Local conditions and topography control soil climate

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Soil climate, characterized by soil temperature and water content, controls fluxes of carbon and water that are critical for resource management. In regions with complex terrain, the local soil climate may be controlled by interactions between incoming solar radiation and topography. These local effects are not resolved in the large, continental-scale models needed for resource management, but it may be possible to estimate those effects from easily obtained topographic and incoming solar information.

In new *Vadose Zone Journal* research, scientists report on a four-year study of topographic effects on soil climate in the Reynolds Creek Experimental Watershed in southwest Idaho. Researchers monitored and simulated soil climate from the surface to bedrock in three paired sites on two slopes with contrasting aspects. Large topographic effects on soil climate were found with south-facing slopes warmer and drier than north-facing slopes. However, the seasonal progression of those effects was very different from that predicted from incoming solar radiation due to local cover (especially snow), precipitation patterns, and soil conditions. These findings demonstrate that accurate representation of soil climate in complex terrain requires high-resolution modeling in some environments.

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Seyfried, M., Flerchinger, G., Bryden, S., Link, T., Marks, D., & McNamara, J. (2021). Slope and aspect controls on soil climate: Field documentation and implications for large–scale simulation of critical zone processes. *Vadose Zone Journal.* **https://doi.org/10.1002/vzj2.20158**

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