Environmental Modelling & Software 72 (2015) 274–275

Contents lists available at ScienceDirect

Environmental Modelling & Software

journal homepage: www.elsevier.com/locate/envsoft

Preface

Thematic issue on agricultural systems modelling and software – Part II

This is the second part of the Thematic Issue on Agricultural Modelling and Software. The first part of the Thematic Issue comprised fifteen papers and appeared as Volume 62 in December 2014. This second part consists of another eleven articles, setting the state of the art in the field of agricultural modelling and software.

The Thematic Issue begins with the guest editors' position paper, *Holzworth* et al., on the current status and future prospects of agricultural modelling and software. We argue that while in the last decade the agricultural modelling community has broadened its scientific focus, software implementations of the leading agricultural models haven't changed significantly. Improvements in software engineering dimensions of agricultural modelling go beyond the technological aspects and have the capacity for significant breakthroughs in several fronts, including model transparency, scientific rigor, reuse, and development.

Ewert et al. present the state of crop modelling to assess climate change risks to food production, and explore how crop models meet the requirements for integrated assessments. They argue that uncertainty propagation related to model parameters and structure, adaptations and scaling is too great for the needs of integrated assessments.

Teixeira et al. focus on evaluating methods to simulate crop rotations for climate impact assessments, and provide a detailed case study in New Zealand. Their results indicate sources of uncertainty for large-scale impact and adaptation assessments where simplifications of crop rotations are often necessary.

Balbi et al. provide an ecosystem-based approach to food provision, which is applied to a specific case study in the Basque country. Their quantitative assessments model the trade-offs between four ecosystem services, specifically crop yield, water supply and quality, climate regulation and air quality.

McNider et al. present an integrated crop and hydrologic modelling system to estimate hydrologic impacts of crop irrigation demands. Their system is built on a gridded version of DSSAT.

Giri et al. integrate statistical and hydrological models to identify implementation sites for agricultural conservation practices.

Ma et al. present a regional-scale analysis of carbon and water cycles on managed grassland systems. A pasture simulation model (PaSim) is improved and evaluated in twelve grassland sites in Europe with an attempt to find a single regionally-applicable parameterisation.

Marin et al. bring focus on sugarcane model intercomparison, by identifying structural differences between APSIM-Sugar and DSSAT/CANEGRO models, and how these differences affect their predictions of crop growth and production. Uncertainties under current and potential future climates are also investigated.

Moriondo et al. review models that simulate olive tree and grapevine yields, and investigate their limitations when applied in a changing climate. They conclude that the simulation of many processes affected by warmer and CO_2-enriched conditions may give rise to important biases.

Kersebaum et al. present a methodological framework and software to evaluate and classify datasets into categories regarding their suitability for different modelling purposes.

Whish et al. integrate pest population models with biophysical crop models. Specifically, they designed a method that allows population models built in DYMEX to interact with APSIM, and demonstrate how rust population modelled in DYMEX reduces a crop's green leaf area in APSIM to ultimately affect grain yield.

Bregaglio & Donatelli focus on plant airborne diseases and present a model framework to simulate generic pathogens and their interaction with plants and agricultural management, implemented in a modular software system.

With this second part of the Thematic Issue, we conclude an effort that started over two years ago. The response of the community was far beyond our expectations and we wouldn't be able to evaluate and select the submitted manuscripts without the help of more than 100 reviewers, many of whom reviewed more than two manuscripts.

Many thanks go to the following reviewers: Marco Acutis*, Myriam Adam, Sotirios V. Archontoulis, James C Ascough II, Christie Bahlai*, Inacio de Barros*, Gianni Bellocchi*, Maurits van den Berg*, Thomas Berger, K.J. Boote*, David Bosch, André Rigland Brodtkorb, Hamish E Brown*, Brett Anthony Bryan, Pierluigi Calanca*, Jean-Pierre Caliman, Davide Cammarano*, Bing Chen Chen, Roberto Confalonieri*, Olivier Crespo, Neville David Crossman*, Denis Curtin, Inaki Garcia de Cortazar-Atauri*, Ralf Denzer, Katrien Descheemaeker*, Kees Van Diepen, Estelle Jeanne Dominati*, Rachel Dunn, Jean-Louis Durand, Frits van Evert, Steven Evett, Frank Ewert, Davide Fanchini*, Roberto Ferrise, Davide Fumagalli*, Christine Fürst*, Donald Scott Gaydon, Andrew David Gronewold, S. del Grosso, R. Gu, Jerry L Hatfield, Ian E Henson, Mario Herrero, Zvi Hochman*, Jiri Hrebicek, Gordon H. Huang*, Neil Ian Huth*, Amor V.M. Ines, Keith Ingram, Geoff Inman-Bamber*, James W. Jones, Alfred Kalyanapu, Brian Keating, James Kiniry, Rob Knapen*, Daniel van Kraalingen, Harbans Lal, Gabrielle De Lannoy*, Deli Liu, Jon Lizaso, Roger D. Magarey*, Rob Malone*, Fabio R. Marin, Roger Martin-Clouaire, Steven Mauget, Dianne Mayberry*, Greg McLean, Andrew D Moore, Claas Nendel, Meine van Noordwijk, Garry O'Leary*, Taru Palosuo,

http://dx.doi.org/10.1016/j.envsoft.2015.09.004
1364-8152/

Eileen Perry, Cheryl H Porter, Helene Raynal, Samuel Rivera, Michael John Robertson*, Daniel Rodríguez*, Alvaro Jorge Romera, W.A.H. Rossing, Giacomo De Sanctis*, Alex Smajgl, Debbie Sparkes*, Claudio Stöckle*, Ken Stone, Luis O Tedeschi, Edmar Imperatrice Teixeira, David Thornby*, Kelly Robert Thorp*, K. Topp*, Renato Vacondio, Kirsten Verburg, Francisco J. Villalobos*, Daniel Wallach*, Dali Wang, Andy Ward, Wopke van der Werf*, Anthony Michael Whitbread*, Gail Wilkerson, Nigel Wright, Wei Xiong, Xiangming Xu*, Yubin Yang, and Gang Zhao*.

Those with a * reviewed more than one manuscript.

Still, we consider that the selected 27 papers of the two issues only partially cover the full state-of-the-art of agricultural modelling and software. Despite this, we believe that we have captured to a great extent the drivers of change in agricultural modelling and software, identified key challenges and suggested a research agenda for the future.

Ioannis N. Athanasiadis, Sander Janssen
WUR, The Netherlands

Dean Holzworth, Peter Thorburn
CSIRO, Australia

Marcello Donatelli
CREA, Italy

Val Snow
AgResearch, New Zealand

Gerrit Hoogenboom
WSU, United States

Jeffrey W. White
USDA-ARS, United States