User's Guide
SURGE and SURGEPLOT

Rijkswaterstaat
Ministerie van Infrastructuur en Waterstaat

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Surges

Surges are used to compare the actual water levels to the astronomical water levels (i.e. the water levels that would have occurred under wind free conditions). Surge data consist of two parts: the 'surge', which is the difference between the highest (or lowest) water levels in a tidal period, and the 'lag', which is the diffrence between the moments at which these highest (lowest) water levels were reached.

The **surge** application calculates the surge data for the predicted and the observed time series in a simulation, by comparing these time series to those of an astronomical simulation. Typically, the observed time series in an astronomical simulation are obtained from harmonic analysis of measured data. The predictions are obtained from simulation results with no wind in the input.

The **surgeplot** application produces a number of (documented) plots, comparing the surge data of the predicted time series to those of the corresponding observed time series.

Perl script '**surge**'

Surge is started by the runscript '**surge.pl**'. The runscript must be started from the command line. Parameters may be specified on the command line or interactively. The run script pompts the user for missing options. The runscript needs the following parameters:

- **-runid1** : runid of the experiment for which surges are to be computed.
- **-runid2** : runid of the experiment containing astronomical data.
- **-dir1** : The directory in which the mat-files for **runid1** are found.
- **-dir2** : The directory in which the mat-files for **runid2** are found.

The runscript checks if the values of the parameters are valid. The script checks if the constants files associated with '**runid1**' and '**runid2**' exist in the corresponding directories dir1, dir2. If the script can't find a constants file, the script will ask (again) for a directory and runid.

The input files are:

- **dirs**<*i*>**/runid**<*i*>**_constants.mat** - general information about the runs
- **dirs**<*i*>**/runid**<*i*>**_info.mat** - general information about the runs
- **dirs**<*i*>**/runid**<*i*>**_wl_obs.mat** - water level observation files
- **dirs**<*i*>**/runid**<*i*>**_wl_prd.mat** - water level prediction files

The output files are:

- **dirs1/runid1_astro_id.mat** - general information about the astro-run
- **dirs1/runid1_surge_obs.mat** - surge observation files
- **dirs1/runid1_surge_prd.mat** - surge prediction files

Perl script '**surgeplot**'

Surgeplot is started by the script '**surgeplot.pl**'. The runscript must be started from the command line. Parameters may be specified on the command line or interactively. The run script pompts the user for missing options, until an empty **dir**<*i*>/**runid**<*i*>-pair is entered. Empty inputs may be specified on the command line by typing '-'. The runscript needs the following parameters:

- **-title** : the name of the 'book' which is output.

•**-runid**<*i*> : runid of an experiment for which surges are to be plotted.
•**-dir**<*i*> : The directory in which the mat-files for **runid**< *i*> are found.

The runscript checks if the values of the parameters are valid. The script checks if the constants files associated with '**runid**<*i*>' exist in the corresponding directories **dir**<*i*>. If the script can't find a constants file, the script will ask (again) for a directory and runid.

The input files are:
dirs<*i*>**/runid**<*i*>**_constants.mat** - general information about the runs
dirs<*i*>**/runid**<*i*>**_info.mat** - general information about the runs
dirs1/runid1_astro_id.mat - general info about the astro-run
dirs1/runid1_surge_obs.mat - surge observation files
dirs1/runid1_surge_prd.mat - surge prediction files
The output files are:
<*title*>**_page_***xxx***.txt** - pages of a 'book' about the surges in the runs **runid**<*i*>

Example

Assume we have the following SDS-files
SDS-d97
SDS-d97a
SDS-astr
SDS-ensemble

The information in these SDS-files is converted to mat-files by running **basisanalyse**:

```
basisanalyse.pl  -makemat y -sdsfil1 SDS-d97 \
                 -sdsfil2 --baifile default.bai \
                 -matlab n -back n -debug n

basisanalyse.pl  -makemat y -sdsfil1 SDS-d97a \
                 -sdsfil2 --baifile default.bai \
                 -matlab n -back n -debug n

basisanalyse.pl  -makemat y -sdsfil1 SDS-astr\
                 -sdsfil2 --baifile default.bai \
                 -matlab n -back n -debug n
```

The surge-files are created by running the **surge** script:

```
surge.pl     -dir1 d97_matfiles -runid1 d97 \
         -dir2 astr_matfiles -runid2 astr

surge.pl     -dir1 d97a_matfiles -runid1 d97a \
         -dir2 astr_matfiles -runid2 astr
```

A 'book' about the surges, finally, is obtained by running the **surgeplot** script:

```
surgeplot.pl  -title SURGE \
              -dir1 d97_matfiles -runid1 d97 \
              -dir2 d97a_matfiles -runid2 d97a \
              -dir3 - -runid3 –
```

The result is found in the file surge_output.pdf.