

This README file contains instructions about how to compile the DYKE-CODE_GEOTWINS on a Linux OS (1), and run the simulation in the sub-folder "RUNS/TEST_01" (2). Here you will also find a description of the content of the folder "GEOMOD-T2.1_DYKE-CODE" (3).

IMPORTANT NOTE: In order to compile the code and run the executable file on a Linux operating system, gfortran compiler and LAPACK libraries must be installed.

1) Compile the FORTRAN90 source files for the DYKE-CODE_GEOTWINS on a Linux OS (tested on Ubuntu20.04).

1.1) Move to the folder "PROGRAM_FILES/DYKE-CODE_GEOTWINS"

1.2) From the terminal run the bash script "*compile_DYKE-CODE_GEOTWINS.sh*":
`> sh compile_DYKE-CODE_GEOTWINS.sh`

This will generate the executable file "*DYKE-SIMULATION_GEOTWINS*" in the sub-folder "MAIN"

2) Run the executable file "*DYKE-SIMULATION_GEOTWINS*".

2.1) Copy the executable file "*DYKE-SIMULATION_GEOTWINS*" to the folder "RUNS/TEST_01";

2.2) Delete the previous output files from the sub-folder "output";

2.3) Execute the "*DYKE-SIMULATION_GEOTWINS*" file. From the terminal, in the folder "RUNS/TEST_01" run the command:

`> ./DYKE-SIMULATION_GEOTWINS`

This will produce the output files in the folder "output". Please refer to the "*outputfile_description.txt*" for a description of the outputs.

3) Description of the content of the directory "GEOTWINS-T2.1_DYKE-CODE".

- *inputfile_description.txt* and *outputfile_description.txt*: These files contain the description of the input-files needed to run the DYKE-SIMULATION_GEOTWINS executable file, and the description of the output-files generated the DYKE-SIMULATION_GEOTWINS.

- **RUNS**: contains one example of a DYKE-SIMULATION_GEOTWINS run (TEST_01).

-- **TEST_01**: contains input and output files (in the "input" and "output" subfolders respectively) relative to the DYKE-SIMULATION_GEOTWINS execution, the DYKE-SIMULATION_GEOTWINS executable file, the c-basch script "plot_crack_shape.csh" that produces the figure "crack_shape.ps" provided that GMT4 software is installed.

--- **input**: please refer to *inputfile_description.txt*.

--- **output**: please refer to *outputfile_description.txt*.

- **PROGRAM_FILES**: contains all files needed to compile and run the DYKE-CODE_GEOTWINS

-- **DYKE-CODE_GEOTWINS**: contains the FORTRAN90 program files for the DYKE-CODE_GEOTWINS, and the script to compile the code.

--- **MAIN**: contains the main file of the DYKE-CODE_GEOTWINS (**MAIN_PROPAGATION_GEOTWINS.f90**), and the executable file (**DYKE-SIMULATION_GEOTWINS**).

--- **MODULES_F90**: contains the module files of the DYKE-CODE_GEOTWINS (DISL2D.f90, CRACK2D.f90, EXTERNAL_FIELD.f90, BELEMENT_GEOTWINS.f90, COMP_FIELD_GEOTWINS.f90, PROPAGATION_GEOTWINS.f90).

--- **compile_DYKE-CODE_GEOTWINS.sh**: bash script to compile the DYKE-CODE_GEOTWINS and produce the executable file "DYKE-SIMULATION_GEOTWINS".