International Congress on Environmental Modelling and Software

9th International Congress on Environmental Modelling and Software - Ft. Collins, Colorado, USA - June 2018

Jun 26th, 5:00 PM - 7:00 PM

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Pritchard, Calvin, "Coupling of Environmental and Social Simulation Components" (2018). *International Congress on Environmental Modelling and Software*. 10.
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Coupling of Environmental and Social Simulation Components

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Abstract: Preexisting implementations of environmental and social system models are in many different programming languages and frameworks. Some models require large amounts of time and effort to implement. In order for coupling these models to be convenient it must be easy to install the model, communicate with other models, and possible for the models to work together under a common modelling formalism. These challenges are explored by coupling an ecological and social model together. A simplification of the discrete event system specification is chosen as the modelling formalism because it is capable of handling discrete time and discrete event models. Model component installation difficulty is reduced by installing into isolated virtual environments with Docker. The Geoscience Ontology is used as a shared vocabulary for model communication. Particular emphasis is placed on integration with existing models in the basic model interface (BMI) and providing thin wrappers around a model component's original communication interface.

Keywords: Model coupling; integrated social and environmental systems; software; interoperability