



Jul 13th, 3:50 PM - 4:10 PM


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Leccia-Phelpin, Odile; Lescot, Jean-Marie; and Vernier, Françoise, "A Generator of Landuse application for complex and heterogeneous agricultural practices" (2016). *International Congress on Environmental Modelling and Software*. 59.

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A Generator of Landuse application for complex and heterogeneous agricultural practices

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Non-point source pollution from agriculture has become a major concern for water managers and institutional stakeholders. To reduce diffuse pollution, agricultural conservation measures are widely used with efficiency. On non-monitored territories environmental modelling enables the assessment of their long term impacts on water and soils and to evaluate land-use change scenarios. We developed an innovative Generator of Landuse (GenLU) application in order to build up multi-year spatial crop successions from identified crop rotations with their related management schedules. GenLU can be used solely for generating landuse or coupled with the Soil and Water Assessment Tool (SWAT) model so as to simulate the fate and transport of pollutant through the biospheres -water and soil and atmosphere-. In water basins in France where it has been experimented, rotations may include up-to 7 crops for 12 management operation schedule for each crop resulting in 84 different operations for each rotation. On large river basins, these operations have to be implemented for thousands of calculation units with crop rotations repeated during long-term simulations. GenLU automates the implementation of the SWAT agronomical database and enables the loading of heterogeneous and complex agricultural systems and practices. The application takes into account the real-world variability of dates for agricultural schedules and for cropping sequences within crop rotations. Ability to build up read-in SWAT files format for alternative scenarios makes GenLU an appropriate tool for implementing the SWAT model on agricultural catchments with complex landuse and agricultural systems.

Keywords: landuse; modelling; scenarios; agriculture; SWAT