

LandscapeDNDC: Getting started

ldndc-team

Institute of Meteorology and Climate Research Atmospheric Environmental Research

Download LandscapeDNDC

(Un-)Installation of LandscapeDNDC

Setting up LandscapeDNDC

Starting a simulation

Download LandscapeDNDC

- Go to <https://ldndc.imk-ifu.kit.edu/download/download.php>
- Choose your operating system and download the package
- The download contains the following list of directories/files:
 - bin
 - doc
 - dotfiles
 - install.bat / install.sh
 - ldndc.conf
 - lib
 - Lresources
 - parameters
 - projects
 - revision
 - run-example.txt

(Un-)Installation of LandscapeDNDC

- In order to install LandscapeDNDC, just execute (double-click on MS Windows) the file `install.bat` (MS Windows) or `install.sh` (Linux). MacOS X is currently not supported.
- An invisible `.ldndc` folder including important files (e.g., parameter database) will be created into your home-directory, i.e., under MS Windows: `<root>\Users\<>username<`
- Deletion of `.ldndc` will uninstall LandscapeDNDC from your system

LandscapeDNDC simulations commonly include 3-4 directories on your operating systems

1 **LandscapeDNDC binary (the compiled program):**

The binary is located in `bin` in the downloaded package or in case you compiled and installed LandscapeDNDC from the source code in the defined installation path.

2 **LandscapeDNDC configuration:**

The most important configuration of LandscapeDNDC concerns the organization of in- and output.

3 **LandscapeDNDC input:**

project, model setup, simulation drivers, ...

4 **LandscapeDNDC outputs (often written very closely to inputs):**

Simulated quantities...

Setting up LandscapeDNDC

LandscapeDNDC simulations expect the following set of inputs:

- 1 Project
- 2 Setup
- 3 Site
- 4 Events
- 5 Climate
- 6 Air chemistry
- 7 Groundwater
- 8 Parameters (site, species, soil)

Setting up LandscapeDNDC

Project file

```
<ldncproject id="0" lat="47.8" lon="14.4">  
  <schedule time="1995-01-01/24_>_2013-12-31"/>  
  <input>  
    <sources sourceprefix="forest/example-project/">  
      <site source="site.xml"/>  
      <event source="mana.xml" />  
      <setup source="setup.xml"/>  
      <climate source="climate.txt" />  
      <airchemistry source="airchem.txt" />  
      <speciesparameters source="parameters_species.xml" />  
      <siteparameters source="parameters_site.xml" />  
    </sources>  
    <attributes use="0" >  
      <airchemistry endless="yes"/>  
    </attributes>  
  </input>  
  <output>  
    <sinks sinkprefix="forest/example-project/output/" />  
  </output>  
</ldncproject>
```

Organizing your simulation

The project file defines two relative paths:

- `<sources sourceprefix="forest/example-project/">`
- `<sinks sinkprefix="forest/example-project/output/" />`

Configuration file:

- `input_path = "<path-to-ldnc>/projects"`
- `output_path = "<path-to-ldnc>/projects"`

The complete information for LandscapeDNDC reads as follows:

- `./ + input_path + sourceprefix`
- `./ + output_path + sinkprefix`

In case `input_path` is an absolute path `./` is neglected.

Setting up LandscapeDNDC

Setup file

```
<ldncsetup>
  <setup id="0" name="Garmisch_forest">
    <location elevation="161.5" latitude="51.06" />
    <topology x="100" y="50" z="161.5" area="100.0" />
    <mobile>
      <modulelist>
        <module id="soilchemistry:dnc" />
        <module id="output:physiology:daily" />
        ...
      </modulelist>
    </mobile>
    <use>
      <climate source="warmclimate" id="0" />
    </use>
  </ldncsetup>
```

Setting up LandscapeDNDC

Setup file for a landscape

```
<ldncsetup>
  <setup id="0" name="Garmisch_forest" >
    <location elevation="161.5" latitude="51.06" />
    <topology x="100" y="50" z="161.5" area="100.0" />
    <mobile>
      <modulelist>
        <module id="soilchemistry:dnc" />
        <module id="output:physiology:daily" />
        ...
      </modulelist>
    </mobile>
  </setup setup id="1" name="Garmisch_grassland" >
    ...
  </setup>
</ldncsetup>
```

Setting up LandscapeDNDC

Site file

```
<site id="0">  
  <soil>  
    <general usehistory="forest" humus="MODER" ... />  
    <layers>  
      <layer depth="20.0" split="2" bd=... clay=... corg=... />  
      <layer depth="60.0" split="3" bd=... clay=... corg=... />  
      <layer depth="100.0" split="2" bd=... clay=... corg=... />  
    </layers>  
  </soil>  
</site>
```

- bulk density (bd)
- organic carbon (corg)
- clay content (clay)
- total nitrogen (norg)
- pH-value (ph)
- stone content (scel)
- saturated hydraulic conductivity (sks)
- field capacity (wcmax)
- wilting point (wcmin)

Setting up LandscapeDNDC

Event file

```
<event>
  <event type="plant" time="2008-01-01-24/24">
    <plant type="piab" name="piab" >
      <wood dbh="0.416" heightmax="26.5" heightmin="16.0" treenumber="409.0" />
    </plant>
  </event>
  <event type="thin" time="1996-04-02">
    <thin name="fasy" reductionnumber="0.079" exportsapwood="false" exportfoliage="false"
      reductionvolume="0.079" exportcorewood="false" >
    </thin>
  </event>
</event>
```

Starting a simulation

Batch file

Example: DE_gebesee.bat

```
IF EXIST %userprofile%\ldndc (
    %cd% \..\..\..\bin\ldndc.exe DE_gebesee.ldndc
) ELSE (
    @echo Directory "%userprofile%\ldndc" missing!
    @echo Did you install LandscapeDNDC via "install.bat"?
)
PAUSE
```

- %userprofile% is an environment variable having the path of your home directory as value
- %cd% is an environment variable having the path of the current directory as value

Starting a simulation

Command line

Example: DE_gebesee

```
$> cd <path/to/ldncd-binary>
```

```
$> ldncd.exe -c <path/to/config> <path/to/project>
```

Using alias and default config in .ldncd:

```
$> alias lrun=<path/to/ldncd-binary>
```

```
$> lrun <path/to/project>
```