. Lauren Pontius, EVSC/ ECON, 2010-2012, Project: The effect of 'islands of fertility' in desert ecosystems.
- Ms. Noaa Spiekermann*, EVSC/Studio Art, 2011-2012, Project: Trajectory analysis from the Mallee basin in Australia using HYSPLIT; biogeochemical analyses of Kalahari soils.
- Ms. Shamika Ranasinghe, EVSC, 2010-2011, Project: Modeling the trajectories of dust from Southern Africa and the Mallee basin in Australia using HYSPLIT.

- Ms. Jennifer Nelson, EVSC, Spring 2011, Project: The biogeochemistry of southern African dust.
- Ms. Jenny Stoner, and Ms. Ellie Horner, EVSC, Spring 2010, Project: The global distribution of dust sources and comparison of soil grain size distribution using a particle size analyzer and Baucuous hydrometer method.

* Recipient of 'Best undergraduate student in hydrology' award, University of Virginia, 2012

SYNERGISTIC ACTIVITIES

Academic Editor:

PloS One (2018 -)

Manuscript reviewer:

Geophysical Research Letters (x3), Geology, Journal of Geophysical Research – Earth Surface, Ecological Engineering, Ecosphere, PLoS One (x4), Journal of Geophysical Research – Atmospheres, Science of the Total Environment, Aeolian Research (x3), Journal of Geophysical Research – Biogeosciences (x2), Boundary-Layer Meteorology, Advances in Water Resources, Earth Surface Processes Landforms, Land Degradation and Development (x2), Biogeochemistry, Ambio, African Journal of Ecology, GeoHealth

Proposal Reviewer: National Science Foundation – Division of Environmental Biology

Convener:

The resilience of wetland ecosystems to multiscale environmental changes, with Yu Zhang and Xin Pei at AGU Fall Meeting 2018.

Advances in ecohydrology of water-stressed environments, with Lixin Wang, Sujith Ravi and Kailiang Yu at AGU Fall Meeting 2016.

Aeolian research at the interface of biophysical, sedimentary and atmospheric processes, with Nicholas Webb, Raleigh Martin and Ryan Ewing at AGU Fall Meeting 2015.

OTHER AWARDS

- Open access publication fund, University of Virginia Library, 2014, 2015.
- Departmental Fellowship, Department of Environmental Sciences, University of Virginia, 2012-2013.
- 3rd place winner, Oral presentation, Huskey Graduate Research Exhibition, University of Virginia, 2012.

- Best Graduate Student Poster, EnviroDay, University of Virginia, 2012.
- Huskey Travel Grant, Graduate School of Arts and Sciences, University of Virginia, 2011, 2012
- Exploratory Award, Department of Environmental Sciences, University of Virginia, 2009 ($1500).
- MSES Scholarship, School of Public and Environmental Affairs, Indiana University, 2006-2007
- College of Natural Resources Alumni Scholarship, College of Natural Resources, Utah State University, 2005-2006:
- Merit Scholarship, Office of International Students and Scholars, Utah State University, 2005-2006
- Service Scholarship, Office of International Students and Scholars, Utah State University, 2004-2005

SERVICE

Mentor, Computer4Kids, Charlottesville, Virginia, 2014-2015.
Panelist, 'Balancing life as a graduate student', Teaching Resource Center, University of Virginia, 2012.
Guest Speaker, Charlottesville High School Environmental Science Class, 2012.
Judge, EnviroDays, University of Virginia, 2011.
Treasurer, Nepalese Student Association, University of Virginia, 2011-2012
Volunteer, International Student Orientation, Indiana University, 2007-2008
President, International Student Council, Utah State University, 2005-2006
Secretary, CNR Student Council, Utah State University, 2005-2006
Student Life VP, International Student Council, Utah State University, 2004-2005
Peer Mentor, Global Village: Utah State University Housing, 2004-2005
Member, Diversity Committee, Associated Students of Utah State University (ASUSU), 2004-2005

SKILLS

Fieldwork: Albemarle-Pamlico Peninsula, North Carolina: (2015-2016), Kalahari Desert, Botswana: (2008-2015), Sevilleta LTER, New Mexico (December 2009, March 2010), White Sands, New Mexico (March 2011), Welveriend, South Africa and Machipanda, Mozambique (Summer 2007), Deseret Land and Livestock, and T.W. Daniels Experimental Forest, Utah (Summer 2005, 2006)

Field: skills in surface water hydrology, vegetation sampling, high precision GPS, Ground Penetrating Radar (GPR), LiCor 6400.
Laboratory: Elemental analysis of soils.

GIS/Image Processing/Programming: ArcGIS, MATLAB, Python (GDAL, scikit-learn)