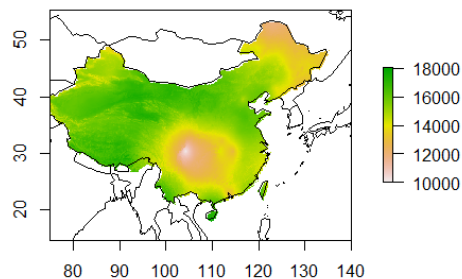5.1

5.1.1

首先批量加载 tif 文件，由于太阳辐射、降水和风速都有 12 个 tif 文件，因此需要将其整合为一个。太阳辐射和风速需要计算 12 个月的平均值，降水则是计算 12 个月的总和。

将 12 个 tif 文件累加到中间变量 b 上，再对 b 求均值（对于降水，b 就是 12 个月的总和）
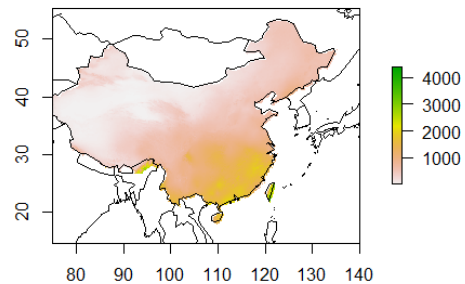
5.1.2

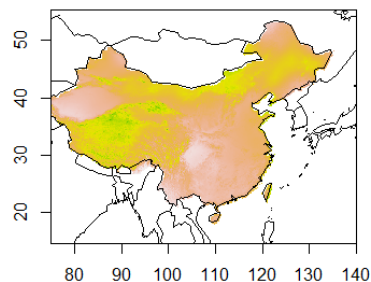首先加载中国地图（.shp 文件），用 China_map 直接对太阳辐射、降水和风速使用 crop 命令效果不佳，因此先用 crop 命令大致选择中国的范围，再通过 mask 命令获得较为精确的"中国的太阳辐射、降水和风速"

5.1.3

设置风力发电机的阈值风速为 3m/s，找到年平均风速的栅格文件中风速小于 3 的栅格，将其赋值为 NA，再绘图即可。

5.1.4

光伏发电站的条件为年降雨量小于 400ml，太阳辐射大于 16000kJ/m^2/day，筛选不符合

条件的这些栅格，将其赋值为 NA，再绘图即可。

Possible sites for photovoltaics farms in China

5.2

5.2.1

```
[ese-huzp@login03 ~]$ cd ~
[ese-huzp@login03 ~]$ pwd
/work/ese-huzp
```

```
[ese-huzp@login03 ~]$ ln -s data_demo data_demo_link
[ese-huzp@login03 ~]$ ls
billing_report  data_demo  data_demo_link  exam
```

5.2.2

```
[ese-huzp@login03 ~]$ cd data_demo/data/
[ese-huzp@login03 data]$ pwd
/work/ese-huzp/data_demo/data
```

```
[ese-huzp@login03 data]$ touch planets.txt_lst
[ese-huzp@login03 data]$ ls
amino-acids.txt  animals.txt  morse.txt  planets.txt      salmon.txt
animal-counts    elements     pdb        planets.txt_lst  sunspot.txt
```
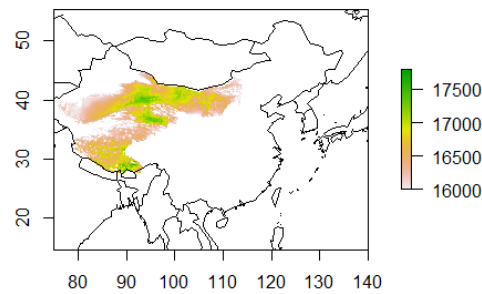
5.2.3

```
[ese-huzp@login03 data]$ echo ~
/work/ese-huzp
```

5.2.4

```
[ese-huzp@login03 data]$ find pdb | wc -l
49
```

5.2.5

```
[ese-huzp@login03 data]$ grep -c C pdb/tnt.pdb
9
```

```
 1 COMPND      2,4,6-TRINITROTOLUENE
 2 AUTHOR      DAVE WOODCOCK  96 07 05
 3 ATOM     1  C        1      1.183   -0.757   -0.174   1.00   0.00
 4 ATOM     2  C        1      1.212    0.643   -0.175   1.00   0.00
 5 ATOM     3  C        1      0.015    1.368   -0.204   1.00   0.00
 6 ATOM     4  C        1     -1.211    0.693   -0.232   1.00   0.00
 7 ATOM     5  C        1     -1.240   -0.706   -0.231   1.00   0.00
 8 ATOM     6  C        1     -0.043   -1.431   -0.201   1.00   0.00
 9 ATOM     7  N        1     -0.071   -2.771   -0.200   1.00   0.00
10 ATOM     8  O        1      1.126   -3.496   -0.171   1.00   0.00
11 ATOM     9  O        1     -1.297   -3.446   -0.228   1.00   0.00
12 ATOM    10  N        1      2.386    1.289   -0.148   1.00   0.00
13 ATOM    11  O        1      2.415    2.689   -0.150   1.00   0.00
14 ATOM    12  O        1      3.583    0.564   -0.119   1.00   0.00
15 ATOM    13  N        1     -2.357    1.387   -0.260   1.00   0.00
16 ATOM    14  O        1     -3.583    0.713   -0.288   1.00   0.00
17 ATOM    15  O        1     -2.328    2.787   -0.262   1.00   0.00
18 ATOM    16  C        1      0.047    2.894   -0.206   1.00   0.00
19 ATOM    17  H        1      2.107   -1.316   -0.150   1.00   0.00
20 ATOM    18  H        1     -2.187   -1.227   -0.252   1.00   0.00
21 ATOM    19  H        1      0.995    3.237   -0.619   1.00   0.00
22 ATOM    20  H        1     -0.059    3.260    0.816   1.00   0.00
23 ATOM    21  H        1     -0.773    3.273   -0.816   1.00   0.00
24 TER     22           1
25 END
26
```

但是可以发现，有两个 C 属于第二行

5.2.6

```
[ese-huzp@login03 data]$ diff pdb/ethane.pdb pdb/ethanol.pdb
1,11c1,12
< COMPND      ETHANE
< AUTHOR      DAVE WOODCOCK  95 12 18
< ATOM     1  C        1     -0.752    0.001   -0.141   1.00   0.00
< ATOM     2  C        1      0.752   -0.001    0.141   1.00   0.00
< ATOM     3  H        1     -1.158    0.991    0.070   1.00   0.00
< ATOM     4  H        1     -1.240   -0.737    0.496   1.00   0.00
< ATOM     5  H        1     -0.924   -0.249   -1.188   1.00   0.00
< ATOM     6  H        1      1.158   -0.991   -0.070   1.00   0.00
< ATOM     7  H        1      0.924    0.249    1.188   1.00   0.00
< ATOM     8  H        1      1.240    0.737   -0.496   1.00   0.00
< TER      9           1
---
> COMPND      ETHANOL
> AUTHOR      DAVE WOODCOCK  96 01 03
> ATOM     1  C        1     -0.426   -0.115   -0.147   1.00   0.00
> ATOM     2  O        1     -0.599    1.244   -0.481   1.00   0.00
> ATOM     3  H        1     -0.750   -0.738   -0.981   1.00   0.00
> ATOM     4  H        1     -1.022   -0.351    0.735   1.00   0.00
> ATOM     5  H        1     -1.642    1.434   -0.689   1.00   0.00
> ATOM     6  C        1      1.047   -0.383    0.147   1.00   0.00
> ATOM     7  H        1      1.370    0.240    0.981   1.00   0.00
> ATOM     8  H        1      1.642   -0.147   -0.735   1.00   0.00
> ATOM     9  H        1      1.180   -1.434    0.405   1.00   0.00
> TER     10           1
```

5.2.7

```
[ese-huzp@login03 ~]$ cd ~
[ese-huzp@login03 ~]$ du -s data_demo
4190     data_demo
```

5.2.8

```
[ese-huzp@login03 ~]$ cp -r data_demo data_demo_new
```

```
[ese-huzp@login03 ~]$ zip -r data_demo_new.zip data_demo_new
  adding: data_demo_new/ (stored 0%)
  adding: data_demo_new/molecules/ (stored 0%)
  adding: data_demo_new/molecules/methane.pdb (deflated 66%)
  adding: data_demo_new/molecules/pentane.pdb (deflated 74%)
  adding: data_demo_new/molecules/cubane.pdb (deflated 73%)
  adding: data_demo_new/molecules/ethane.pdb (deflated 70%)
```

```
  adding: data_demo_new/data/salmon.txt (deflated 51%)
  adding: data_demo_new/data/animals.txt (deflated 57%)
  adding: data_demo_new/data/sunspot.txt (deflated 83%)
  adding: data_demo_new/data/animal-counts/ (stored 0%)
  adding: data_demo_new/data/animal-counts/animals.txt (deflated 52%)
  adding: data_demo_new/data/planets.txt (deflated 67%)
  adding: data_demo_new/.bash_profile (deflated 31%)
[ese-huzp@login03 ~]$ ls
billing_report  data_demo  data_demo_link  data_demo_new  data_demo_new.zip  exam
```

```
[ese-huzp@login03 ~]$ rm data_demo_new
[ese-huzp@login03 ~]$ unzip data_demo_new.zip
Archive:  data_demo_new.zip
   creating: data_demo_new/
   creating: data_demo_new/molecules/
  inflating: data_demo_new/molecules/methane.pdb
  inflating: data_demo_new/molecules/pentane.pdb
  inflating: data_demo_new/molecules/cubane.pdb
  inflating: data_demo_new/molecules/ethane.pdb
  inflating: data_demo_new/molecules/propane.pdb
```

```
  inflating: data_demo_new/data/animal-counts/animals.txt
  inflating: data_demo_new/data/planets.txt
  inflating: data_demo_new/.bash_profile
[ese-huzp@login03 ~]$ ls
billing_report  data_demo  data_demo_link  data_demo_new  data_demo_new.zip  exam
```

5.2.9

```
[ese-huzp@login03 ~]$ ll
total 643
drwxr-xr-x 2 root     root       4096 Sep 26 15:19 billing_report
drwxr-xr-x 8 ese-huzp ese-ouycc  4096 Nov 24 20:01 data_demo
lrwxrwxrwx 1 ese-huzp ese-ouycc     9 Nov 30 08:50 data_demo_link -> data_demo
drwxr-xr-x 8 ese-huzp ese-ouycc  4096 Nov 30 09:36 data_demo_new
-rw-r--r-- 1 ese-huzp ese-ouycc 581974 Nov 30 09:38 data_demo_new.zip
drwxr-xr-x 2 ese-huzp ese-ouycc  4096 Sep 12 11:04 exam
[ese-huzp@login03 ~]$ chmod -R 750 data_demo_new
[ese-huzp@login03 ~]$ ll
total 643
drwxr-xr-x 2 root     root       4096 Sep 26 15:19 billing_report
drwxr-xr-x 8 ese-huzp ese-ouycc  4096 Nov 24 20:01 data_demo
lrwxrwxrwx 1 ese-huzp ese-ouycc     9 Nov 30 08:50 data_demo_link -> data_demo
drwxr-x--- 8 ese-huzp ese-ouycc  4096 Nov 30 09:36 data_demo_new
-rw-r--r-- 1 ese-huzp ese-ouycc 581974 Nov 30 09:38 data_demo_new.zip
drwxr-xr-x 2 ese-huzp ese-ouycc  4096 Sep 12 11:04 exam
```

5.2.10

```
[ese-huzp@login03 ~]$ history 10
  127  chmod -R 750 test
  128  ll
  129  module load R
  130  R
  131  cd ~
  132  ls
  133  ll
  134  chmod -R 750 data_demo_new
  135  ll
  136  history 10
```

我在做完 2.8 之后断网了一段时间，因此历史命令最上面几行应该是很久之前的一些命令。

```
    inflating: data_demo_new/data/elements/Os.xml
    inflating: data_demo_new/data/elements/Gd.xml
    inflating: data_demo_new/data/elements/Tb.xml
    inflating: data_demo_new/data/elements/O.xml
    inflating: data_demo_new/data/elements/Am.xml
    inflating: data_demo_new/data/elements/Ra.xml
    inflating: data_demo_new/data/elements/Es.xml
    inflating: data_demo_new/data/elements/Mo.xml
    inflating: data_demo_new/data/elements/V.xml
    inflating: data_demo_new/data/elements/Cr.xml
    inflating: data_demo_new/data/elements/Rn.xml
    inflating: data_demo_new/data/elements/Ge.xml
    inflating: data_demo_new/data/elements/Co.xml
    inflating: data_demo_new/data/elements/Tc.xml
    inflating: data_demo_new/data/elements/Pm.xml
    inflating: data_demo_new/data/elements/Rb.xml
    inflating: data_demo_new/data/elements/C.xml
    inflating: data_demo_new/data/elements/Yb.xml
    inflating: data_demo_new/data/elements/Zn.xml
    inflating: data_demo_new/data/elements/Cs.xml
    inflating: data_demo_new/data/elements/Fm.xml
    inflating: data_demo_new/data/elements/Ni.xml
    inflating: data_demo_new/data/elements/Ar.xml
    inflating: data_demo_new/data/salmon.txt
    inflating: data_demo_new/data/animals.txt
    inflating: data_demo_new/data/sunspot.txt
     creating: data_demo_new/data/animal-counts/
    inflating: data_demo_new/data/animal-counts/animals.txt
    inflating: data_demo_new/data/planets.txt
    inflating: data_demo_new/.bash_profile
[ese-huzp@login03 ~]$ ls
billing_report  data_demo  data_demo_link  data_demo_new  data_demo_new.zip  exam
[ese-huzp@login03 ~]$
Network error: Software caused connection abort
_____

Session stopped
    - Press <return> to exit tab
    - Press R to restart session
    - Press S to save terminal output to file
```

```
Support Team Email: hpc@sustech.edu.cn
Support Team Phone: 0755-88015834, 15986647786, 15818796162

Attention:
1. Please do not run jobs that keep generating numerous small files for a long time  befo
 cause a high pressure to the storage system and slow down everyone.
2. Please do not run large memory jobs on the login node, because it will slow down every
3. Please do not use MPICH in job, because it may cause a high pressure to the storage sy

Warning: violation of the above rules may result in job termination and account blocking
[ese-huzp@login03 ~]$ cd ~
[ese-huzp@login03 ~]$ ls
billing_report  data_demo  data_demo_link  data_demo_new  data_demo_new.zip  exam
[ese-huzp@login03 ~]$ ll
total 643
drwxr-xr-x 2 root     root     4096 Sep 26 15:19 billing_report
drwxr-xr-x 8 ese-huzp ese-ouycc 4096 Nov 24 20:01 data_demo
lrwxrwxrwx 1 ese-huzp ese-ouycc    9 Nov 30 08:50 data_demo_link -> data_demo
drwxr-xr-x 8 ese-huzp ese-ouycc 4096 Nov 30 09:36 data_demo_new
-rw-r--r-- 1 ese-huzp ese-ouycc 581974 Nov 30 09:38 data_demo_new.zip
drwxr-xr-x 2 ese-huzp ese-ouycc 4096 Sep 12 11:04 exam
[ese-huzp@login03 ~]$ chmod -R 750 data_demo_new
[ese-huzp@login03 ~]$ ll
total 643
drwxr-xr-x 2 root     root     4096 Sep 26 15:19 billing_report
drwxr-xr-x 8 ese-huzp ese-ouycc 4096 Nov 24 20:01 data_demo
lrwxrwxrwx 1 ese-huzp ese-ouycc    9 Nov 30 08:50 data_demo_link -> data_demo
drwxr-x--- 8 ese-huzp ese-ouycc 4096 Nov 30 09:36 data_demo_new
-rw-r--r-- 1 ese-huzp ese-ouycc 581974 Nov 30 09:38 data_demo_new.zip
drwxr-xr-x 2 ese-huzp ese-ouycc 4096 Sep 12 11:04 exam
[ese-huzp@login03 ~]$ history 10
  127  chmod -R 750 test
  128  ll
  129  module load R
  130  R
  131  cd ~
  132  ls
  133  ll
  134  chmod -R 750 data_demo_new
  135  ll
  136  history 10
[ese-huzp@login03 ~]$
```