GEE遥感训练营出品

Google Earth Engine

Google Earth Engine教学

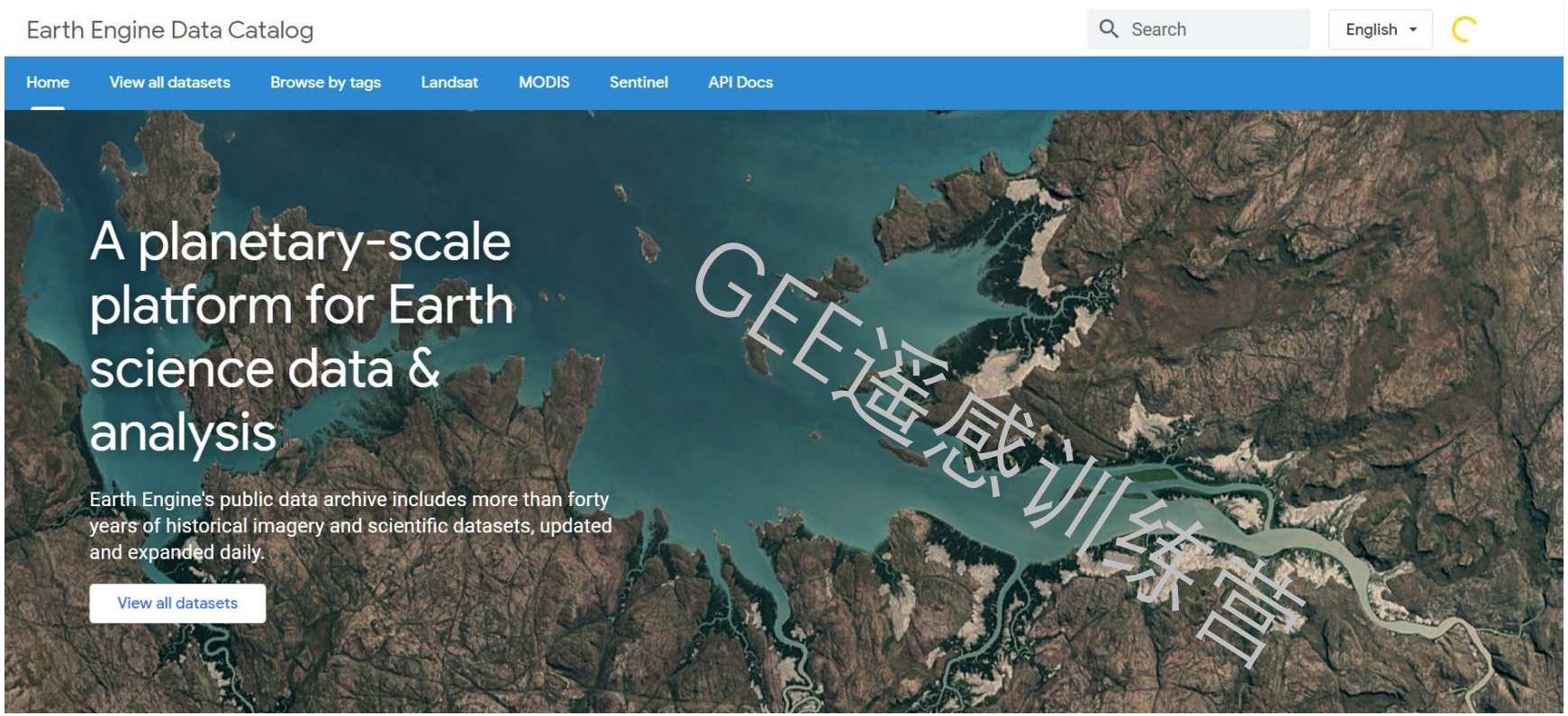
常用影像数据集、云去除和导出（下载）

Day 4

基本内容

- ✓常用ImageCollection
- ✓云去除
- ✓影像下载
- ✓注意事项

ImageCollection



- **Landsat**
- **Sentinel-2**
- **Sentinel-1**
- **MODIS**
- **Cropland Datasets**

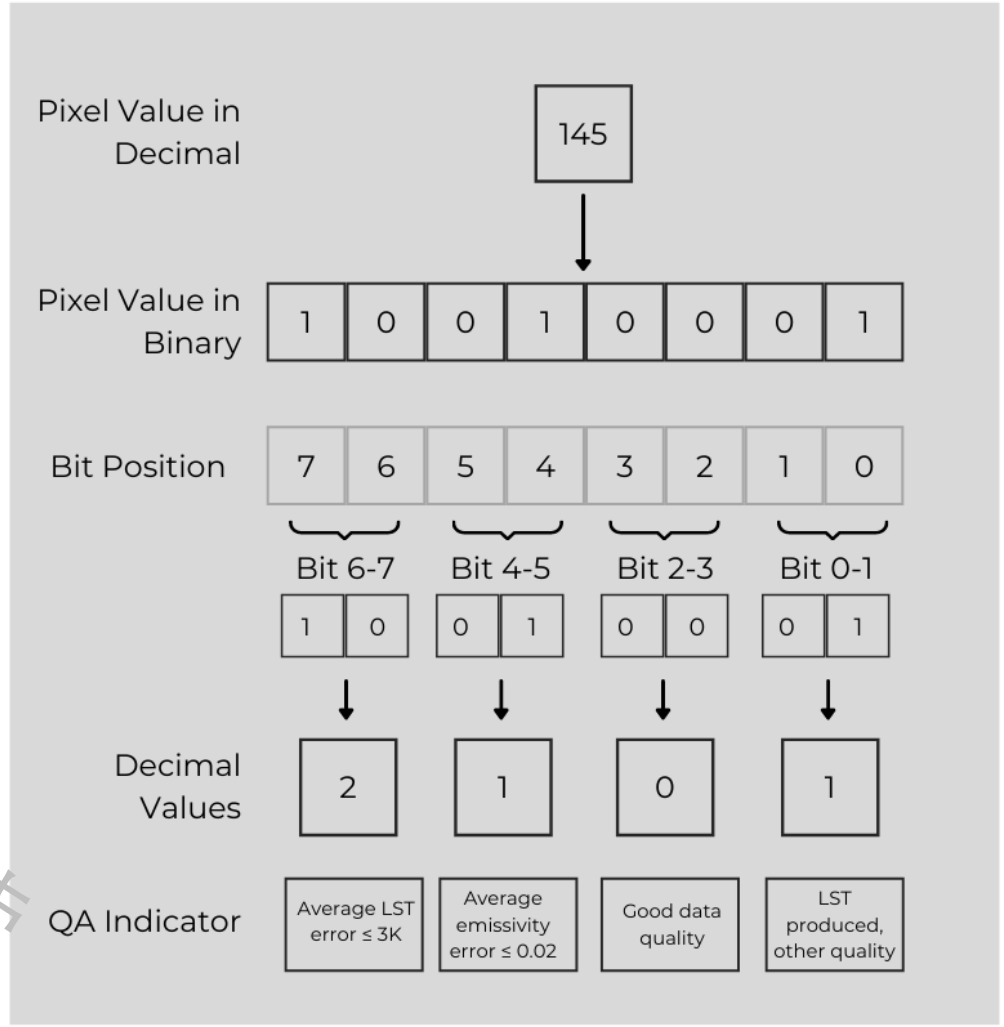
https://developers.google.com/earth-engine/datasets

Bit 位操作

LST_Day_1km	Kelvin	7500	65535	0.02	Daytime Land Surface Temperature
QC_Day					Daytime LST Quality Indicators

Bitmask for QC_Day

- Bits 0-1: Mandatory QA flags
  - 0: LST produced, good quality, not necessary to examine more detailed QA
  - 1: LST produced, other quality, recommend examination of more detailed QA
  - 2: LST not produced due to cloud effects
  - 3: LST not produced primarily due to reasons other than cloud
- Bits 2-3: Data quality flag
  - 0: Good data quality
  - 1: Other quality data
  - 2: TBD
  - 3: TBD
- Bits 4-5: Emissivity error flag
  - 0: Average emissivity error ≤ 0.01
  - 1: Average emissivity error ≤ 0.02
  - 2: Average emissivity error ≤ 0.04
  - 3: Average emissivity error > 0.04
- Bits 6-7: LST error flag
  - 0: Average LST error ≤ 1K
  - 1: Average LST error ≤ 2K
  - 2: Average LST error ≤ 3K
  - 3: Average LST error > 3K



常用数据集及云去除

- Landsat-去云

https://code.earthengine.google.com/bdcfb3fdbb4eed8d6ab34194a23e822c
https://code.earthengine.google.com/c683923fa92993fa675427321cd73c73

- Sentinel-2去云

https://code.earthengine.google.com/9e8cb85b759ba63dafe9b8b075210bb2

- MODIS去云

https://code.earthengine.google.com/23dee68d9e9194ec3fcf743d4c62952e
https://code.earthengine.google.co.in/5e7140525070ff4b392d20609194cd2c

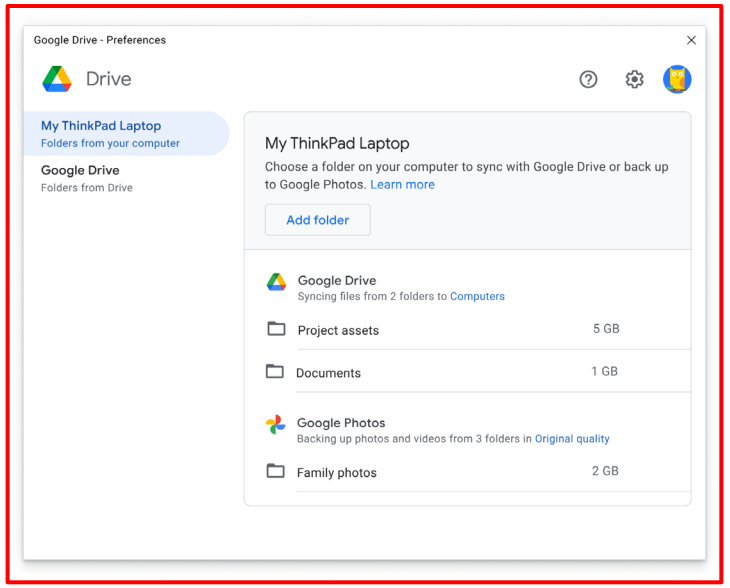
- Sentinel-1

注意MODIS影像数据的使用与Landsat和Sentinel的使用有些不同

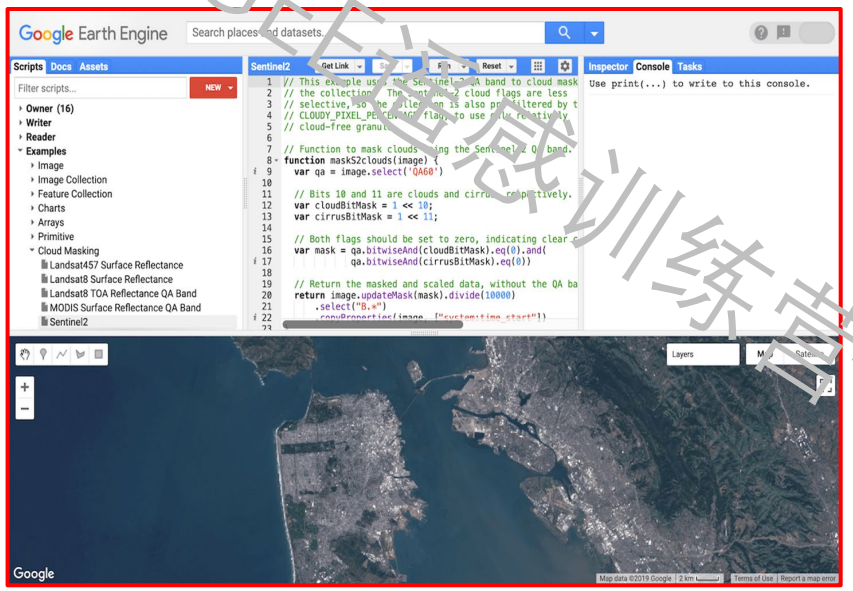
Where to export

You can export images, map tiles, tables and video from Earth Engine. The exports can be sent to your **Google Drive** account, to **Google Cloud Storage** or to a new **Earth Engine asset**.

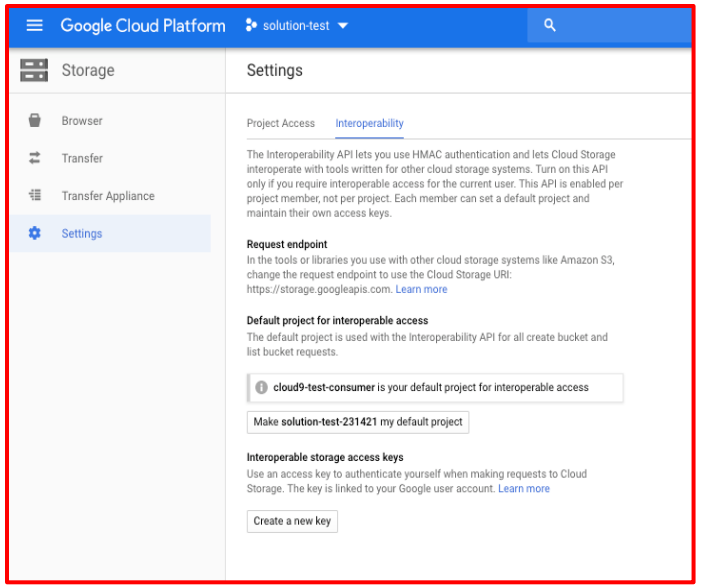
- **Driver**



- **Asset**



- **Cloud Storage**



Export Single Image

- **To Driver**

Export.image.toDrive()

```
// Export the image, specifying scale and region.
Export.image.toDrive({
  image: landsat,
  description: 'imageToDriveExample',
  scale: 30,
  region: geometry
});
```

- **To Asset**

Export.image.toAsset()

```
// Export the image to an Earth Engine asset.
Export.image.toAsset({
  image: band4,
  description: 'imageToAssetExample',
  assetId: 'exampleExport',
  scale: 30,
  region: geometry,
});
```

- **To Cloud Storage**

Export.image.toCloudStorage()

```
// Export the image to Cloud Storage.
Export.image.toCloudStorage({
  image: landsat,
  description: 'imageToCloudExample',
  bucket: 'your-bucket-name',
  fileNamePrefix: 'exampleExport',
  scale: 30,
  region: geometry
});
```

Note: 参数为**字典类型**

Export Single Image

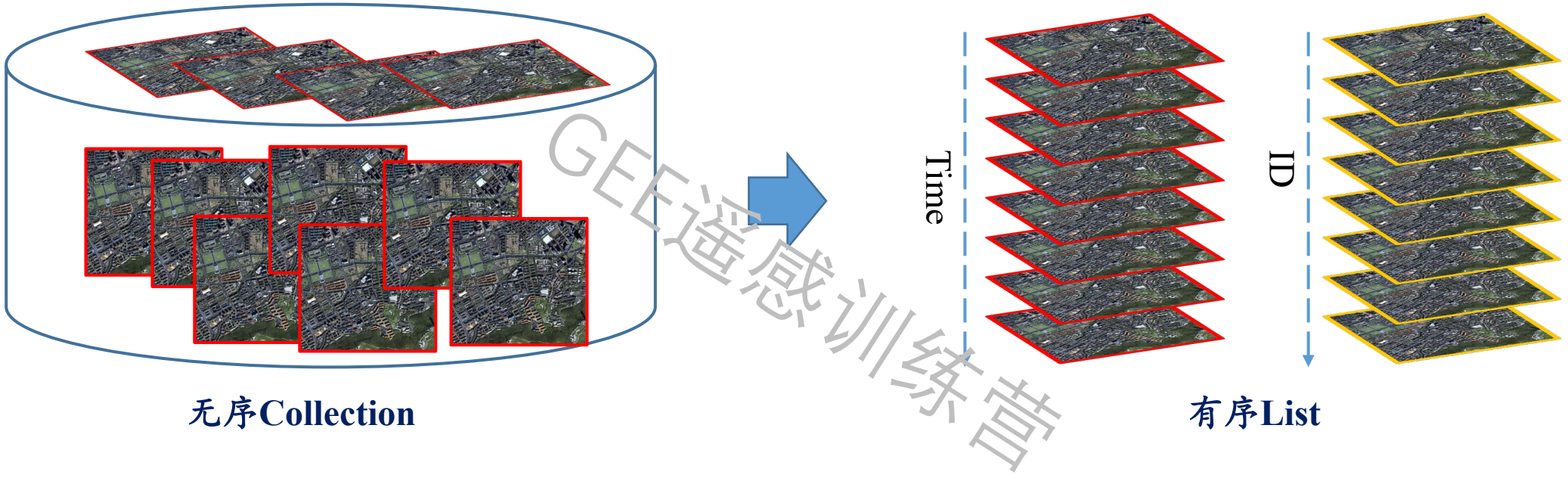
- 检索得到影像
- 确定导出波段
- 确定导出范围
- 确定导出位置
- 确定导出尺度

```
Export.image.toAsset({
  image: band4.select([XXX]),
  description: 'imageToAssetExample',
  assetId: 'exampleExport',
  scale: 30,
  region: geometry,
});
```

https://code.earthengine.google.com/6594c09eb844191f825ab6ea4c32f62f

Export ImageCollection

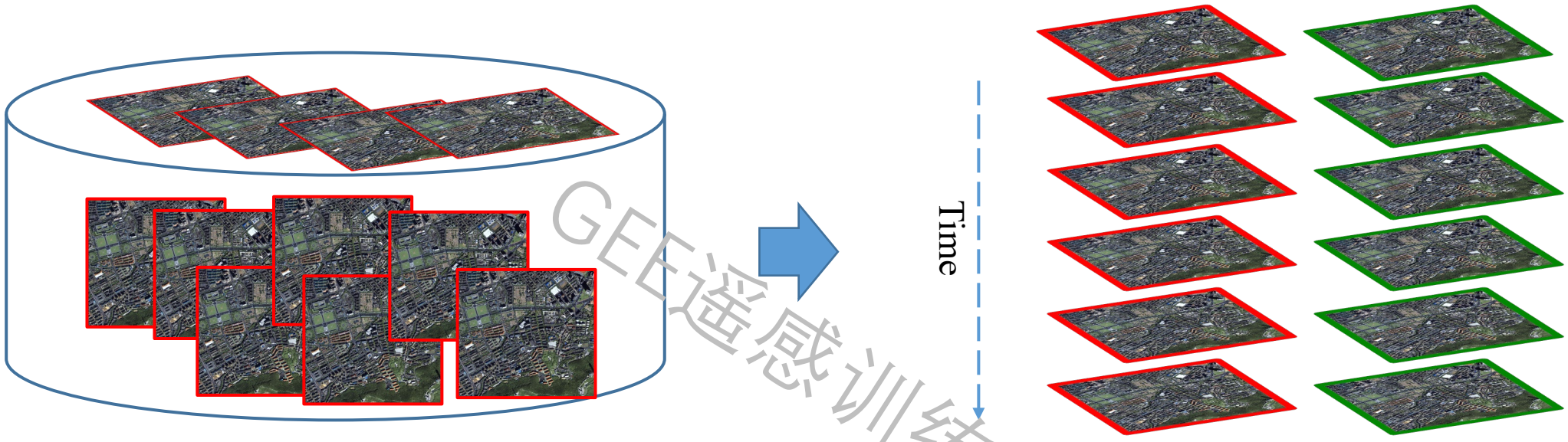
Differing from single image, in order to export the entire ImageCollection, we need first to **convert and re-organize the ImageCollection into List**, and then apply the **loop trick (for example, for-loop)** to access every element in the List



https://code.earthengine.google.com/ed946ae3cff7cb7123f6b492687f3d06

Exporting Monthly Composite

Monthly composite is a very promising and useful strategy to be used when reducing the image numbers is required while it also needs to maintain the major information in the crude image collection



https://code.earthengine.google.com/7975d5fb8db6391cd0909ac4556fb549

最后注意事项

Export.image.toDrive(image, description, folder, fileNamePrefix, dimensions, region, scale, **crs**, crsTransform, **maxPixels**, shardSize, fileDimensions, skipEmptyTiles, fileFormat, formatOptions)

`region`	*Geometry.LinearRing|Geometry.Polygon|String, optional*	*A LinearRing, Polygon, or coordinates representing region to export. These may be specified as the Geometry objects or coordinates serialized as a string. If not specified, the region defaults to the viewport at the time of invocation.*
`scale`	*Number, optional*	*Resolution in meters per pixel. Defaults to 1000.*
`crs`	*String, optional*	*CRS to use for the exported image.*
`crsTransform`	*List, optional*	*Affine transform to use for the exported image. Requires "crs" to be defined.*
`maxPixels`	*Number, optional*	*Restrict the number of pixels in the export. By default, you will see an error if the export exceeds 1e8 pixels. Setting this value explicitly allows one to raise or lower this limit.*

```
// Set the export "scale" and "crs" parameters.
Export.image.toDrive({
  image: image,
  description: 'foo_image',
  folder: 'foo_project',
  region: region,
  scale: 30,
  crs: 'EPSG:5070',
  maxPixels: 1e14
});
```

EPSG查询网址：https://spatialreference.org/ref/epsg/

UTM查询网址：https://blog.csdn.net/xiuxiu831017/article/details/79583221

Thanks for your attention

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