EPIC run Cultivars - parallelized

Katerina Krizova

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INITIAL SETUP

paths

```
path_in <- "c:/Users/krizovak/Documents/__EPIC__/R/"

path_met <- "C:/Users/krizovak/Documents/__EPIC__/R/_tables/v3_czsk/"
path_tab <- "c:/Users/krizovak/Documents/__EPIC__/R/_tables/"
path_shp <- "c:/Users/krizovak/Documents/__EPIC__/R/_shapefiles/"
path_epic <- "c:/Users/krizovak/Documents/__EPIC__/EPIC_CS_v4_Aug2022/"

path_out <- "c:/Users/krizovak/Documents/__EPIC__/R/_cultivarRESULTS/"
```

time period

```
period <- 1989:2019
```

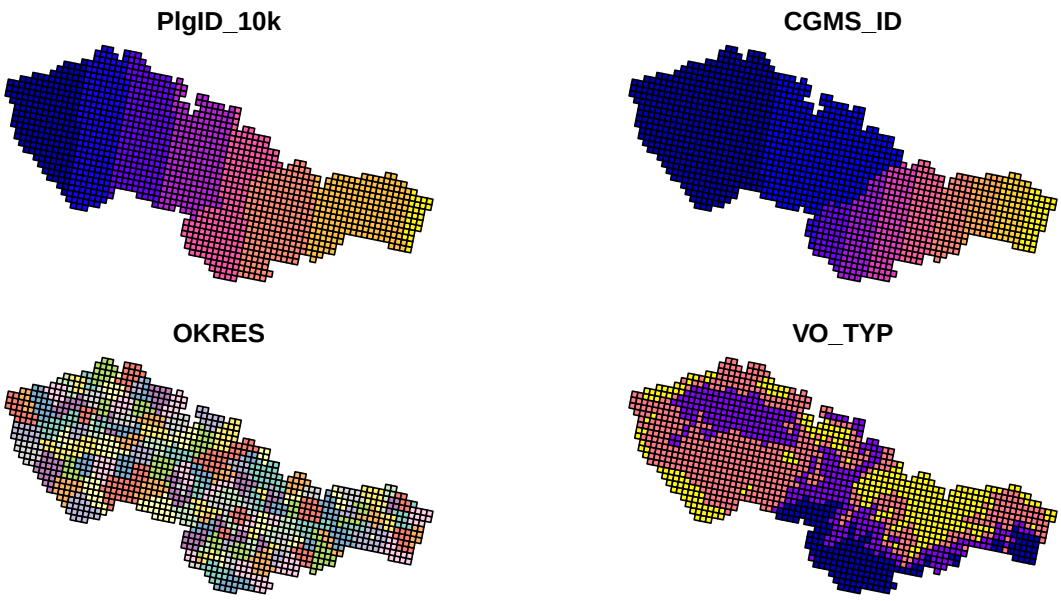
crop params

- crop: WWHT
- crop ID: 10
- seasonality: WIN
- basal temperature: 0
- optimal temperature: 15

geospatial backgroud

10 km grids

- 877 for CZ
- 550 for SK




```
##      PlgID_10k CGMS_ID  OKRES VO_TYP ctry ctry_id parallel
## 1003       991    2343 SK0401      1   SK    1003        6
## 1206      1229    3526 SK0706      4   SK    1206        7
## 1298      1307    4223 SK0701      4   SK    1298        8
## 1364      1354    4731 SK0806      2   SK    1364        8
## 1389      1409    5023 SK0702      4   SK    1389        8
```

CROP CALENDAR - mozna vůbec nepotrebujeme...

WWHT_crop_cal

contains information about

- crop and cropid
- planting and harvest days for specific cultivars (also julian)

file necessary for:

- ?

CALCULATING PHU FROM DLY FILES

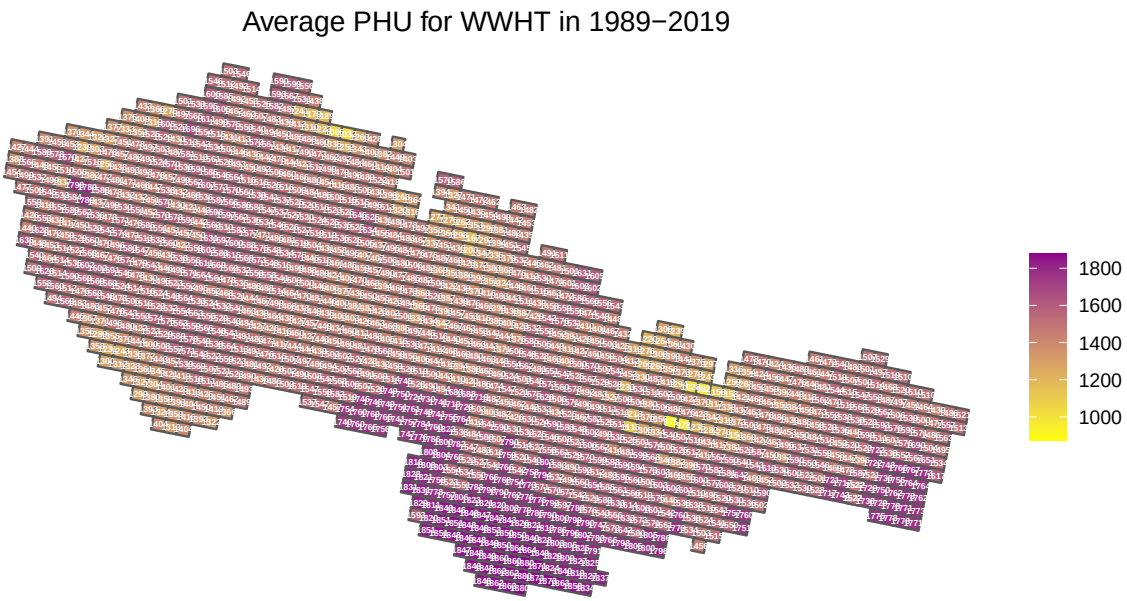
calculates optimal PHU (potential heat units) for each cultivar

required parameters: **tbs** and **top**

```
## [1] TRUE
```

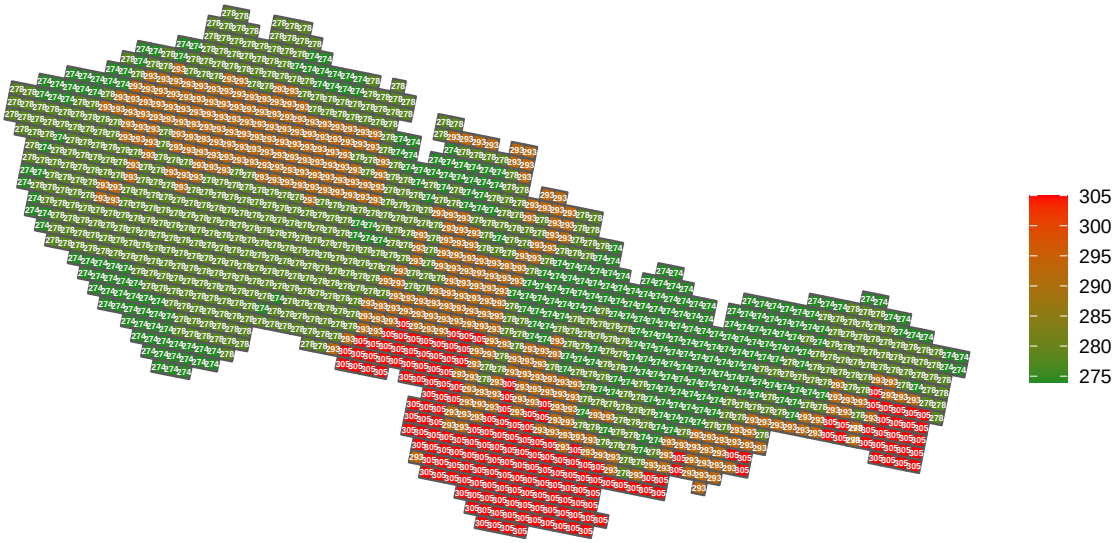
PHU CALENDAR AND MAPS

WWHT_phu_cal

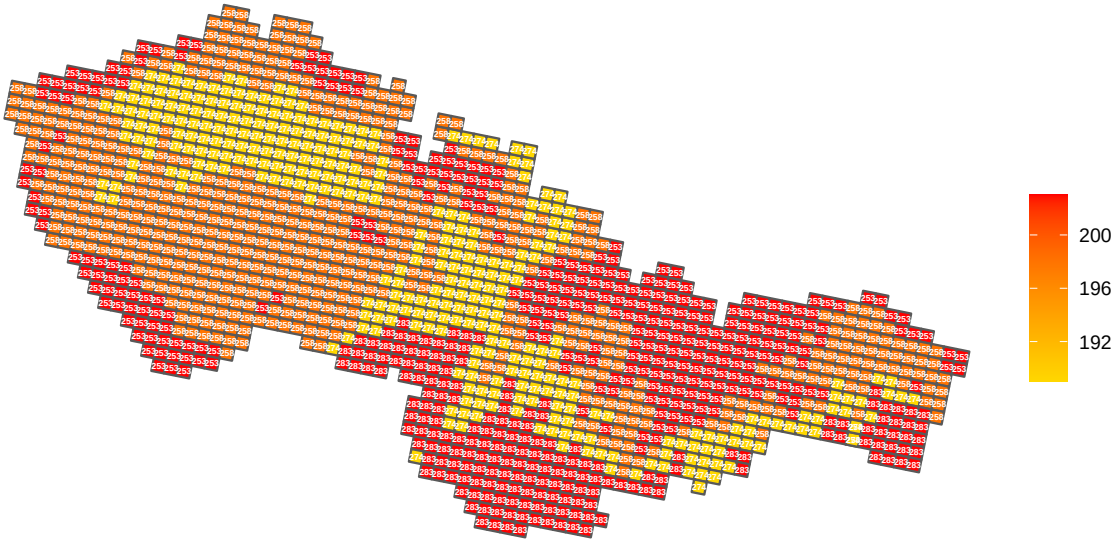


Harvesting day (julian) for WWHT / scenario:2

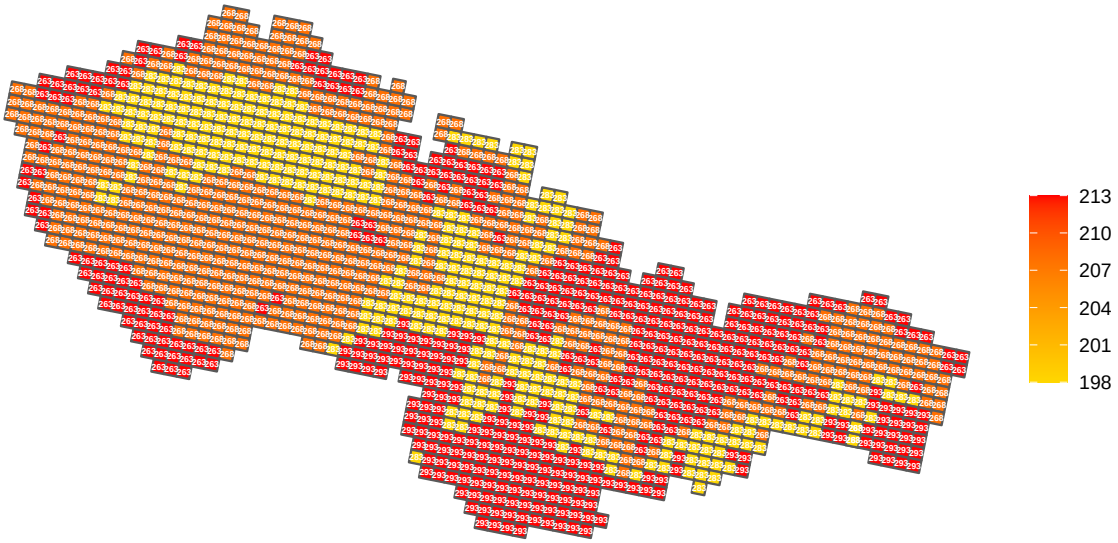
Harvesting day (julian) for WWHT / scenario:3



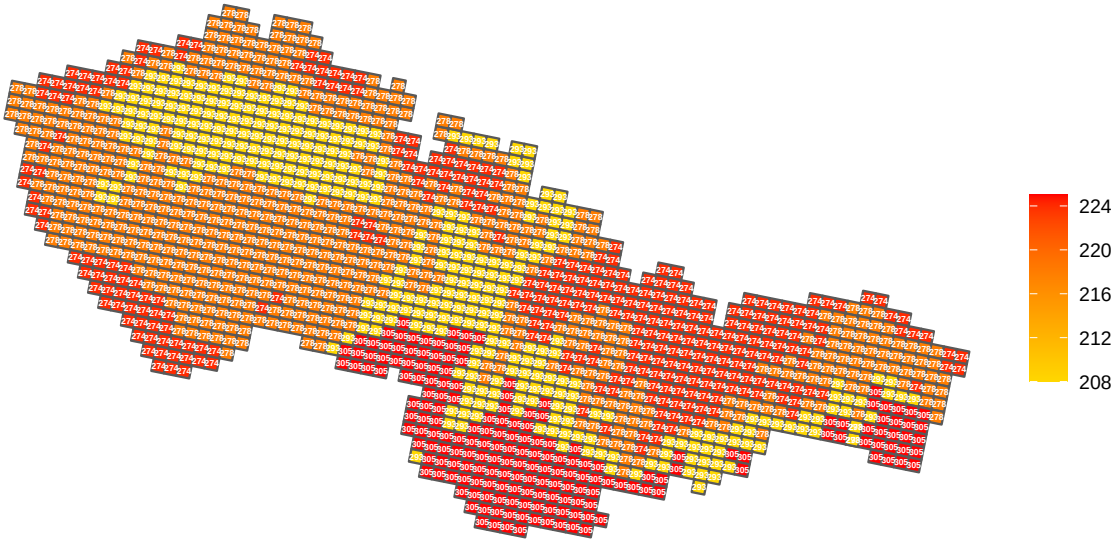
Planting day (julian) for WWHT / scenario:1



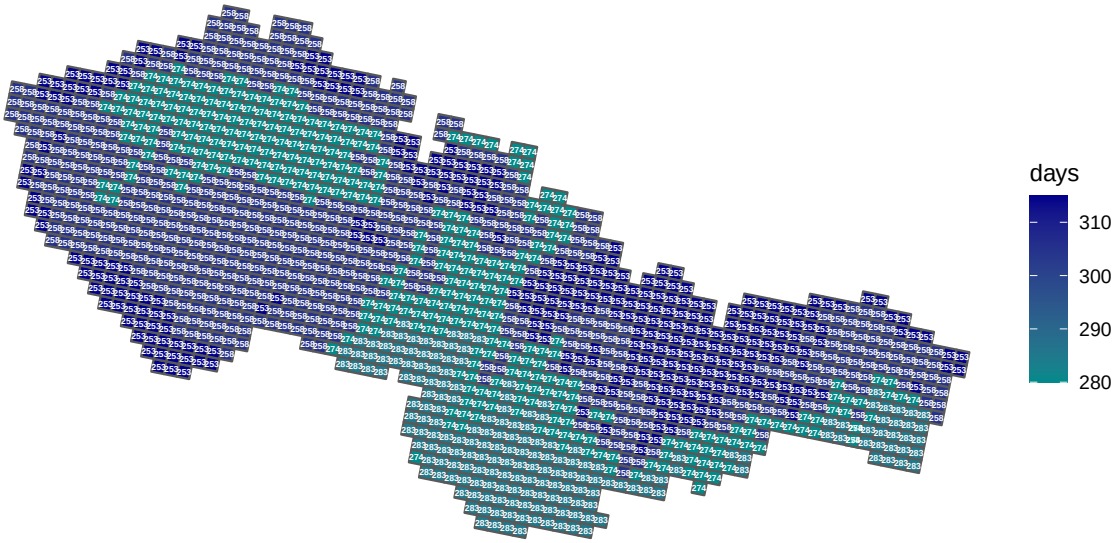
Planting day (julian) for WWHT / scenario:2



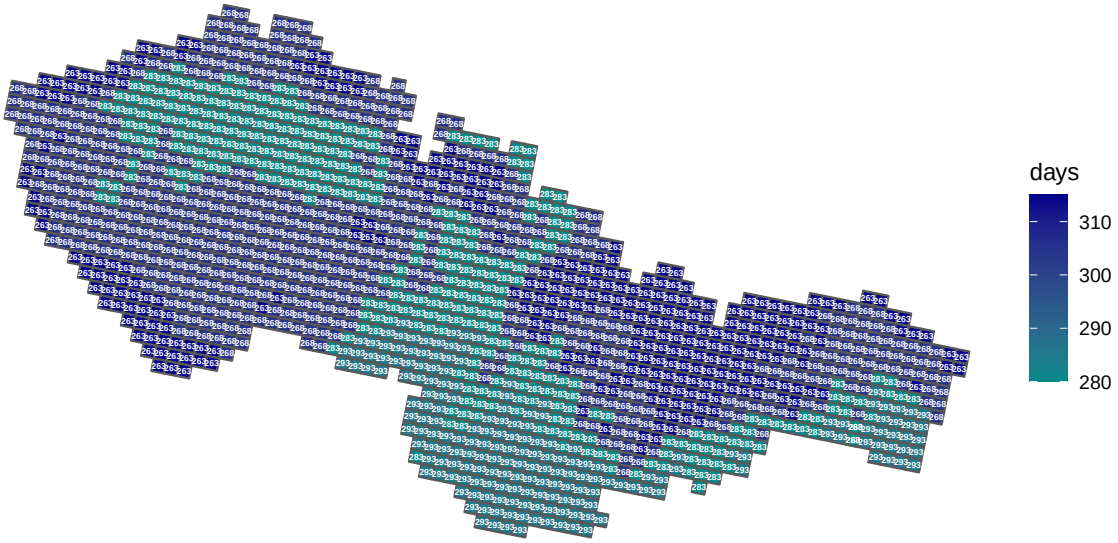
Planting day (julian) for WWHT / scenario:3



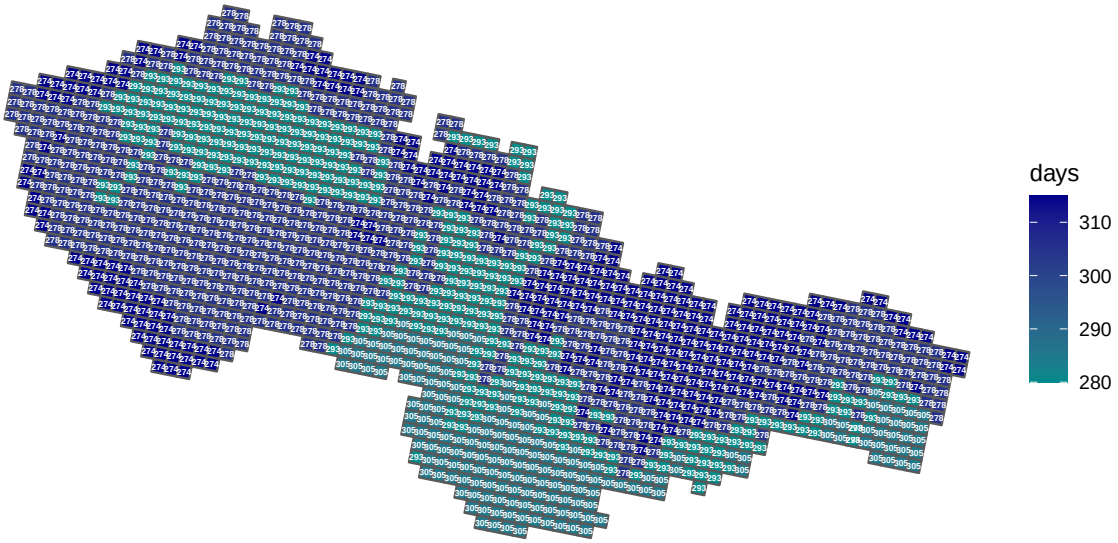
Length of vegetation period for WWHT / scenario:1



Length of vegetation period for WWHT / scenario:2



Length of vegetation period for WWHT / scenario:3



PARALLELIZATION OF EPIC SIMULATIONS

split runs in 8 different folders to ensure faster simulations

1 year simulated in 4-6 s

CZ

1) 1-175
2) 176-350
3) 351-525
4) 526-701
5) 702-890

SK

6) 1336-2641
7) 2642-3734
8) 3735-5425

DIRECTORIES

create directories for storing EPIC input files:

```
# cult

unlink(paste0(path_out, crop, "/epicrun"), recursive=TRUE)
unlink(paste0(path_out, crop, "/epicrun_parallel"), recursive=TRUE)
unlink(paste0(path_out, crop, "/OPSC"), recursive=TRUE)
unlink(paste0(path_out, crop, "/OPSC_parallel"), recursive=TRUE)
unlink(paste0(path_out, crop, "/SITE_parallel"), recursive=TRUE)
unlink(paste0(path_out, crop, "/SOIL_parallel"), recursive=TRUE)
unlink(paste0(path_out, crop, "/PARM"), recursive=TRUE) # delete folders form prec. run

# dir.create (paste0(path_out, crop, "/epicrun"), showWarnings = FALSE)
dir.create(paste0(path_out, crop, "/epicrun_parallel"), showWarnings = FALSE)
# dir.create (paste0(path_out, crop, "/OPSC"), showWarnings = FALSE)
dir.create (paste0(path_out, crop, "/OPSC_parallel"), showWarnings = FALSE)
dir.create (paste0(path_out, crop, "/SITE_parallel"), showWarnings = FALSE)
dir.create (paste0(path_out, crop, "/SOIL_parallel"), showWarnings = FALSE)
# dir.create (paste0(path_out, crop, "/PARM"), showWarnings = FALSE)
dir.create (paste0(path_out, crop, "/_outs"), showWarnings = FALSE) # create new ones

Louts <- list.files(paste0(path_out, crop, "/_outs/"), pattern = ".ACM|.ACY")
file.remove(paste0(path_out, crop, "/_outs/", Louts)) # ACM and ACY files removal from _outs folder
```

```
## Warning in file.remove(paste0(path_out, crop, "/_outs/", Louts)): cannot remove
## file 'c:/Users/krizovak/Documents/__EPIC__/R/_cultivarRESULTS/WWHT/_outs/',
## reason 'Permission denied'
```

```
## [1] FALSE
```

```
# v4

for(i in 1:8) {
  path_temp <- paste0("c:/Users/krizovak/Documents/__EPIC__/EPIC_CS_v4_Aug2022/EPIC_CS_", i, "/")
  unlink(paste0(path_temp, "EPIC0810"), recursive=TRUE)
  unlink(paste0(path_temp, "OPSC"), recursive=TRUE)
  unlink(paste0(path_temp, "SITE"), recursive=TRUE)
  unlink(paste0(path_temp, "SOIL"), recursive=TRUE)
  dir.create(paste0(path_temp, "EPIC0810"))
  dir.create(paste0(path_temp, "OPSC"))
  dir.create(paste0(path_temp, "SITE"))
  dir.create(paste0(path_temp, "SOIL"))
  # copy EPIC0810 files
  oldDir <- paste0("c:/Users/krizovak/Documents/__EPIC__/EPIC_CS_v4_Aug2022/_EPIC_CS_0_/EPIC0810/")
```

```
  newDir<- paste0(path_temp, "EPIC0810/")
  L <- list.files(paste0(oldDir))
  file.copy(from = paste0(oldDir, L),
          to = paste0(newDir, L), overwrite = TRUE)
  # copy SITE files
  oldDir <- paste0("c:/Users/krizovak/Documents/__EPIC__/EPIC_CS_v4_Aug2022/_EPIC_CS_0_/SITE/")
  newDir<- paste0(path_temp, "SITE/")
  L <- list.files(paste0(oldDir))
  file.copy(from = paste0(oldDir, L),
          to = paste0(newDir, L), overwrite = TRUE)
  # copy SOIL files
  oldDir <- paste0("c:/Users/krizovak/Documents/__EPIC__/EPIC_CS_v4_Aug2022/_EPIC_CS_0_/SOIL/")
  newDir<- paste0(path_temp, "SOIL/")
  L <- list.files(paste0(oldDir))
  file.copy(from = paste0(oldDir, L),
          to = paste0(newDir, L), overwrite = TRUE)
}
```

EPIC INPUT FILES

EPICRUN

EPIC/EPIC0810/epicrun_x

EPICRUN for initial calibrations runs works with only 1 SIT and 1 SOL file for all grids

SIT

+ CZ: 119
+ SK: 6135

SOL

+ CZ: 10
+ SK: 7

OPC created for each 'runid' (runid 167 = 167.opc)

DLY created for each 'runid' (runid 167 = 167.dly) / same for WP1

WINDID set as 1 for each 'runid'

```
##  [1] GRID     scenario cropid   crop     PLN_JUL  HRV_JUL  LVP      PHU
##  [9] ctry     parallel VO_TYP   runid
## <0 rows> (or 0-length row.names)
```

```
##      PlgID_10k CGMS_ID  OKRES VO_TYP ctry ctry_id parallel
## 1003       991    2343 SK0401      1   SK    1003        6
## 1206      1229    3526 SK0706      4   SK    1206        7
## 1298      1307    4223 SK0701      4   SK    1298        8
## 1364      1354    4731 SK0806      2   SK    1364        8
## 1389      1409    5023 SK0702      4   SK    1389        8
```

OPC

Operation schedules

OPSCCOM

OPSCCOM.dat

?

OPS FILES IN R

OPS FILES 2 PRINT

WWHT_OPSC_cultivars_2print.txt

operation schedules

necessary table: *OPSC_Param_SVK13.txt*

SITE

SITECOM

SITECOM.dat

(same as SITE0810.dat)

Catalog of site files available for the project

EPIC looks in the site catalog file SITE0810.dat (or the catalog named in EPICFILE.dat) for the site number referenced in EPICRUN.dat and obtains the name of the file containing the site-specific data. The site-specific file is used to describe each Hydrologic Landuse Unit (HLU), which is homogenous with respect to climate, soil, landuse, and topography. The site may be of any size consistent with required HLU resolution. Site files (filename.sit) describe each site: latitude, longitude, elevation, area, etc. A project may involve several sites (typically fields, but could be a larger area). Sites (fields) may contain buffers and filter strips, etc. The site catalog SITE0810.dat and the site files can be renamed and edited.

SOIL

SOILCOM

SOILCOM.dat

(same as SOIL0810.dat)

Catalog of soil data files

Soils EPIC looks in the soil catalog file SOIL0810.dat (or the catalog named in EPICFILE.dat) for the soil number referenced in EPICRUN.dat and obtains the name of the file containing the soil-specific data. The soil-specific file named filename.sol listed in the catalog file contains data describing the soil profile and the individual horizons. The study may involve several different soils for the farm or watershed analysis and are selected for use in the subarea file. The soil catalog SOIL0810.dat and the soil files can be renamed and edited.

BATCH FILE

PARMFILES

WWHT_PARM_cultivars_2print.txt

?

necessary table: *CZ_PARM0810tab_v0.txt*