



UFZ Environmental Modeling & Monitoring Lecture

Tuesday 4 September 2018, 10:00 am, UFZ Leipzig, KUBUS Lecture Hall 2AB

“Spatio-temporal Scaling of Soil Formation and Vegetation Growth”

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At the scale of a single pore, advection, diffusion, and reaction times may be similar, making modeling complicated. With increasing scale, advective processes should gain in importance. The advective solute velocity for conservative, but non-Gaussian, solute transport is a theoretical proxy for surface reactions in porous media, and its scaling with fluid flow rates, time, and space match both experimental and field results, including those of chemical weathering and soil formation. In an analogy, we find that vegetation growth is limited by the topology of the optimal paths in the soil surface, related both to mechanics of root development (energy expenditure) and to dominant nutrient fluxes. Both scaling relationships are rooted in the tendency for flow to follow optimal paths. Each gives a different scaling power, producing an enormous difference in time scales, at large enough length scales. While soil formation is proportional to infiltration, the vegetation growth rate is proportional to the transpiration.

After the lecture, there will be a coffee break and the chance for interaction with Allen Hunt. All interested colleagues are kindly invited.

Link to registration: <http://www.ufz.de/index.php?en=44337>

Allen G. Hunt



... is a professor of Physics and Earth & Environmental Sciences at Wright State University, Dayton, Ohio, USA. He studied Field Geomorphology at Duke University and holds a Ph.D. from the University of California in Condensed Matter Physics. He broadened his knowledge in this field as Fulbright Scholar in Germany. From 2002 - 2003, he was a program director in Hydrologic Sciences at the USA National Science Foundation. His early scientific career was dedicated to fields such as Stochastic Subsurface Hydrology as well as Surface Hydrology. Nowadays, his research interests are directed to soil formation and vegetation growth as well.

Allen Hunt has published more than 130 referred articles in the fields of physics, materials science, geology, chemistry, biology, climate science, and hydrology in journals such as Nature and Reviews of Geophysics. **For more details, see** https://www.researchgate.net/profile/Allen_Hunt/info