" "

SHUD

2024-08-01

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             ( )
  2.
  3.
  4.
  5.
                 PΙ
  6.
1.2
  1.
                            " " PI
  3.
1.3
  1.
  2.
  3. (
shud.xyz/book_lab/servers
                                                      https://www.
                                           \mathbf{AI}
```

6 CHAPTER 1.

5.

```
1.
2.
3. 4 1
4.

•
-
-
-
-
5.

2.2

1. + PI shulele@lzb.ac.cn
2. 2024 2024 8 15
3. 2024 9 1
4. 30
5.
```

2.3

2.1

 $https://shud.xyz/openfund.docx \\ https://shud.xyz/CV\_template.docx$ 

8 CHAPTER 2.

3.1

```
1.
  2.
  3.
           4
                   1
  4.
  5.
3.2
  1.
                   PI shulele@lzb.ac.cn
                2024 8 15
  2. 2024
  3.\ 2024\ 9\ 1
        30
  4.
  5.
3.3
     \rm https://shud.xyz/openfund.docx
     https://shud.xyz/CV\_template.docx
```

10 CHAPTER 3.

### 4.1

1. 1000 2. 3. 4. 5. 5000

### 4.2

60% 12000 16000 50% 5000 / 20% 2000 100% 5000 40000 12 CHAPTER 4.

### 5.1

1. 2.

3.

1. 2. 3. 4.

### **5.2**

1. 2.

### 5.3

1. 2. 3.

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 ${\rm SHUD}$ • R • D 6.1 PΙ 6.2 6.2.16.2.1.1 R1. Rum River Rum River 4000 1. 1979-2023 NLDAS SHUD Rum River 2. 3. Rum River LSTM GraphNET

16 CHAPTER 6.

```
1.
 2. NWIS
 3. ( )
 1.
 2. R
 3.
 4.
6.2.1.2 R2.
  SHUD
 1. SHUD
 2.
 3.
 4.
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\operatorname{SHUD}
 1.
 2. SHUD
 3.
 4.
 1. SHUD
 2.
 1. R Python
 C/C++ debug
6.2.1.4 R4. -
SHUD
 1. SHUD 2. 3.
 1. SHUD
```

2.

6.2.

3.

### 6.2.1.5 R5. SHUD

"

1. SHUD

2. SHUD

3.

4.

1.

2.

3. 4.

1. R Python

2. C/C++ debug

3.

4.

### 6.2.1.6 R6. SHUD

2. AutoSHUD SHUD

3.

4. SHUD

1.

2.

1.

2. R

3.

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Tikal

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```
700-1200 Tikal
  1.
  2.
  3.
  1.
  2.
  1.
  2.
  3.
6.2.1.8 R8. SHUD
  1.
  2.
         (mesh independence)?
6.2.1.9 R9.
6.2.1.10 R10.
                 GOF
    (GOF goodness of fitting)
                                           GOF
  1.
      R Python
6.2.1.11 R11.
  1.
6.2.1.12 R12.
                  ParFlow, PIHM/SHUD, OpenGeoSphere, HydroGeo-
Sphere, imHM, tRIBS, MIKE-SHE, CATHY, PAWS
```

6.2.

#### 6.2.1.13 R13. SHUD

AutoSHUD SHUD

100 500 1000 SHUD

#### 6.2.2

SHUD

#### **6.2.2.1** D1. SHUD NetCDF

NetCDF

 ${\bf SHUD} \qquad {\bf NetCDF}$ 

1. NetCDF 文件 2. SHUD 输入文件 **NLDAS** CMFD **GLDAS** .sp.mesh .sp.att ERA5 **FLDAS** CN05.1 .tsd.forc .csv ... ... 3. NetCDF预处理(R, Python) 空间匹配 读取时间序列 5.SHUD模型 NetCDF格点 时间一致性 变量列表 SHUD三角单元 时间戳 单位换算 Centroid

SHUD

Figure 6.1: NetCDF\_module.003

模拟结果

- 1. C/C++
- 2. NetCDF
- 3. GIS

#### 6.2.2.2 D2.

https://nwm.ac.cn

4. ASCII 格式时间序列数据

CHAPTER 6.

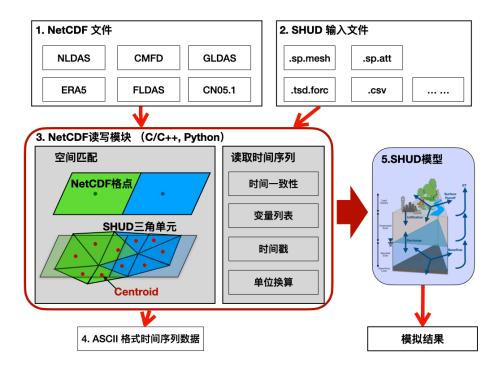


Figure 6.2:  $NetCDF\_module.002$ 

6.2.

```
1.
       Shapefile
  2.
  3.
        \operatorname{SHUD}
  4.
  1. GIS
  2.
* GIS
6.2.2.3 D2.
GHDC(https://ghdc.ac.cn)
                                               SHUD
                                                                             SWAT,
TOPMODEL,
  1. Python, R
  2.
6.2.2.4 D3.
                  API
GHDC(https://ghdc.ac.cn)
GHDC
         API
                  \operatorname{API}
  1. Python
  2. R
  3.
6.2.2.5 D4.
                CMA-ES
  R doParall doMC
                                       {\rm R~doMC}
                         R Python
  1.
  2. R Python
6.2.2.6 D5.
                SHUD OpenMP
 SHUD
          OpenMP
                        shud-omp
                                              shud shud-omp
                                                                              shud-
omp
```

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1. 2. C/C++

```
SHUD https://www.shud.xyz/book_lab/, PDF, ePub.
R https://www.shud.xyz/bookr/ R R R
SHUD https://www.shud.xyz/Book_CN/
SHUD https://shudapp.netlify.app
SHUD https://github.com/SHUD-System/SHUD
(GHDC) https://ghdc.ac.cn/ https://www.shud.xyz/ghdc_cn/ Bilibili Bilibili " (GHDC)"
(NWM) https://nwm.ac.cn
```

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