Geophysical Research Abstracts
Vol. 20, EGU2018-14280-1, 2018
EGU General Assembly 2018

Cloud computing for ecosystem services and land-use modelling: a test case with the InVest tool

Doug Salt, Marie Castellazzi, Laura Poggio, Andrea Baggio Compagnucci, and Alessandro Gimona
The James Hutton Institute, Aberdeen, United Kingdom (laura.poggio@hutton.ac.uk)

Modelling scenarios of ecosystem services at national scales and beyond requires large-scale processing of geospatial data, which are now beyond single computer capacities. To overcome those limitations, we have developed tools using infrastructure as a service (IaaS) to automate the provision of large scale high performance computing (HPC) for computationally intensive models. We are testing this approach using an InVEST model (Nutrient Retention) on Scottish watersheds (6,886) with alternative scenarios of land use change (18). This is a pleasingly parallel problem, where each watershed can be modelled on its own. A distributed resource manager (batch scheduler, Son Of a Grid Engine) was used to take advantage of a large number of virtual machines (VMs) deployed on Google Cloud platform. The VMs were deployed using an automatic workflow.
This work will be easy to extrapolate to the use of larger data sets, of more computationally demanding models, and to analyse a higher number of scenarios over large areas. It will also permit reproducibility of complex modelling tasks. The experience and expertise gained will make cloud computing an effective solution to problems demanding a high amount of computational resources.