3-D View and Fine Resolution: Keys to Coupled Land Model System

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Objective

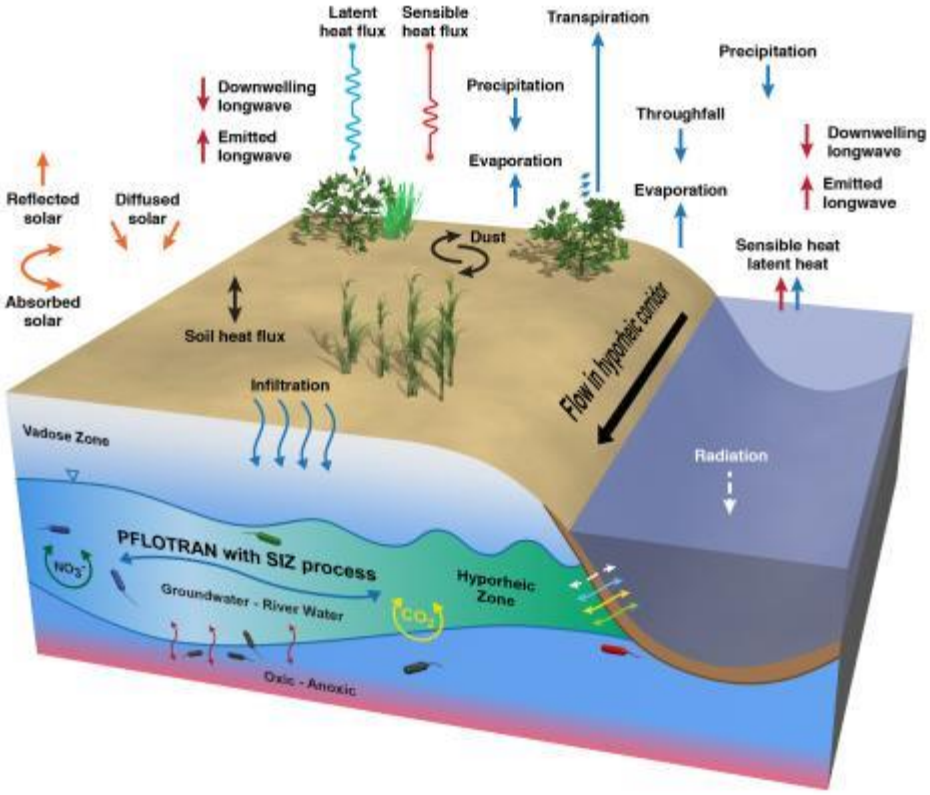
- Incorporate missing hydrologic processes, such as lateral transport, that are key for simulating the well-connected land-aquifer-river continuum along river corridors.

New Science

- Demonstrated that groundwater-river water interactions greatly impact land-surface energy partitioning along river corridors in arid climates.

Significance

- Developed an integrated surface and subsurface model that can provide more accuracy when simulating Earth system dynamics, such as how vegetation is impacted in an extreme drought.
- Two widely-used highly scalable models under active development at high-performance computing facilities were integrated and made open-source to research communities.



Simulated hydrologic processes using the integrated land surface and subsurface model

Bisht, G., Huang, M., Zhou, T., Chen, X., Dai, H., Hammond, G. E., Riley, W. J., Downs, J. L., Liu, Y., and Zachara, J. M.: Coupling a three-dimensional subsurface flow and transport model with a land surface model to simulate stream–aquifer–land interactions (CP v1.0), Geosci. Model Dev., 10, 4539-4562, https://doi.org/10.5194/gmd-10-4539-2017, 2017.