

Getting started – iLand release 0.3

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Installing iLand

The downloaded iLand package contains:

- The executable (iland.exe) and the required library files (QtCore4.dll, QtGui4.dll, QtScript4.dll, QSql4.dll, QtXml4.dll, libgcc_s_dw_2-1.dll, mingwm10.dll) for running iLand on Microsoft Windows (XP, Vista, Windows 7).
- An extensive example for running the model "out of the box" in the "example" folder.
- The full source code of iLand is packed in the "src.zip" file.

To install iLand, simply extract the ZIP folder to a location of your choice und start the model by double clicking the "iland.exe" file. iLand comes without a dedicated installer and does not modify the Windows registry. It is thus also possible to run iLand from a USB stick.

iLand is written in C++ and uses the cross-platform toolkit Qt. Therefore iLand can in principal also be used on Linux and Mac platforms. We have already (successfully compiled and employed iLand also on a Linux machine (usually Ubuntu). Macs should work as well, but we actually never tried running iLand on a Mac yet (see also the building instructions below).

Running iLand

iLand organizes its inputs and outputs in so-called "projects". A "project" is a set of folders containing different kinds of data (e.g. climate data or species parameters) and a "project-file" (<http://iland.boku.ac.at/project+file>), which is a XML-file acting as the main controller for the various model options.

In order to run simulations with iLand you need to (see also Figure 1):

- Start The iLand viewer (iland.exe) (see also <http://iland.boku.ac.at/iLand+Software>)
- Select a project file (1)
- Create the model (2). This sets up the model landscape and initial trees.
- Run the model (3). Enter the number of years you want the model to run.
- While the model is running (there is also a "Pause" button), you can view different types of data in the GUI visualization:
 - "Light influence field": This is the "LIF" (<http://iland.boku.ac.at/competition+for+light>). Red means low, blue high light levels. Spatial resolution is a 2m grid.
 - "dominance grid": Maximum tree heights at 10m resolution
 - "Individual trees" shows tree crowns from bird's eye perspective (i.e. as stylized circles with the radius indicating the size of the tree). The color indicates the light resource index (again, red means low LRIs, see <http://iland.boku.ac.at/competition+for+light>)
 - "resource unit" show the resource units, i.e. a 100m grid used for the calculation of e.g. the water balance. (<http://iland.boku.ac.at/resource+units>)

- Clicking on a tree and a resource unit, respectively, shows their attribute in the “Data” box in the lower right corner. You can enter mathematical expressions (<http://iland.boku.ac.at/Expression>) using these variables in the „Expression“ field to visualize various aspects (e.g. “dbh” or “dbh*dbh/4*3.141592” to calculate basal area)
- The log area (4) contains messages from the model. This kind of log info is especially helpful to track configuration or model errors.
- The non-visual outputs of the model are stored in an output database (<http://iland.boku.ac.at/Outputs>). See <http://iland.boku.ac.at/Software+Tools> for tools helping to access the SQLite databases iLand uses to store simulation results in (it is also quite easy to read these databases into R for further analysis).

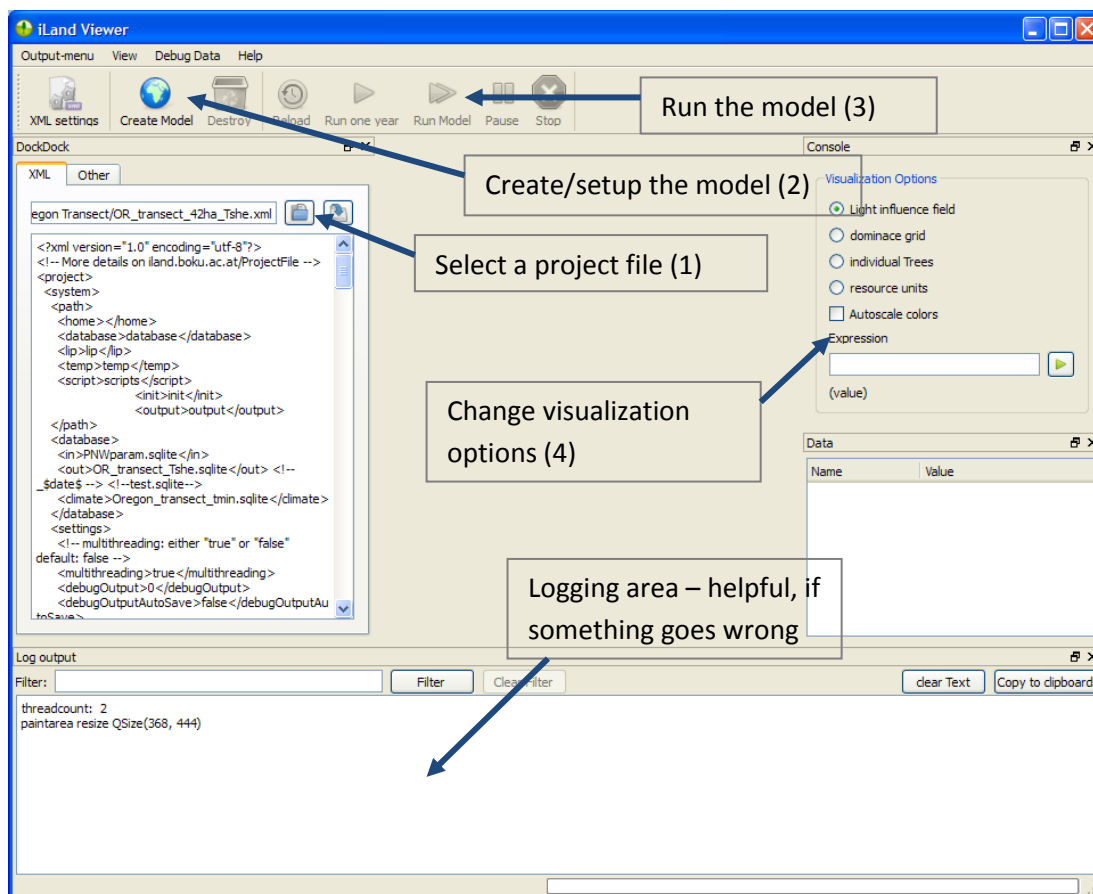


Figure 1. Main window of iLand at startup

Building iLand from source

The download package contains also the full source code of the model as a ZIP archive “src.zip”. In order to be able to modify and compile iLand for yourself, you will need Qt and the QtCreator IDE. Both packages are freely available at <http://qt.nokia.com/downloads>. The shipped release is compiled with Qt 4.6 (mingw) but we expect no problems when using more recent versions of Qt (e.g. 4.8).

After installing the Qt Creator IDE, open the “iland.pro” project in the “src/iland” folder (be sure to preserve file paths when extracting the source code). iLand uses no external libraries (except the Qt libraries) which should simplify the building process considerably – a click to “build” should suffice.

The example project

The example supplied with the model is meant for illustrative purposes only, to allow you to conduct first runs "out of the box", to get a feel of how the model works, and how its input data look like. The two example project files provided are even-aged simulations for Douglas-fir (Psme) and Western Hemlock (Tshe) over the extensive environmental gradient of the Oregon Transect. Stands are initialized as young and homogenous even-aged stands (with stem number differing by site index - see the folder "init"). Periodic thinnings are simulated (see their definition in the "scripts" folder) to emulate yield tables and grant comparability of simulation results to yield table estimates. The landscape setup is a "pseudo-landscape", in which all the 42 transect plots are represented by a single hectare (with independent soil and climate information, see the environment files supplied in the root directory of the project), and in which spatial interactions between the individual plots are omitted (note the setting "model>parameter>torus=true" in the project file). Out of the box, the runs will record two different sets of stand information in the output database, but different levels of output (e.g., individual tree output) can be activated in the "output" section of the project file. Climate data for this example was taken from <http://www.daymet.org> (Thornton et al. 1997, J. Hydrol. 190, 214–251) and soil data was derived from FIA (USDA 2009, The Forest Inventory and Analysis Database) and auxiliary information as described in Seidl et al. (2012, Ecol. Model. doi:10.1016/j.ecolmodel.2012.02.015). For more details on the example project we refer to Seidl et al. (2012, Ecol. Model. doi:10.1016/j.ecolmodel.2012.02.015). Please cite this study if you should use any part of the supplied example in your work (e.g., parameters etc.), and also acknowledge the original data providers as appropriate.