



Open Archive Toulouse Archive Ouverte

OATAO is an open access repository that collects the work of Toulouse researchers and makes it freely available over the web where possible

This is an author's version published in: <http://oatao.univ-toulouse.fr/17397>

To cite this version:

Thierry, Hugo and Vialatte, Aude and Monteil, Claude and Ouin, Annie *ATLAS: A tool to model spatial-temporal dynamics of processes influencing ecosystem services*. (2016) In: 8th International Congress on Environmental Modelling and Software Society (iEMSs 2016), 10 July 2016 - 14 July 2016 (Toulouse, France). (Unpublished)

Any correspondence concerning this service should be sent to the repository administrator: tech-oatao@listes-diff.inp-toulouse.fr



Jul 13th, 3:30 PM - 3:50 PM

ATLAS: A Tool to Model Spatial-temporal Dynamics of Processes Influencing Ecosystem Services

Hugo Thierry

Dynafor, Université de Toulouse, INRA, INPT, INP-EI Purpan, hugo.thierry@ensat.fr

Aude Vialatte

Dynafor, Université de Toulouse, INRA, INPT, INP-EI Purpan

Claude Monteil

Dynafor, Université de Toulouse, INRA, INPT, INP-EI Purpan

Annie Ouin

Dynafor, Université de Toulouse, INRA, INPT, INP-EI Purpan

Follow this and additional works at: <http://scholarsarchive.byu.edu/iemssconference>

 Part of the [Civil Engineering Commons](#), [Data Storage Systems Commons](#), [Environmental Engineering Commons](#), [Hydraulic Engineering Commons](#), and the [Other Civil and Environmental Engineering Commons](#)

Hugo Thierry, Aude Vialatte, Claude Monteil, and Annie Ouin, "ATLAS: A Tool to Model Spatial-temporal Dynamics of Processes Influencing Ecosystem Services" (July 13, 2016). *International Congress on Environmental Modelling and Software*. Paper 46.
<http://scholarsarchive.byu.edu/iemssconference/2016/Stream-B/46>

This Event is brought to you for free and open access by the Civil and Environmental Engineering at BYU ScholarsArchive. It has been accepted for inclusion in International Congress on Environmental Modelling and Software by an authorized administrator of BYU ScholarsArchive. For more information, please contact scholarsarchive@byu.edu.

ATLAS: A Tool to Model Spatial-temporal Dynamics of Processes Influencing Ecosystem Services

Hugo Thierry¹, Aude Vialatte¹, Claude Monteil¹ & Annie Ouin¹

¹ Dynafor, Université de Toulouse, INRA, INPT, INP-El Purpan, Castanet Tolosan, France

Hugo.thierry@ensat.fr

Abstract: Biodiversity provides various benefits to humankind throughout what is defined as ecosystem services. Within a specific ecosystem, a wide range of ecosystem services can be identified. During the past decades, human intervention has aimed to increase some services such as food production through agricultural intensification, at the expense of other services such as water regulation. Mapping, evaluating and quantifying each of these ecosystem services provided by biodiversity to crop production could help to increase the multi-functionality of agricultural landscapes. In this context, we developed a spatially-explicit model called **ATLAS** (Agricultural LandscAPE Simulator). **ATLAS** aims in simulating realistic spatio-temporal dynamics of agricultural landscapes, through crop rotations and phenology at the landscape scale. The robustness of the model was evaluated using two criteria: an accurate composition (crop area) and configuration (crop clustering) of crops. Here, we show the potential of such a tool to map and evaluate ecosystem services through the simulation of underlying ecological processes. We applied this model to two case studies: control of pests and crop pollination. First, we studied how the dynamics of a cereal aphid, *Rhopalosiphum padi*, respond to spatial-temporal crop availability. Second, we developed an extension to model spatial-temporal dynamics of flower resources in relation to wild pollinators and pollination. With a low amount of inputs and calibration needed in **ATLAS**, the impact of agricultural practices on ecosystem services can thus be explored to allow better comprehension and management.*

Keywords: *Spatialised model, Agricultural landscapes, Ecosystem services, Pollination, Pest regulation*