Title
Creative reproducible earth-surface computing: build your own model in Landlab and share it on HydroShare

Citation:

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Abstract
The ability to test hypotheses about surface processes coupled to both subsurface and atmospheric regimes is invaluable to research in the Earth and planetary sciences; to swiftly develop experiments using community resources is extraordinary. Landlab is a toolkit for building, coupling, and exploring two-dimensional numerical models. HydroShare is an online collaborative environment for sharing data and models. Creating a new model can demand a large investment of time, expert software skills, and can be constrained to adapting existing models with limited flexibility to address new questions. Advancing the state of knowledge includes not only experimentation and publication, but also communication and distribution of large, and complex models and datasets. The open-source modeling framework (Landlab) is accessed through a web portal (HydroShare) designed to accelerate the development of new process models by providing (1) a set of tools for regular and irregular grid structures, data manipulation and visualization, to make it faster and easier to develop new physical process components, (2) a suite of modular and interoperable process components that can be combined to create an integrated model; (3) cyber infrastructure that provides collaboration functions with multiple levels of sharing and privacy settings, Creative Commons license options, and DOI publishing, and 4) cloud access and high-speed processing from the CyberGIS HydroShare JupyterHub server at the National Center for Supercomputing Applications. Landlab on HydroShare supports the modeling continuum from fully developed modelling applications, prototyping new science tools, hands on research demonstrations, and classroom applications. New users can run models from a web browser, while advanced users can execute and develop models from command line terminals. The HydroShare-Landlab building block in EarthCube is a model of technology collaboration and tool exchange in the geoscience modeling community.