



GEE遥感训练营出品



Google Earth Engine教学

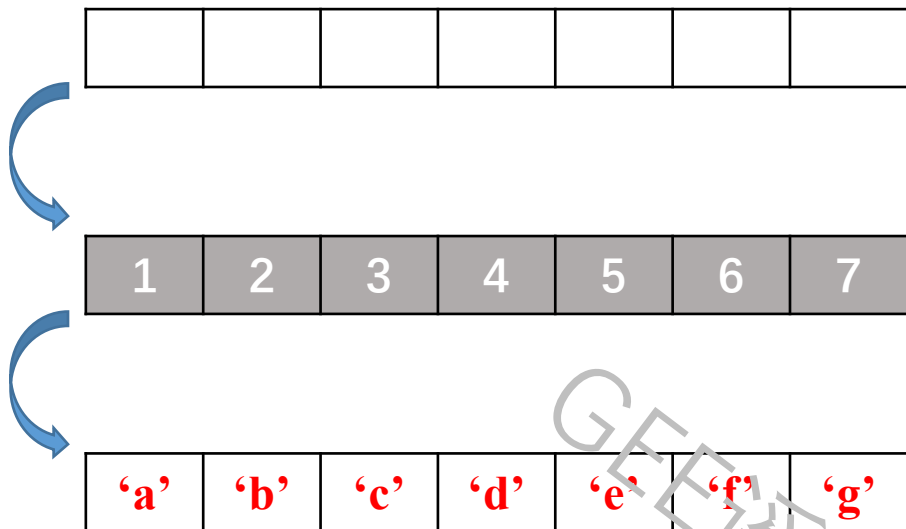
基本概念III

Day 3

基本内容

- ✓ **List**
- ✓ **Array**
- ✓ **Reduce**

List



顺序结构

```
var tmpList = ee.List([1,2,3,4,5]);
print("tmpList:", tmpList);

var tmpList2 = ee.List.sequence(1,10);
print("tmpList2:", tmpList2);

var tmpList3 = tmpList.cat(tmpList2);
print(tmpList3);

var clientList = [];
for(var i = 0; i < 8; i++) {
  clientList.push(i + 1);
}
print(clientList);

var serverList = ee.List.sequence(0, 7);
serverList = serverList.map(function(n) {
  return ee.Number(n).add(1);
});
print(serverList);
```

List—函数 举例

cat

Concatenates the contents of other onto list.

size

Returns the number of elements in list.

sequence

Generate a sequence of numbers from start to end (inclusive) in increments of step, or in count equally-spaced increments. If end is not specified it is computed from $\text{start} + \text{step} * \text{count}$, so at least one of end or count must be specified.

get

Returns the element at the specified position in list. A negative index counts backwards from the end of the list.

<https://code.earthengine.google.com/351837496f6c8959679c283c07f74138>

List—map和for功能

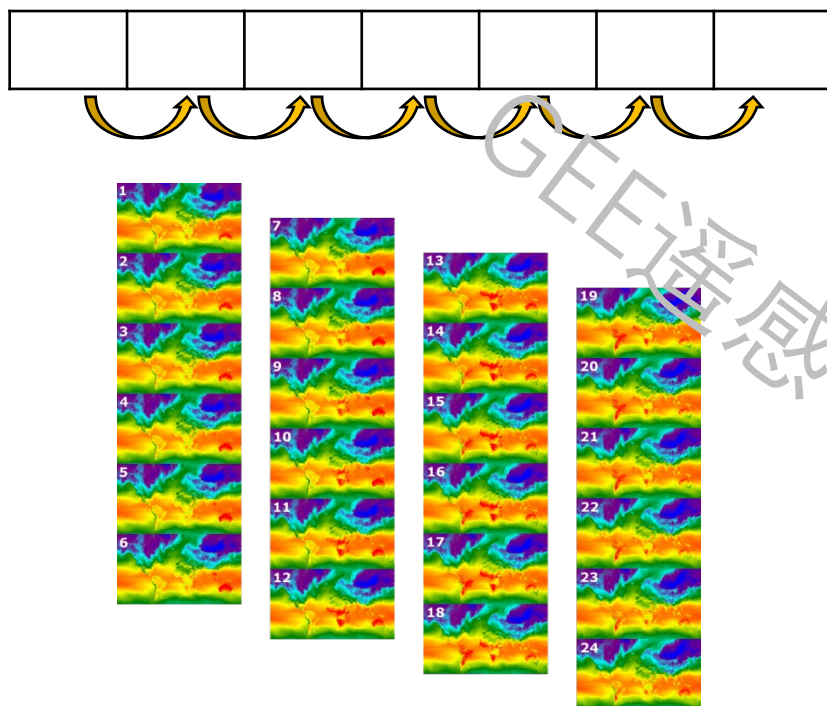
To apply a function to **every element** in a List use List.map(). The only argument to map() is **a function** which **takes one parameter**



<https://code.earthengine.google.com/21cf01e0df63f68c04a2e536620268da>

List—iterate函数

- Although map() applies a function to every image in a collection, the function visits every image in the collection **independently**.



Iterate用法

```
function iterateSome (element, first){  
  函数体  
}  
List.iterate(iterateSome, first)
```

已知: List为[1,5,10,20,25,30],

求解: 累加和、相邻元素之和

输出: 累计和—[1,6,16,36,61,91]

相邻和—[1,6,15,30,45,55]

<https://code.earthengine.google.com/856cfff29997c769773655fb48733978>

□ 结合map和List等就可以完成很多有趣的实验了

➤ 实现若干年份最少云量影像的建立

<https://code.earthengine.google.com/fe3e994f34566d2b1afa91e88196cece>

➤ 月合成影像

<https://code.earthengine.google.com/c60499b4dbe5b53bcb66e3e3c1ab7407>

for, iterate和map的比较

➤ 如何更高效地使用各类方法实现自己的目的

<https://code.earthengine.google.com/afc3d15ad9ce61906140c0786d055b41>

for 用时

```
► ImageCollection (8 elements)  
imgMonth_for
```

```
running time for for-loop:  
The processing time is :  
0.116
```

map 用时

```
► ImageCollection (8 elements)  
imgMonth_map
```

```
running time for map function:  
The processing time is :  
0.036
```

iterate 用时

```
► ImageCollection (8 elements)  
imgMonth_iterate
```

```
running time for for-loop:  
The processing time is :  
0.037
```


Array

- The dimension of an array refers to the number of axes along which the underlying data varies. For example, 0-D arrays are scalar numbers, 1-D arrays are vectors, 2-D arrays are matrices, 3-D arrays are cubes, and >3-D arrays are hyper-cubes.

Number

100

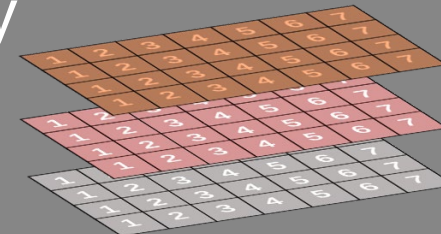
List

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Array

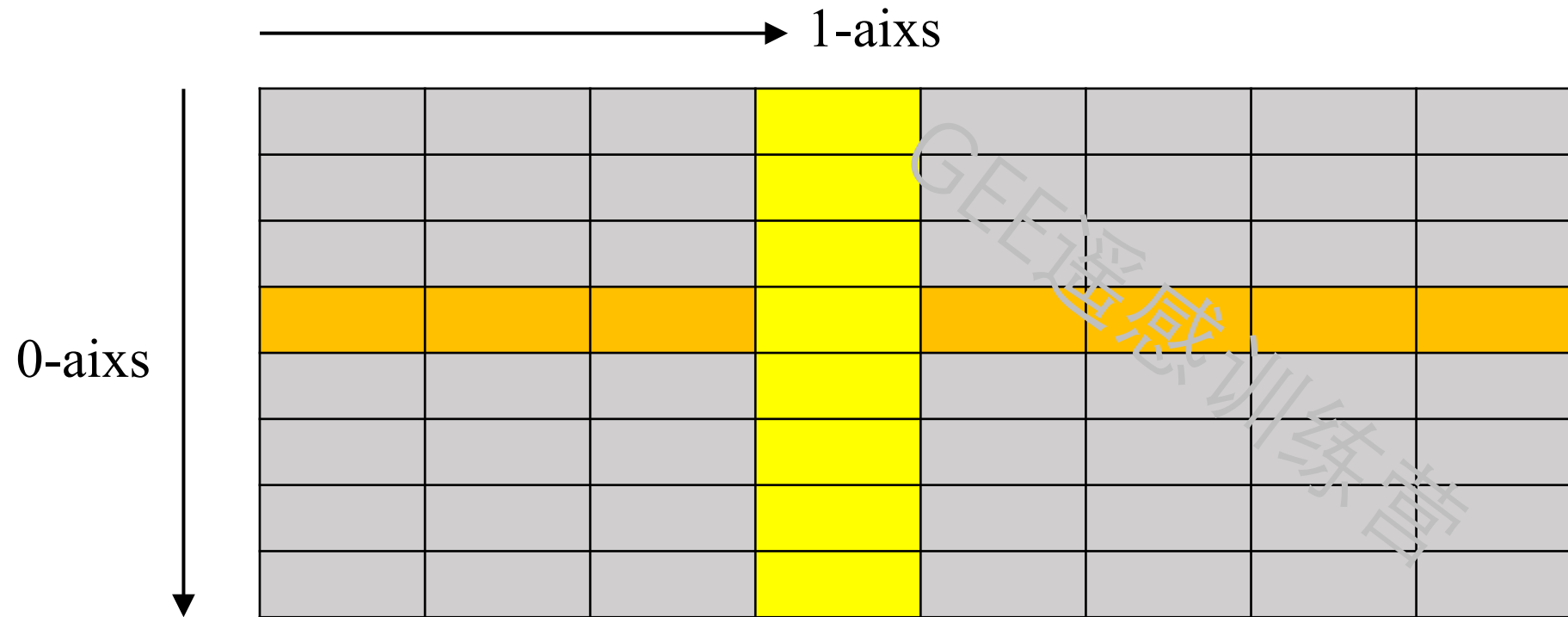
1	2	3	4	5	6	7
1	2	3	4	5	6	7

MultiArray



Array

- The dimension of an array refers to the number of axes along which the underlying data varies. For example, 0-D arrays are scalar numbers, 1-D arrays are vectors, 2-D arrays are matrices, 3-D arrays are cubes, and >3-D arrays are hyper-cubes.



Array—函数举例

get

Extracts the value at the given position from the input array.

length

Returns a 1-D EEARray containing the length of each dimension of the given EEARray

cat

Concatenates multiple arrays into a single array **along the given axis**. Each array must have the same dimensionality and the same length on all axes except the concatenation axis.

.cat(arrays, axis)

slice

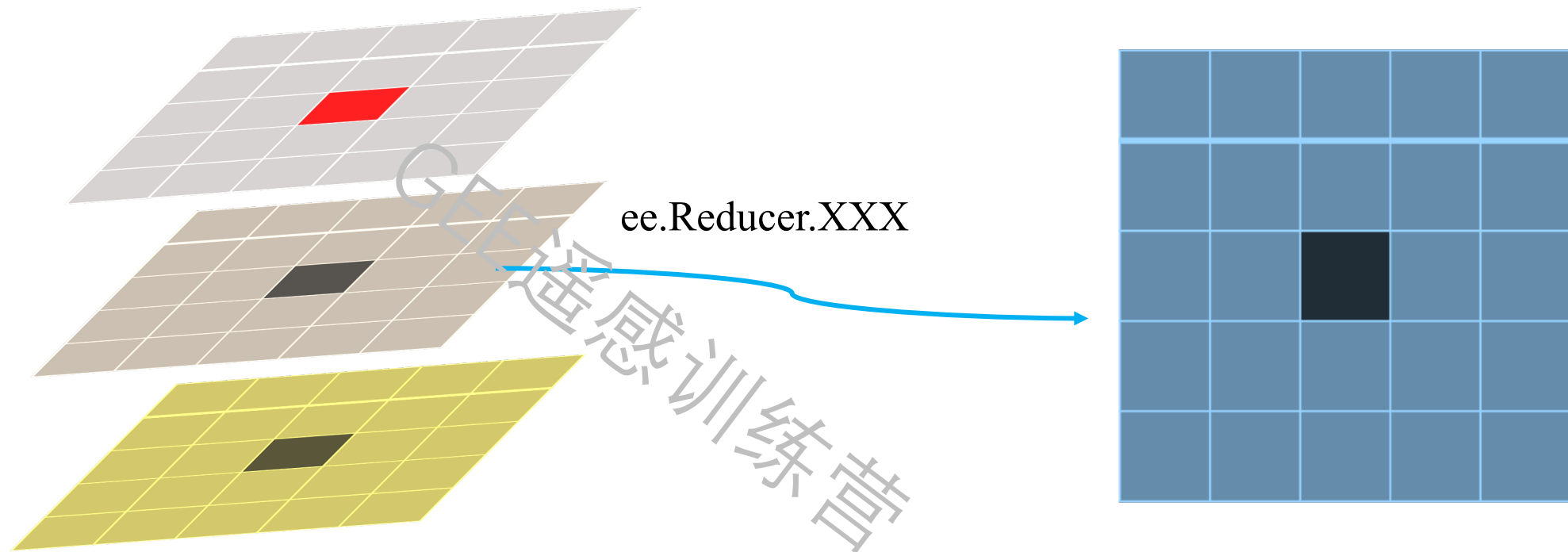
Creates a **subarray** by **slicing out each position along the given axis** from the 'start' (inclusive) to 'end' (exclusive) by increments of 'step'.

.slice(axis, start, end, step)

<https://code.earthengine.google.com/e99e5d9718d17bdcd08b81dcbfb950ce>

Reduce

Reducers are the way to aggregate data over time, space, bands, arrays and other data structures in Earth Engine. The `ee.Reducer` class specifies how data is aggregated. The reducers in this class can specify a simple statistic to use for the aggregation (e.g. minimum, maximum, mean, median, standard deviation, etc.), or a more complex summary of the input data (e.g. histogram, linear regression, list)



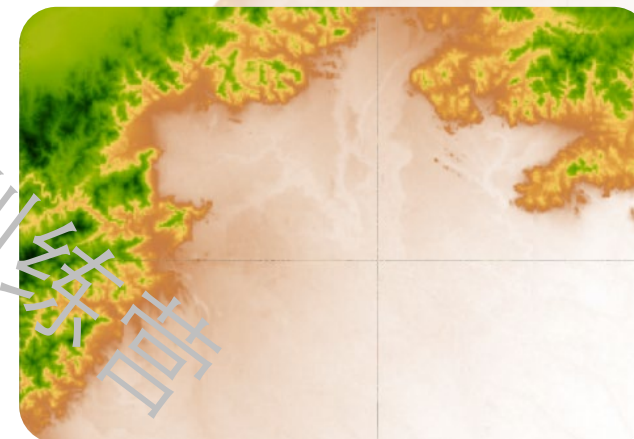
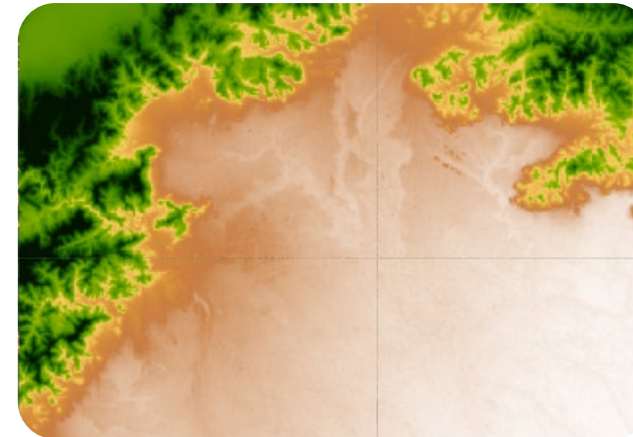
Image之归一化

unitScale

Scales the input so that the range of input values [low, high] becomes [0, 1]. Values outside the range are NOT clamped. This algorithm always produces floating point pixels.

where

For each pixel in each band of 'input', if the corresponding pixel in 'test' is nonzero, output the corresponding pixel in value, otherwise output the input pixel.



<https://code.earthengine.google.com/87108ce069098ac6b333ea9cc194edb6>



Thanks for your attention

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