CoMSES Digest: Winter 2018

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Editor's Note

Greetings from CoMSES! And greetings from Chicago, where the temperature is slightly above freezing during the day and slightly below freezing at night- in my view, perfect weather for early December, though I have heard that others disagree.

The end of the year is fast upon us. With this, the Digest's final issue of 2018, let me convey best wishes for a happy end of the year and a spectacular 2019. In this

issue, we briefly look back at CoMSES 2018, the virtual conference hosted in October, and then turn to events and jobs that extend into 2019. CoMSES will be moving forward- see the notes and reports from the Board- and the model library, if current trends remain steady, will continue to grow in both submissions and downloads. As a 'note from the field', I offer a quick update about some work my archaeological colleagues and I are doing to better integrate archaeological models into discussions of adaptation to climate change.

Many of you will be taking well-earned breaks for the end of the year and the holiday season, but before you do, make sure to upload your most recent models to the library, and encourage your students and colleagues to do so as well.

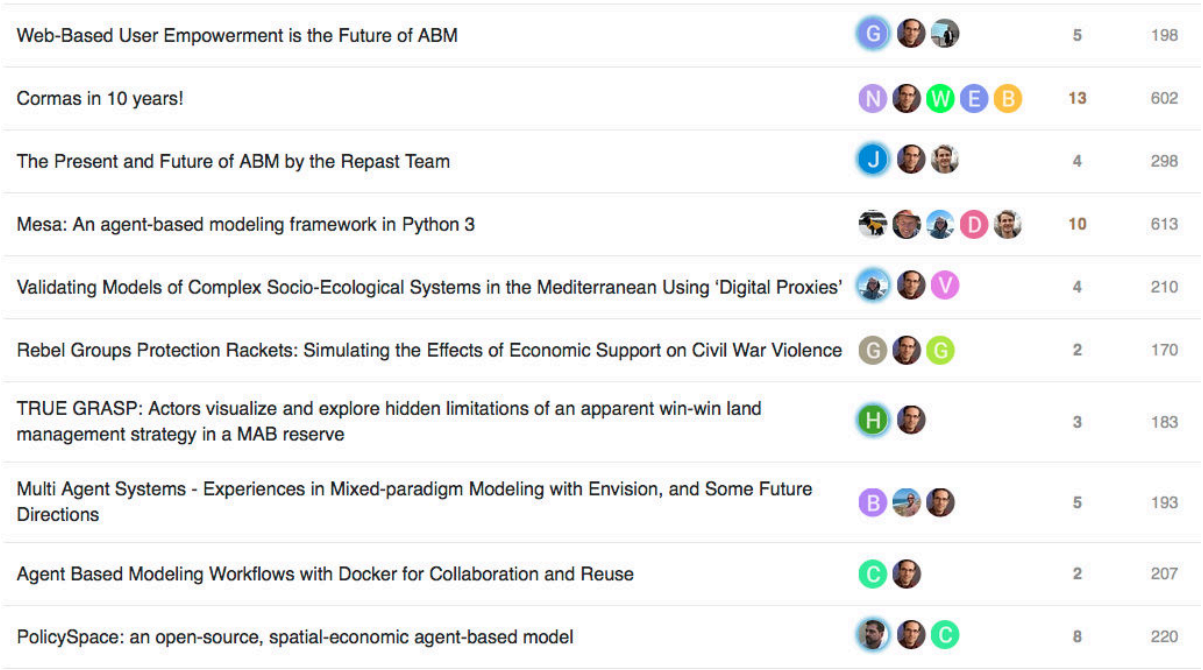
Best,

John T. Murphy, *CoMSES Digest Editor*

CoMSES News

Virtual Conference: CoMSES 2018

CoMSES 2018, the Virtual Conference, took place in October and was an unqualified success. Ten video talks were submitted, leading to robust discussions on the CoMSES forums and more than 3,500 views. The CoMSES forums website tells the story:



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The story is not over! The videos are available for viewing in perpetuity, and the

authors and others in the CoMSES network are available for questions, comments, and discussions, via the CoMSES forums (see below).

Elections

As the end of the year approaches, we will be holding the annual elections for Board Member positions. The current Board includes Kimberly Rogers and Miriam Kiran (terms 2018-2020), Andrew Bell and Bill Rand (terms 2017-2019), and outgoing members Moira Zellner and Forest Stonedahl (term 2016-2018).

Look for more information soon- CoMSES members will be informed of the candidates and timeline via email.

From the Field

Archaeology for Tomorrow

Archaeology has a claim to data no other field can make as fully: the long-term record of human-environment interactions. That these data, and thus the field of archaeology, can hold keys for how humans can adapt to a changing climate is a truism that many archaeologists hold dear. But the path to making use of these data, from designing studies that recover them through interpretation, generalization, and, importantly, communication and implementation of the lessons gleaned from them, is not yet fully charted. Efforts to push this program forward continue. Recently I presented a paper at the Conference on Complex Systems in which I discussed a summary of some of the work done at a recent workshop held in February in Delft. The workshop, organized by Maurits Ertsen and Joel Gunn, hosted by Technological University Delft, and funded by the Wenner-Gren Foundation, focused on how models and modeling can inform our understanding of ancient water management systems. The follow-up paper, which was also sponsored by IHOPE, presented the view that human impact on the planet at a global scale has been occurring for considerably longer than is commonly realized, predating the Industrial Revolution by millennia. The changes are tied to uses of fire, large-scale landscape changes, and technological innovations that have been occurring for thousands of years and that leave signatures in the archaeological record; these global changes lead to local-scale outcomes that shape the global trajectory in a linked system. The workshop and follow-on work focus on the key role that models and modeling can play in understanding these dynamics.

A more recent workshop, operating under the IHOPE umbrella but in conjunction with the the National Socio-Environmental Synthesis Center (SESYNC), brought together a small team of archaeologists from two study areas (Maya and Mesopotamia) and asked them to consider how they might structure existing data sets to better serve the purpose of extracting lessons from the past that can be applied to contemporary issues. The long-term plan for this effort is to bring these initial case studies to bear on more cross-context problems in two subsequent workshops, which will focus on different aspects of the problem (e.g. urban vs. rural and hinterland areas).

The same general theme will be taken up again in a session that will take place at the Computer Applications in Archaeology conference in Krakow in April. In a session organized by Iza Romanowska and Stefani Crabtree, researchers will discuss the challenges that lie in moving from archaeological knowledge (inter alia) to actionable decisions in real-world contexts via computational approaches.

In considering how archaeology may contribute to the examination and solution of contemporary problems, it is easy to be discouraged, not only by the magnitude of the challenge but by the difficulties that exist in the wider world outside archaeology that either fail to support or actively obstruct this enterprise. (The recent resignation of the U.S. National Parks Service's coordinator for climate change adaption is only one example.) But archaeology has a high ceiling on what it can contribute. Models and modeling will play a key role, both in constructing inferences about the past and in generalizing them to multiple contemporary contexts (and even to global scale), and in communicating these to wider audiences. Models will serve as not only sources of knowledge, but as examples, inspirations, and hope.

From the Forums

CoMSES 2018 Virtual Conference

Web-Based User Empowerment is the Future of ABM

- https://forum.comses.net/t/web-based-user-empowerment-is-the-future-of-abm/7013

Cormas in 10 years!

- https://forum.comses.net/t/cormas-in-10-years/7014

The Present and Future of ABM by the Repast Team

- https://forum.comses.net/t/the-present-and-future-of-abm-by-the-repast-team/7015

Multi Agent Systems - Experiences in Mixed-paradigm Modeling with Envision, and Some Future Directions

- https://forum.comses.net/t/multi-agent-systems-experiences-in-mixed-paradigm-modeling-with-envision-and-some-future-directions/7016

TRUE GRASP: Actors visualize and explore hidden limitations of an apparent win-win land management strategy in a MAB reserve

- https://forum.comses.net/t/true-grasp-actors-visualize-and-explore-hidden-limitations-of-an-apparent-win-win-land-management-strategy-in-a-mab-reserve/7018

PolicySpace: an open-source, spatial-economic agent-based model

- https://forum.comses.net/t/policyspace-an-open-source-spatial-economic-agent-based-model/7017

Rebel Groups Protection Rackets: Simulating the Effects of Economic Support on Civil War Violence

- https://forum.comses.net/t/rebel-groups-protection-rackets-simulating-the-effects-of-economic-support-on-civil-war-violence/7019

Validating Models of Complex Socio-Ecological Systems in the Mediterranean Using ‘Digital Proxies’

- https://forum.comses.net/t/validating-models-of-complex-socio-ecological-systems-in-the-mediterranean-using-digital-proxies/7027

Mesa: An agent-based modeling framework in Python 3

- https://forum.comses.net/t/mesa-an-agent-based-modeling-framework-in-python-3/7039

Agent Based Modeling Workflows with Docker for Collaboration and Reuse

- https://forum.comses.net/t/agent-based-modeling-workflows-with-docker-for-collaboration-and-reuse/7041

General Forum

An argument for emergent phenomena by PW Anderson (1972):

- https://forum.comses.net/t/an-argument-for-emergent-phenomena-by-pw-anderson-1972/7234

Factors to consider when designing command-line interfaces:

- https://forum.comses.net/t/factors-to-consider-when-designing-command-line-interfaces/7083

Calendar of Events

Conferences and Workshops

Agent-Based Models in Philosophy: Prospects and Limitations
20 - 22 March 2019, Ruhr-University Bochum, Germany
https://www.comses.net/events/505/

Courses

Winter School 2019 Agent-Based Modeling of Social Ecological Systems
7 - 11 January 2019, Arizona State University, Tempe, Arizona, USA
https://www.comses.net/events/489/

HUMAINT Winter School “Artificial Intelligence and its ethical, social, legal and economic impact
Feb 4-8 2019, Seville, Spain
https://www.comses.net/events/501/

Winter School "Spatial Simulation Modelling"
12 - 22 February 2019, Salzburg, Austria
https://www.comses.net/events/502/

Summer school on simulation models - eX Modelo
June 23-29
https://www.comses.net/events/504/

Submission Opportunities

ABM and Simulation session at the INQUA 2019 conference in Dublin
Session: “Human and non-human responses to the Mid-Pleistocene Transition”
31 July 2019, Dublin

https://www.comses.net/events/500/
Submission Deadline: 9 January 2019

Jobs and Appointments

Note: For some of these, the application deadline has passed; they are listed here to give a broad view of activity in the field. The most recent postings are listed first. If you are looking for a job, log on to the CoMSES forums and subscribe to receive notifications when new jobs are posted.

US DoE Computational Science Graduate Fellowship

- https://www.comses.net/jobs/387/

Graduate research opportunities at University of Missouri in Water Studies & Sustainability

- https://www.comses.net/jobs/386/

Four postdoc positions available at IFISC, Palma de Mallorca

- https://www.comses.net/jobs/385/

MRC-funded studentship in Glasgow on sensitivity analysis for complex health-related ABMs

- https://www.comses.net/jobs/383/

Fully Funded Doctoral Position at NYU's Department of Epidemiology

- https://www.comses.net/jobs/382/

Senior Data Scientist, National Fish and Wildlife Foundation, Washington DC

- https://www.comses.net/jobs/381/

Fully funded PhD studentship on ABMs of food security, biodiversity and global trade at JHI and U Edinburgh

- https://www.comses.net/jobs/380/

Assistant Professor in Earth-Surface Process Modeling, University of Colorado

- https://www.comses.net/jobs/379/

Lecturer and Senior Lecturer in Information Systems, Sydney, Australia

- https://www.comses.net/jobs/378/

Postdoctorate position "dynamical models of how individual and group perceive each other, including individual and group self-perception", Laboratoire d'Ingénierie pour les Systèmes Complexes (LISC) at Irstea Center of Clermont-Ferrand (France)

- https://www.comses.net/jobs/377/

PhD position in Political Science with specialization in computational analysis, Linnaeus University, Sweden

- https://www.comses.net/jobs/376/

Two PERMANENT Faculty Posts at University College Dublin School of Sociology

- https://www.comses.net/jobs/375/

Model Library

New Model Uploads

A near-record number of model uploads took place during the past three months. In total, seventeen models were uploaded, nearly breaking the record of eighteen, achieved first in Summer 2016 and repeated in Summer 2018. The models uploaded cover a wide range of topics- a range that would be extraordinary except that the model library has demonstrated time and again that the range of models produced by the CoMSES community is extreme. Subject areas include the interaction of particles with living things (leaves, skin, lungs); dynamics in opinion spread and elections; market economies for labor and for trading carbon; transport and migration; forest fires and tree disease; and getting food, whether by hunting, gathering, and dining in restaurants. Of particular note is a new archaeological simulation, CHAAK, by Alex Kara. In CHAAK, the Maya region is simulated, but the specific problem is not what caused collapse, but instead what prevented recovery- an intriguing take on the 'mysterious Maya' that will form a nice pair with Scott

Heckbert's MayaSim. In addition, Tom Brughmans has provided some useful NetLogo code for creating network structures, and an associated tutorial.

Absorption of particulate matter by leafs

Chiara Letter Georg Jäger | Published Mon Nov 12 08:07:40 2018 | Last modified Mon Nov 12 08:17:52 2018

This model aims to understand the interaction between particulate matter and leaves of trees. The particles collide with the leaf and can either be absorbed with a certain probability, otherwise they bounce off it. The absorptions are detected in a counter. The movement of the particles depends mainly on the strength and direction of the wind and the air temperature. They also show a certain random movement, but the proportion is negligible.
In a collision with the leaf, the particles are absorbed with a certain probability (absorption-probability), otherwise repelled.

An Agent-based Assessment of Health Vulnerability to Long-term particulate exposure in Seoul Districts

Hyesop Shin Mike Bithell | Published Mon Nov 5 22:51:21 2018 | Last modified Mon Dec 3 15:35:56 2018

This model aims to understand the cumulative effects on the population's vulnerability as represented by exposure to PM10 (particulate matter with diameter less than 10 micrometres) by different age and educational groups in two Seoul districts, Gangnam and Gwanak. Using this model, readers can explore individual's daily commuting routine, and its health loss when the PM10 concentration of the current patch breaches the national limit of 100μg/m3.

BorealFireSIM Model

Liliana Perez | Published Thu Dec 13 20:55:27 2018

BorealFireSIM is a cellular automaton based model that serves to identify future fire patterns in the boreal forest of Quebec, Canada. The model simulates yearly fire seasons and adjusts decadal climate variables based on two future carbon pathways (RCP45 (low emissions) and RCP85 (business as usual)).
The ***BorealFireSIM*** model simulates future fire patterns up to the year 2100.

CHAAHK: a Spatial Simulation of the Maya Elevated Core Region

Alex Kara | Published Tue Dec 4 23:33:28 2018

This thesis presents an abstract spatial simulation model of the Maya Central

Lowlands coupled human and natural system from 1000 BCE to the present day. It's name is the Climatically Heightened but Anothropogenically Achieved Historical Kerplunk model (CHAAHK). The simulation features features virtual human groups, population centers, transit routes, local resources, and imported resources. Despite its embryonic state, the model demonstrates how certain anthropogenic characteristics of a landscape can interact with externally induced trauma and result in a prolonged period of relative sociopolitical uncomplexity. Analysis of batch simulation output suggests decreasing empirical uncertainties about ancient wetland modification warrants more investment. This first submission of CHAAHK's code represents the simulation's implementation that was featured in the author's master's thesis.

Catch Me if You Can: Using a Threshold Model to Simulate Support for Presidential Candidates in the Invisible Primary

Elizabeth Stiles | Published Wed Nov 14 20:11:19 2018

We use a threshold model to drive our simulated network analysis testing public support for candidates in invisible primaries. We assign voter thresholds for candidates and vary number of voters, attachment to candidates and decay. Results of the algorithm show effects of size of lead, attachment and size of decay.

Customers going to a restaurant

hdouss | Published Tue Sep 25 07:22:06 2018

The model is about customers going to a restaurant when they are hungry. They wait in the queue if no tables are available. Customers can leave the restaurant and got upset and decide to never return to the restaurant. The model tries to show 2 things: 1.the main caracteristics of the people that decided to never return to the restaurant and 2.the main factors that can impact the total number of customers that decided to never return to the restaurant.

Hunter Gatherer Survival

Juan Barcelo Florencia Del Castillo | Published Mon Oct 22 09:22:41 2018

This program simulates a group of hunter-gatherer (households) moving randomly over an artificial landscapoe pulated with resources randomly distributed (a Gaussian distribution). To survive, agents hunt and gather using their own labor resources and available technology. When labor and technology is not enough to compensate the resource difficulty of access, they need to cooperate. The purpose of the model is to analyze the consequences of cooperation on cultural diversity: the more the agents cooperate, the more their culture (a 10 componenet vector) is

updated to imitate the culture of cooperative agents. The less the agent cooperates, the more different its culture becomes.

Importing a Roman transport network

Tom Brughmans | Published Sun Sep 30 08:50:43 2018

A draft model teaching how a Roman transport model can be imported into Netlogo, and the issues confronted when importing and reusing open access Roman datasets. This model is used for the tutorial:
Brughmans, T. (2018). Importing a Roman Transport network with Netlogo, Tutorial, https://archaeologicalnetworks.wordpress.com/resources/#transport .

LaMEStModel

Ruth Meyer | Published Fri Oct 12 18:08:45 2018

The Labour Markets and Ethnic Segmentation (LaMESt) Model is a model of a simplified labour market, where only jobs of the lowest skill level are considered. Immigrants of two different ethnicities (“Latino”, “Asian”) compete with a majority (“White”) and minority (“Black”) native population for these jobs. The model’s purpose is to investigate the effect of ethnically homogeneous social networks on the emergence of ethnic segmentation in such a labour market. It is inspired by Waldinger & Lichter’s study of immigration and the social organisation of labour in 1990’s Los Angeles.

MigrAgent

Rocco Paolillo Wander Jager | Published Fri Oct 5 09:59:44 2018 | Last modified Wed Nov 28 14:03:41 2018

MigrAgent simulates migration flows of a population from a home country to a host country and mutual adaptation of a migrant and local population post-migration. Agents accept interactions in intercultural networks depending on their degree of conservatism. Conservatism is a group-level parameter normally distributed within each ethnic group. Individual conservatism changes as function of reciprocity of interaction in intergroup experiences of acceptance or rejection.

The aim of MigrAgent is to unfold different outcomes of integration, assimilation, separation and marginalization in terms of networks as effect of different degrees of conservatism in each group and speed of migration flows.

Modeling Personal Carbon Trading with ABM

Roman Seidl | Published Fri Dec 7 13:35:10 2018

A simulated approach for Personal Carbon Trading, for figuring out what effects it might have if it will be implemented in the real world. We use an artificial population with some empirical data from international literature and basic assumptions about heterogeneous energy demand. The model is not to be used as simulating the actual behavior of real populations, but a toy model to test the effects of differences in various factors such as number of agents, energy price, price of allowances, etc. It is important to adapt the model for specific countries as carbon footprint and energy demand determines the relative success of PCT.

Network structures tutorial

Tom Brughmans | Published Sun Sep 30 08:32:57 2018 | Last modified Tue Oct 2 09:48:18 2018

A draft model with some useful code for creating different network structures using the Netlogo NW extension. This model is used for the following tutorial: Brughmans, T. (2018). Network structures and assembling code in Netlogo, Tutorial, https://archaeologicalnetworks.wordpress.com/resources/#structures.

Opinion Dynamics with various confidence distributions

Jonas Lindblad | Published Fri Sep 28 20:36:42 2018

Project for the course “Introduction to Agent-Based Modeling”.

The NetLogo model implements an Opinion Dynamics model with different confidence distributions, inspired by the Bounded Confidence model presented by Hegselmann and Krause in 2002. Hegselmann and Krause used a model with uniform distribution of confidence, but one could imagine agents that are more confident in their own opinions than others. Confidence with triangular, semi-circular, and Gaussian distributions are implemented. Moreover, network structure is optional and can be taken into account in the agent’s confidence such that agents assign less confidence the further away from them other agents are.

RefugeePathSIM Model

Guillaume Arnoux Hébert Liliana Perez Saeed Harati | Published Thu Oct 11 20:00:29 2018 | Last modified Tue Oct 16 17:02:24 2018

RefugeePathSIM is an agent-based model to simulate the movement behavior of refugees in order to identify pathways of forced migration under crisis. The model generates migrants and lets them leave conflict areas for a destination that they choose based on their characteristics and desires. RefugeePathSIM has been developed and applied in a study of the Syrian war, using monthly data in years 2011-2015.

Root disease model

Adam Bouche | Published Sun Sep 30 20:44:37 2018

This is a model of root disease spread between trees in the landscape. The disease spreads via two transmission processes: (a) root contact/root graft transmission between adjacent trees and (b) insect vectors that carry spores between trees. Full details can be found in the “Info” tab in the model and in the readme file in the GitHub repository.

SKIN_ACAP

Morteza Mahmoudzadeh | Published Tue Sep 25 11:38:47 2018

Modified SKIN Model based on absorptive capacity concept.

word-of-mouth dynamics with information seeking

Samuel Thiriot | Published Wed Oct 24 18:05:25 2018

Studies on word-of-mouth identify two behaviors leading to transmission of information between individuals: proactive transmission of information, and information seeking. Individuals who are aware might be curious of it and start seeking for information; they might find around them the expertise held by another individual. Field studies indicate individuals do not adopt an innovation if they don’t hold the corresponding expertise. This model describes this information seeking behavior, and enables the exploration of the dynamics which emerges out of it.

Most Downloaded Models

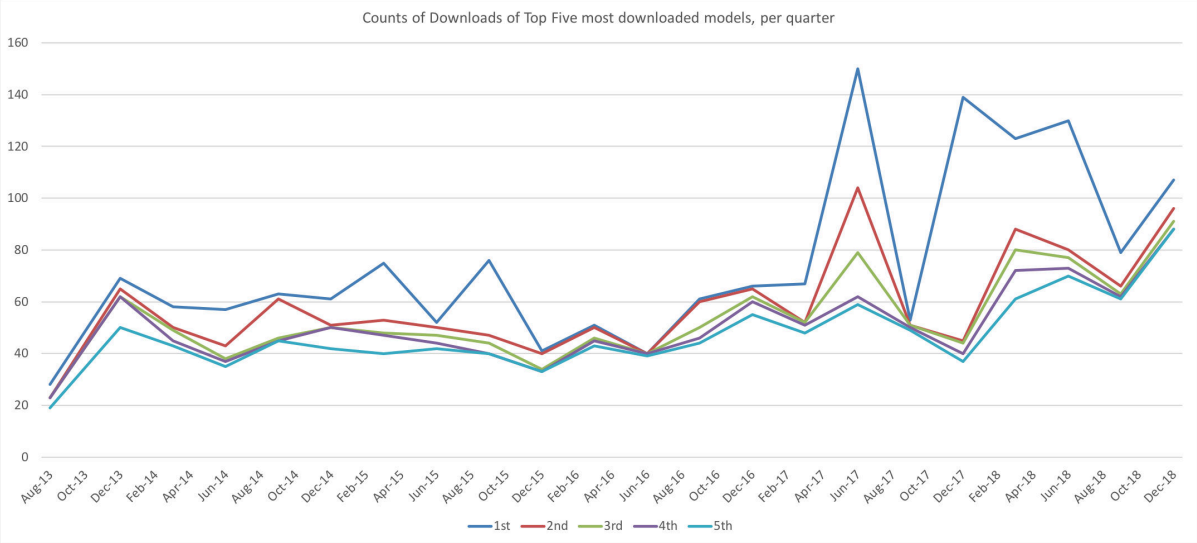
The five most-downloaded models included only two that had previously been in the top five: Scott Heckbert's MayaSim, in third place, and Belsare's disease surveillance model, dropping from second place last quarter to fourth. The other three were newcomers- one (a model of restaurant behavior) was uploaded during this quarter and immediately made the list. The total number of downloads from the top five was 470, somewhat higher than the previous high (454 in Summer 2017). Nearly 130 models were downloaded 30 or more times, totaling more than 6,000 downloads.

1. **(107 Downloads)** Agent-based Renewables model for Integrated Sustainable Energy (ARISE) by Muhammad Indra Al Irsyad, Anthony Halog, and Rabindra Nepal
2. **(96 Downloads)** Customers going to a restaurant by hdouss
3. **(91 Downloads)** MayaSim: An agent-based model of the ancient Maya social-

ecological system by Scott Heckbert

4. **(88 Downloads)** MOOvPOPsurveillance by Aniruddha Belsare, Matthew E Gompper, and Joshua J Millspaugh
5. **(88 Downloads)** Talent vs Luck: the role of randomness in success and failure by Alessandro Pluchino, Alessio Emanuele Biondo, and Andrea Rapisarda

The CoMSES Digest has been tracking the most-downloaded models since 2013; the numbers of downloads have increased through time, with more recent periods seeing a few large spikes over a generally increasing trend:



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