LPJGUESS - Landlab - Coupling Documentation -- V.0.5

Initial Folderstructure needed:

```
model_dir/
        |── forcings/
        |   |── climdata/
        |   |    |── split_files/
        |   |    |── Climate_TraCE21ka_prec.nc
        |   |    |── Climate_TraCE21ka_temp.nc
        |   |    |── Climate_TraCE21ka_rad.nc
        |   |    |── co2_TraCE_21ka_1990CE.txt
        |   |    |── ndepo_lamarque_cl_hist_landid.nc*
        |── lpjguess.template/
        |   |── dumpdir_eor/
        |   |── loaddir/
        |   |── earthshape_lpjsetup.ins
        |   |── focussites_transient.ins
        |   |── eartshape_pfts.ins
        |   |── lpguess.ins.tpl
        |   |── landid.txt
        |── ll_output/
        |   |── BED/
        |   |── DEM/
        |   |── DHDT/
        |   |── NC/
        |   |── SoilDepth/
        |   |── SoilP/
        |   |── Veg/
        |── debugging/
        |── temp_output/
        |── runfile_space.py
        |── inputFile.py
        |── initial_bedrock.npy
        |── initial_soildepth.npy
        |── initial_topography.npy
```

Files/Folders created during runtime:

```
        |── temp_lpj/
        |── temp_output/
        |   |── current_output.nc
```

Important Files / Modules for input/output handling and conversion:

Landlab Component *dynveg_lpjguess.py / create_input_for_lpjguess.py (../landlab/landlab/components/dynveg_lpjguess)*

This component handles the the calls to LPJGUESS during model-runtime and the conversion of current landlab output to lpjguess subpixel input at each timestep

File *create_input_for_landlab.py*

Todo: This file needs to be incorporated in the framework of the component mentioned above. Right now it needs to sit in the model base-directory.
It handles the conversion and spatial mapping of lpjguess subpixel output to landlab grids during runtime.

Landlab Component *landformClassifier.py (../landlab/landlab/components/landform_classifier)*

This is a theoretically separate component that can be used without the LPJGUESS coupling of landlab. This handles the classification of each cell within a landlab model grid into different Landforms during runtime.
This however absolutely necessary for the coupled simulations

Known issues/Todo:

- LPJGUESS is compiled in my folder locally (check inputFile.py for location). This could be done globally if more people are using it. WILLI
- The location and filename(!!) of the forcing-files are right now hardcoded in dynveg_lpjguess.py. It works, but since this is a global landlab-module, the naming of the input_files needs to be the same for all simulations. Right now its /forcings/climdata/Climate_TraCE21ka_prec/_temp; _rad].nc. Manu
- The output timestep (inputFile.py, variable *outInt*) is the same for the spin-up period as well as the transient period. Since we are mostly not interested in the spin-up we create a huge chunk of data, that we basically don't use. This is also a runtime issue, since the creation of output takes a lot of time. Willi/Manu
- Since time is/was a little tight on my side, I never switched to the landlab branch that Willi created which incorporates the new inputFile format (not the python file). Since I adapted my workflow on this, honestly I am planning to

continue on this. This also mean, that I added a lot of stuff to the input File which is not in the “new” version, which needs to go there. Willi