

LandscapeDNDC: Getting started

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Overview

Command interpreter

Installation of LandscapeDNDC

Setting up LandscapeDNDC

Starting a simulation

- Command line interpreter is a program that literally interpretes commands
- Graphical user interfaces (GUI) are the opposite: commands are executed by clicking buttons
- Advantages of Command line interpreter:
 - Automatization of processes
 - Documentation of processes
 - More direct and precise access to the functions of an operating system
- Different command line interpreters depending on the operating system:
 - MS Windows: PowerShell
 - Unix(-like) systems: Bash

Command line interpreter

Helpful DOS commands

- `dir`: list content of directory
- `cd`: change directory
`cd ..\ Desktop` (first one folder upwards and then to Desktop)
- `copy`: copy file
`copy Desktop\ file1.txt backup\ backup1.txt`
- `del`: delete file
`del Desktop\ file1.txt`
- `mkdir`: create new folder
`mkdir Desktop\ new_folder`
- `set`: create temporary environment variable
`set root=D:\ Work\ Root`
- `ldnc.exe`: run simulation
`bin\ ldnc.exe -c config.con path\ to\ projects.ldnc`

(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` (MacOS X, Linux)
- 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

Setting up LandscapeDNDC

- 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>
```

Setting up LandscapeDNDC

Setup file

```
<ldncsetup>
  <setup id="0" name="example name" ... >
    <use>
      <climate source="warmclimate" id="0" />
      ...
    </use>
    <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="garmischer acker" model="arablednc" >
    ...
  </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

Command line

Example: DE_gebesee

```
$> cd path/to/ldncd
```

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

```
$> bin/ldncd.exe -c config.conf  
/projects/arable/DE_gebesee/DE_gebesee.ldncd
```

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

Organizing your simulation

The project file `DE_gebesee.ldnc` defines two relative paths:

- `sourceprefix="arable/DE_gebesee/DE_gebesee_"`
- `sinkprefix="arable/DE_gebesee/DE_gebesee_output/DE_gebesee_"`

Configuration file after installation of LandscapeDNDC:

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

The complete information for LandscapeDNDC reads as follows:

- `%cd% + input_path + sourceprefix`
- `%cd% + output_path + sinkprefix`

In case `input_path` is an absolute path `%cd%` is neglected (as in our case assuming a successful LandscapeDNDC installation).