

CSHORE Execution

CSHORE is distributed as FORTRAN code located in the `src-repo` directory. Two pre-compiled executables for Windows and Linux, with filenames `cshore_usace_win.out` and `CSHORE_USACE_LINUX.out`, respectively, are also included in the `usace_distribute_bundle/bin/` directory. CSHORE is version reporting is provided at time of execution, with a version date provided as output.

Model execution is completed through either scripting or execution at the command line. A Matlab script example is provided in `usace_distribute_bundle/example_application` as `run_model.m`. Command line execution is accomplished by calling the CSHORE executable from a directory that includes an input file named `infile`. For example, execution from a Windows operating system:

```
Z:\wes\cshore-git>cd usace_distribute_bundle\example_application
```

```
Z:\wes\cshore-git\usace_distribute_bundle\example_application>..\bin\cshore_usace_win.out
CSHORE USACE version, 2014 last edit 2024-03-14
```

```
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CSHORE applied to idealized planar slope
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```

Similarly, execution from a Linux system:

```
$ cd usace_distribute_bundle/example_application/
```

```
$ ../bin/CSHORE_USACE_LINUX.out
```

```
CSHORE USACE version, 2014 last edit 2024-03-14
```

```
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CSHORE applied to idealized planar slope
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```

CSHORE Parameters

The CSHORE family of models has dependencies on the following scalars:

d_{50}	=	median sediment grain size
sg	=	sediment specific gravity
w_f	=	sediment fall velocity
por	=	bed porosity
e_B	=	breaking efficiency
e_f	=	bottom dissipation efficiency
slp	=	suspended load parameter
$slpot$	=	suspended load parameter for over-topping
blp	=	wave-related bed load parameter
f_w	=	wave friction factor
γ	=	ratio of breaking wave height to water depth

Physical Parameters

Some parameters are physical and are prescribed by field measurements or estimation. The median grain size, d_{50} , for instance, is specified according to measured or assumed data. Likewise the sediment fall velocity w_f and porosity por are physical attributes of the model domain. Typical values of these parameters is given:

Parameter	Typical Value	Units
d_{50}	0.20	mm
w_f	0.026	m/s
sg	2.65	
por	0.40	

Table 1: Physical parameters

Empirical and Numerical Parameters

The 1-D CSHORE model formulation includes empirical devices for estimation of nearshore hydrodynamics and sediment transport. Typical values for the parameters is provided along with a range of acceptable values. It should be noted that the breaking model in CSHORE relies on a user-supplied γ , the ratio of wave height to water depth in the saturated breaking region. Strictly speaking, this is not an empirical model parameter, and data from the surf zone is usually available in the laboratory for guidance. In the typical application with field conditions, however, it is not practical to collect surf zone information, and typical values are provided in Table 2.

Parameter	Typical Value	Range
dx	1	0.1 (lab) – 1(field)
γ	0.7	0.5 – 0.9
e_B	0.005	0.001 – 0.01
e_f	0.01	
slp	0.5	0.2 – 0.5
$slpot$	0.1	0.05 – 0.2
$\tan \phi$	0.63	0.63
blp	0.001	0.0005 – 0.002
f_w	0.015	0.005 – 0.03
rwh	0.03	0.01 (lab) – .05(field)

Table 2: Empirical parameters

Input file structure

The CSHORE model developers, over time, have added capabilities and code branches to extend the range of application. The optional processes are included with an array of logical parameters that are given below. It is suggested, at present, to provide the user with a limited set of options to avoid unadvised application before complete scrutiny by the USACE. The following four tables detail the input file structure required by CSHORE.

Parameter	Allowed Values	Meaning and Conditional
ILINE	1	Single transect
IPROFL	0, 1	0=no sediment transport, 1=sediment transport
ISEDAV	0	unlimited sediment availability, Conditional on IPROFL = 1
IPERM	0	neglect permeability
IOVER	1	Allow overtopping and compute runup statistics
IWTRAN	0	No standing water in landward zone, Conditional on IOVER = 1
IPOND	0	No ridge and runnel, Conditional on IOVER = 1
INFILT	0	No infiltration landward of dune crest, Conditional on IOVER = 1 and IWTRAN=0
IWCINT	0	No wave-current interaction
IROLL	0	No roller effect
IWIND	0	No wind effect
ITIDE	0	No pressure effect
IVEG	0	No vegetation effect
DXC	dx	see above
GAMMA	γ	see above
D50 WF SG	$d_{50} w_f sg$	see above, Conditional on IPROFL = 1
EFFB EFFF SLP SLPOT	$e_b e_f slp slpot$	see above, Conditional on IPROFL = 1
TANPHI BLP	$\tan \phi blp$	see above, Conditional on IPROFL = 1
RWH	rwh	See above
ILAB	0	Assume continuous and bounded boundary condition data
NWAVE		Number of wave conditions. Provide $nwave + 1$ conditions for interpolation with ILAB=0
NSURGE		Number of water level conditions. Provide $nsurge + 1$ conditions for interpolation with ILAB=0

time(s)	wave period(s)	root-mean-square wave height(m)	wave setup(m)
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time(s)	water level(m)
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Parameter	Allowed Values	Meaning and Conditional
NPINP		Number of bottom position data points

$x(m)$	$z_b(m)$	f_w
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Sample INFILE For cases of fixed bed, IPROFL=0

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1				->ILINE
0				->IPROFL
0				->IPERM
1				->IOVER
0				->IWTRAN
0				->IPOND
0				->IWCINT
0				->IROLL
0				->IWIND
0				->ITIDE
0				->IVEG
	1.0000			->DXC
	0.8000			->GAMMA
	0.0200			->RWH
0				->ILAB
5				->NWAVE
5				->NSURGE
	0.00	8.0000	2.1000	0.0000
	3600.00	8.0000	2.2000	0.0000
	7200.00	8.0000	2.3000	0.0000
	10800.00	8.0000	2.4000	0.0000
	14400.00	8.0000	2.5000	0.0000
	18000.00	8.0000	2.6000	0.0000
	0.00	0.0000		
	3600.00	0.5000		
	7200.00	0.8660		
	10800.00	1.0000		
	14400.00	0.8660		
	18000.00	0.5000		
301				->NBINP
	0.0000	-8.0000	0.0150	
	1.0000	-8.0000	0.0150	
	2.0000	-8.0000	0.0150	
	3.0000	-8.0000	0.0150	
	4.0000	-8.0000	0.0150	
	5.0000	-8.0000	0.0150	
	.			
	.			

297.0000	7.7600	0.0150
298.0000	7.8400	0.0150
299.0000	7.9200	0.0150
300.0000	8.0000	0.0150

For cases including sediment transport, IPROFL=1

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1				->ILINE
1				->IPROFL
0				->ISEDAV
0				->IPERM
1				->IOVER
0				->IWTRAN
0				->IPOND
0				->INFILT
0				->IWCINT
0				->IROLL
0				->IWIND
0				->ITIDE
0				->IVEG
	1.0000			->DXC
	0.8000			->GAMMA
	0.3000	0.0448	2.6500	->D50 WF SG
	0.0050	0.0100	0.5000	0.1000 ->EFFB EFFF SLP SLPOT
	0.6300	0.0010		->TANPHI BLP
	0.0200			->RWH
0				->ILAB
5				->NWAVE
5				->NSURGE
	0.00	8.0000	2.1000	0.0000
	3600.00	8.0000	2.2000	0.0000
	7200.00	8.0000	2.3000	0.0000
	10800.00	8.0000	2.4000	0.0000
	14400.00	8.0000	2.5000	0.0000
	18000.00	8.0000	2.6000	0.0000
	0.00	0.0000		
	3600.00	0.5000		
	7200.00	0.8660		
	10800.00	1.0000		

14400.00	0.8660		
18000.00	0.5000		
301			->NBINP
0.0000	-8.0000	0.0150	
1.0000	-8.0000	0.0150	
2.0000	-8.0000	0.0150	
3.0000	-8.0000	0.0150	
4.0000	-8.0000	0.0150	
5.0000	-8.0000	0.0150	
.			
.			
.			
297.0000	7.7600	0.0150	
298.0000	7.8400	0.0150	
299.0000	7.9200	0.0150	
300.0000	8.0000	0.0150	