

```
In [214... import numpy as np #nd array
```

```
In [216... ones_aar=np.ones((5,5))
```

```
In [218... ones_aar
```

```
Out[218... array([[1., 1., 1., 1., 1.],
   [1., 1., 1., 1., 1.],
   [1., 1., 1., 1., 1.],
   [1., 1., 1., 1., 1.],
   [1., 1., 1., 1., 1.]])
```

```
In [226... ones_aar=np.ones((5,5),dtype=int) #converting ti ineger
```

```
In [228... ones_aar
```

```
Out[228... array([[1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1]])
```

```
In [230... zeros_arr=np.zeros((3,3),dtype=int)
```

```
In [232... zeros_arr
```

```
Out[232... array([[0, 0, 0],
   [0, 0, 0],
   [0, 0, 0]])
```

```
In [234... ones_aar
```

```
Out[234... array([[1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1],
   [1, 1, 1, 1, 1]])
```

```
In [236... ones_aar *233
```

```
Out[236... array([[233, 233, 233, 233, 233],
   [233, 233, 233, 233, 233],
   [233, 233, 233, 233, 233],
   [233, 233, 233, 233, 233],
   [233, 233, 233, 233, 233]])
```

```
In [238... zeros_arr
```

```
Out[238... array([[0, 0, 0],
   [0, 0, 0],
   [0, 0, 0]])
```

```
In [240... ones_aar
```

```
Out[240... array([[1, 1, 1, 1, 1],  
   [1, 1, 1, 1, 1],  
   [1, 1, 1, 1, 1],  
   [1, 1, 1, 1, 1],  
   [1, 1, 1, 1, 1]])
```

```
In [244... import matplotlib.pyplot as plt #visualization
```

```
%matplotlib inline (all the image keep inside)
```

```
In [247... %matplotlib inline
```

```
In [249... from PIL import Image #oython imaging library
```

```
In [253... nature_img=Image.open(r"C:\Users\Bharti\Downloads\ocean_img.png")
```

```
In [255... nature_img
```

```
Out[255...
```



```
In [257... ocean=Image.open(r"C:\Users\Bharti\Downloads\ocean.png")
```

```
In [259... ocean
```

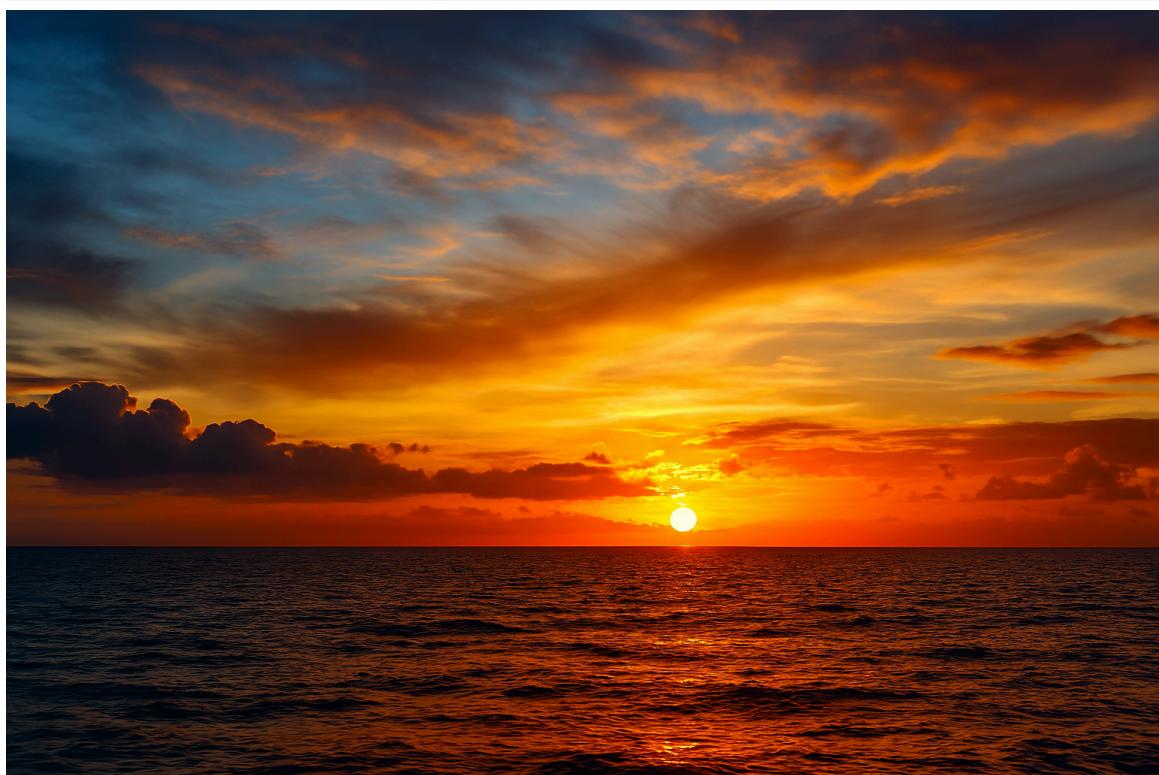
Out[259...]



In [261...]
`sunset_img=Image.open(r"C:\Users\Bharti\Downloads\sunset.png")`

In [263...]
`sunset_img`

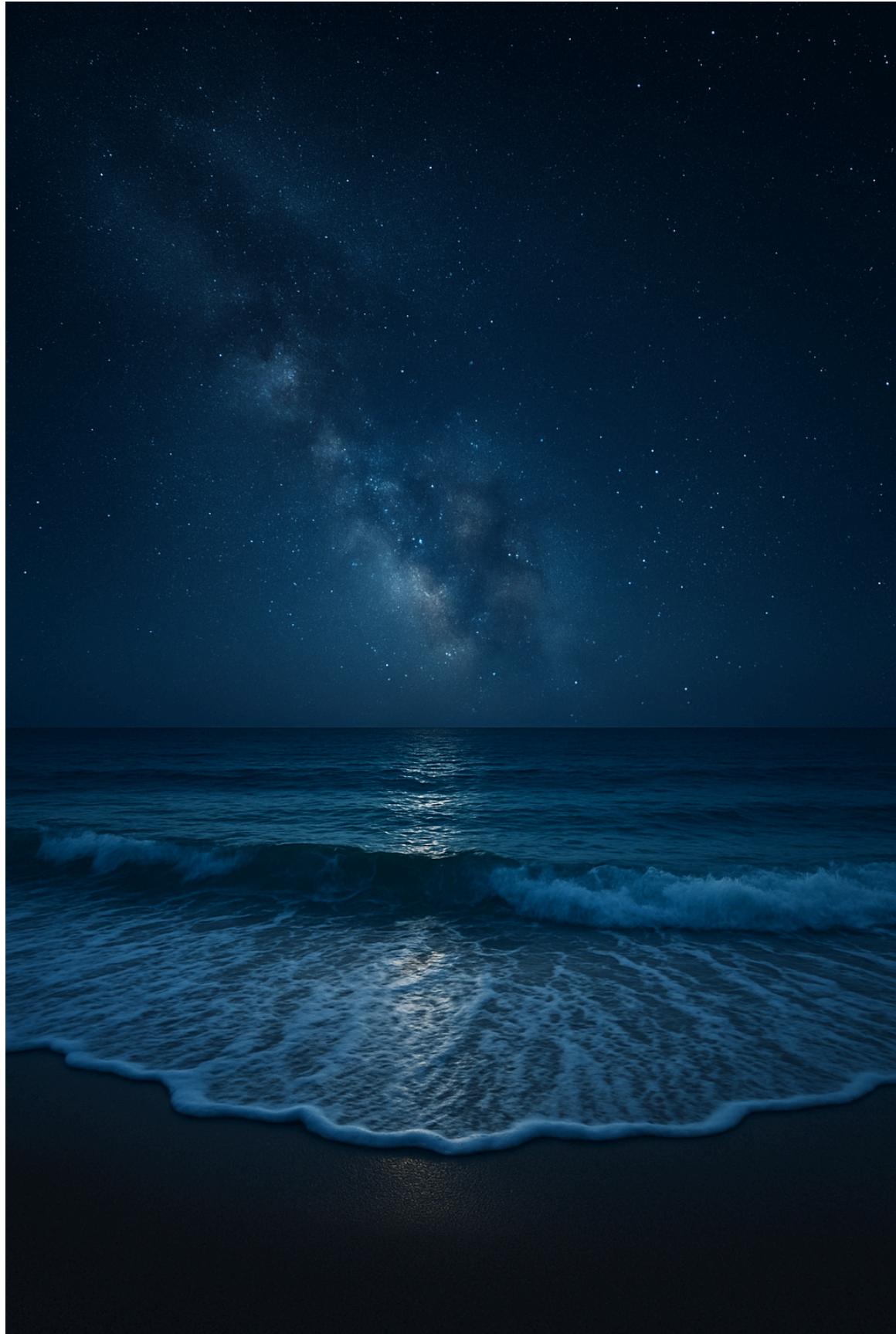
Out[263...]



In [265...]
`ocean_night_view=Image.open(r"C:\Users\Bharti\Downloads\nigh_view_ocean.png")`

In [267...]
`ocean_night_view`

Out[267...]



In [269...]: `type(ocean)`

Out[269...]: `PIL.PngImagePlugin.PngImageFile`

In [315...]: `ocean_arr=np.asarray(ocean)`
`ocean_arr`

```
Out[315... array([[[ 34, 130, 173],  
   [ 34, 132, 172],  
   [ 34, 131, 172],  
   ...,  
   [  0,   90, 136],  
   [  0,   89, 135],  
   [  1,   90, 135]],  
  
   [[ 35, 129, 173],  
   [ 32, 129, 172],  
   [ 35, 130, 175],  
   ...,  
   [  0,   90, 137],  
   [  0,   90, 136],  
   [  0,   90, 133]],  
  
   [[ 34, 132, 174],  
   [ 34, 129, 174],  
   [ 33, 131, 173],  
   ...,  
   [  0,   90, 137],  
   [  0,   90, 135],  
   [  1,   90, 134]],  
  
   ...,  
  
   [[126, 153, 149],  
   [102, 128, 123],  
   [ 91, 112, 108],  
   ...,  
   [ 66,   40,    4],  
   [ 53,   34,   13],  
   [ 75,   47,    6]],  
  
   [[213, 220, 218],  
   [219, 228, 226],  
   [214, 222, 216],  
   ...,  
   [106,   60,    0],  
   [ 64,   40,    8],  
   [ 63,   33,    0]],  
  
   [[215, 218, 216],  
   [213, 217, 214],  
   [204, 212, 206],  
   ...,  
   [151,   85,    2],  
   [104,   69,   27],  
   [ 80,   46,    7]]], dtype=uint8)
```

```
In [321... type(ocean_arr)
```

```
Out[321... numpy.ndarray
```

```
In [371... ocean_arr.shape
```

```
Out[371... (1024, 1536, 3)
```

```
In [373... plt.imshow(ocean_arr)
```

```
Out[373... <matplotlib.image.AxesImage at 0x2955b321280>
```

```
In [375... ocean_view=ocean_arr.copy()
```

```
In [377... ocean_view
```

```
Out[377... array([[[ 34, 130, 173],  
   [ 34, 132, 172],  
   [ 34, 131, 172],  
   ...,  
   [ 0,  90, 136],  
   [ 0,  89, 135],  
   [ 1,  90, 135]],  
  
   [[ 35, 129, 173],  
   [ 32, 129, 172],  
   [ 35, 130, 175],  
   ...,  
   [ 0,  90, 137],  
   [ 0,  90, 136],  
   [ 0,  90, 133]],  
  
   [[ 34, 132, 174],  
   [ 34, 129, 174],  
   [ 33, 131, 173],  
   ...,  
   [ 0,  90, 137],  
   [ 0,  90, 135],  
   [ 1,  90, 134]],  
  
   ...,  
  
   [[126, 153, 149],  
   [102, 128, 123],  
   [ 91, 112, 108],  
   ...,  
   [ 66,  40,    4],  
   [ 53,  34,   13],  
   [ 75,  47,    6]],  
  
   [[213, 220, 218],  
   [219, 228, 226],  
   [214, 222, 216],  
   ...,  
   [106,  60,    0],  
   [ 64,  40,    8],  
   [ 63,  33,    0]],  
  
   [[215, 218, 216],  
   [213, 217, 214],  
   [204, 212, 206],  
   ...,  
   [151,  85,    2],  
   [104,  69,   27],  
   [ 80,  46,    7]]], dtype=uint8)
```

```
In [387... ocean_arr==ocean_view
```

```
Out[387... array([[[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

   [[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

   [[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

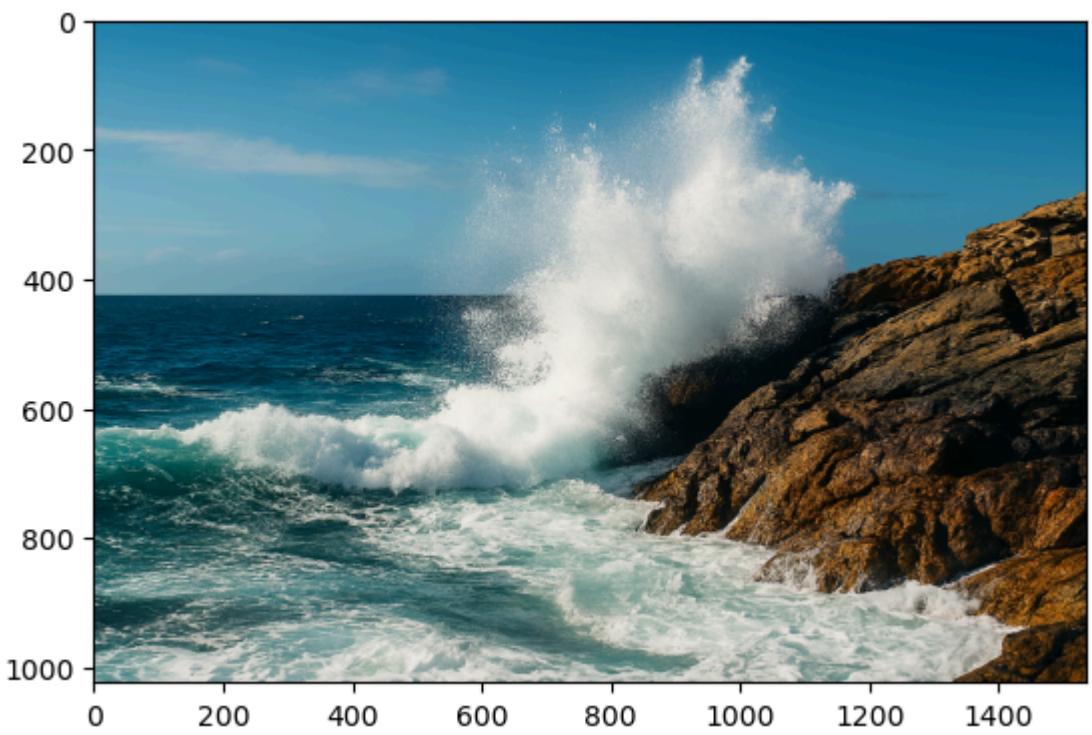
   ...,

   [[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

   [[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

   [[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]]])
```

```
In [389... plt.show()
```



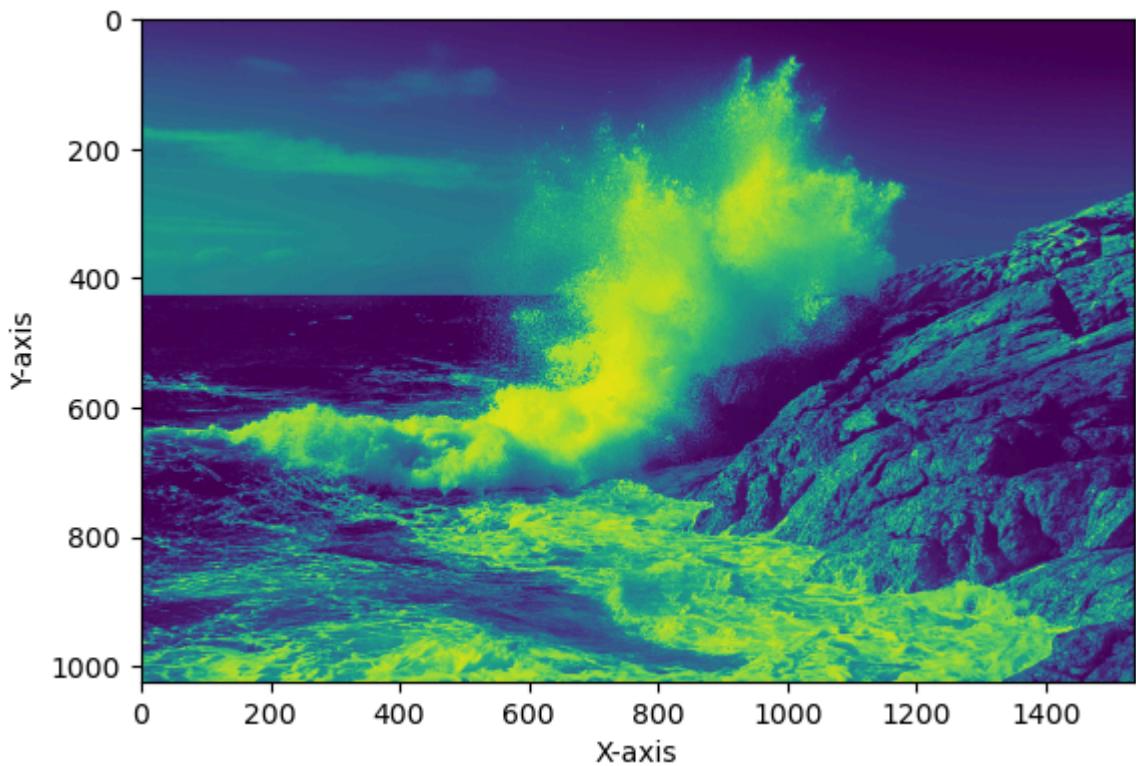
```
In [393...]: ocean_view.shape
```

```
Out[393...]: (1024, 1536, 3)
```

```
In [395...]: plt.imshow(ocean_view[:, :, 0], cmap='gray')
```

```
Out[395...]: <matplotlib.image.AxesImage at 0x2955b31aff0>
```

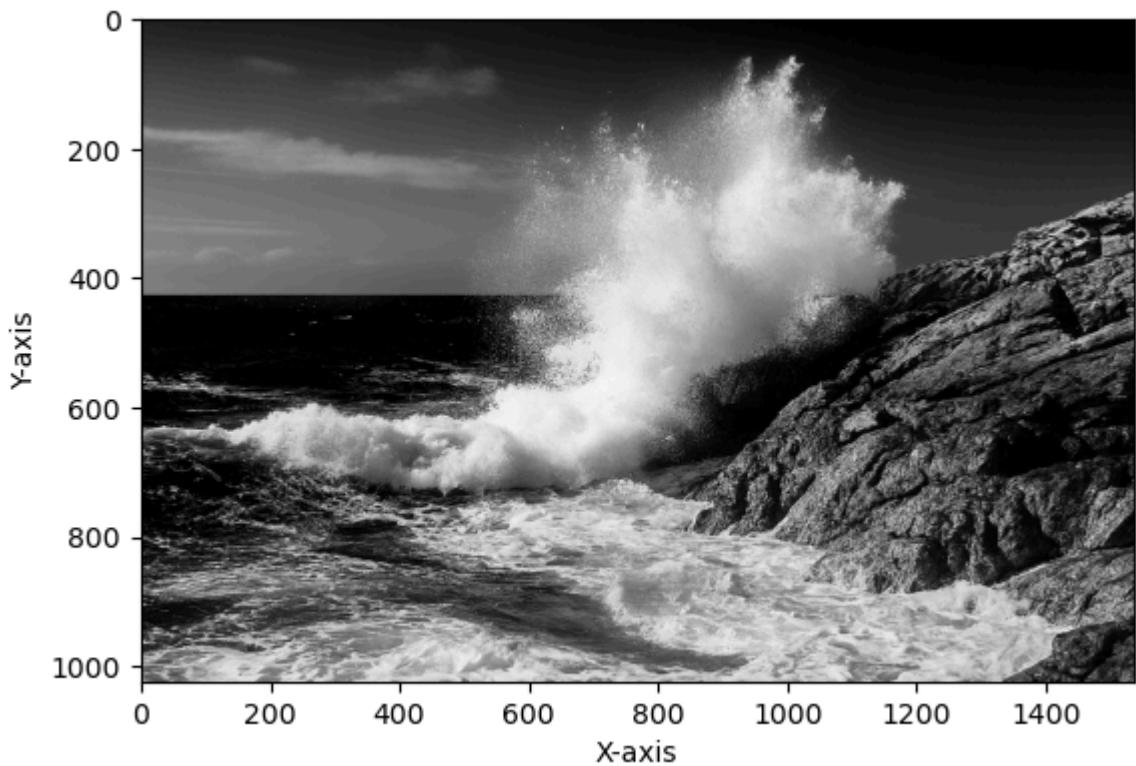
```
In [399...]: plt.imshow(ocean_view[:, :, 0])
plt.imshow(ocean_view[:, :, 0]) # display one channel
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



```
In [403...]: ocean_view[:, :, 0]
```

```
Out[403...]: array([[ 34,  34,  34, ...,  0,   0,   1],
       [ 35,  32,  35, ...,  0,   0,   0],
       [ 34,  34,  33, ...,  0,   0,   1],
       ...,
       [126, 102,  91, ...,  66,  53,  75],
       [213, 219, 214, ..., 106,  64,  63],
       [215, 213, 204, ..., 151, 104,  80]], dtype=uint8)
```

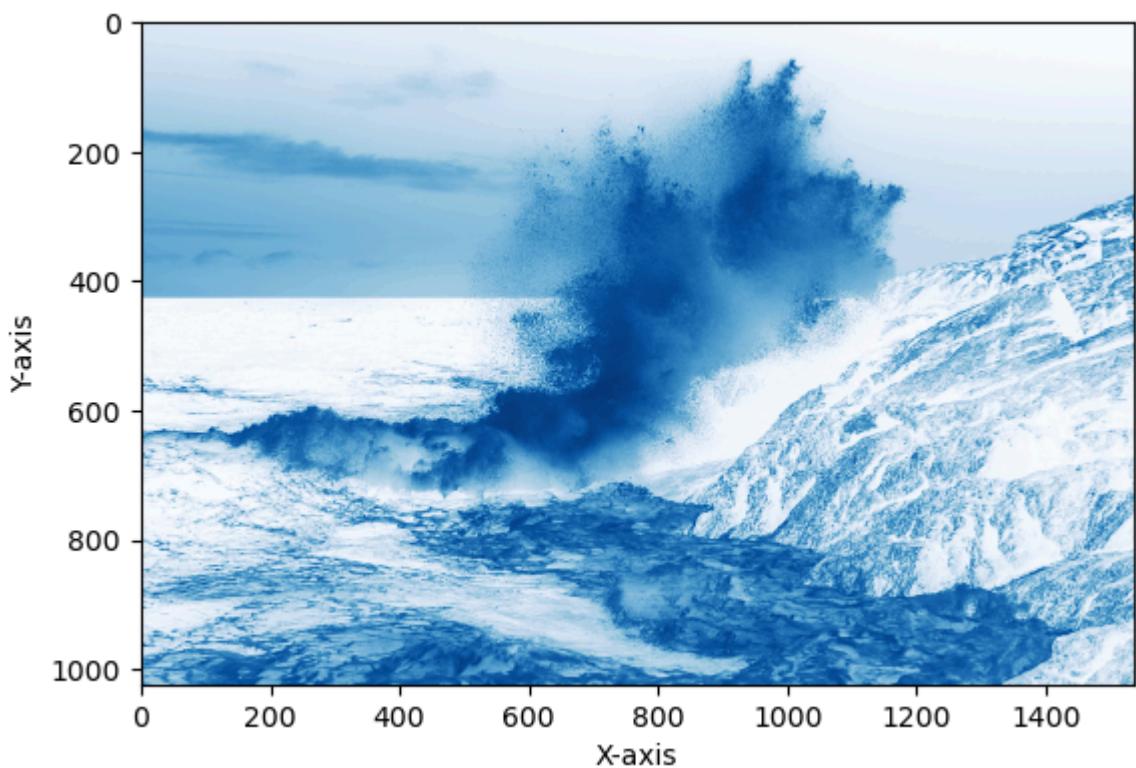
```
In [405...]: plt.imshow(ocean_view[:, :, 0])
plt.imshow(ocean_view[:, :, 0], cmap='gray') # display one channel
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



```
In [407...]: plt.imshow(ocean_view[:, :, 0], cmap='Blues')
```

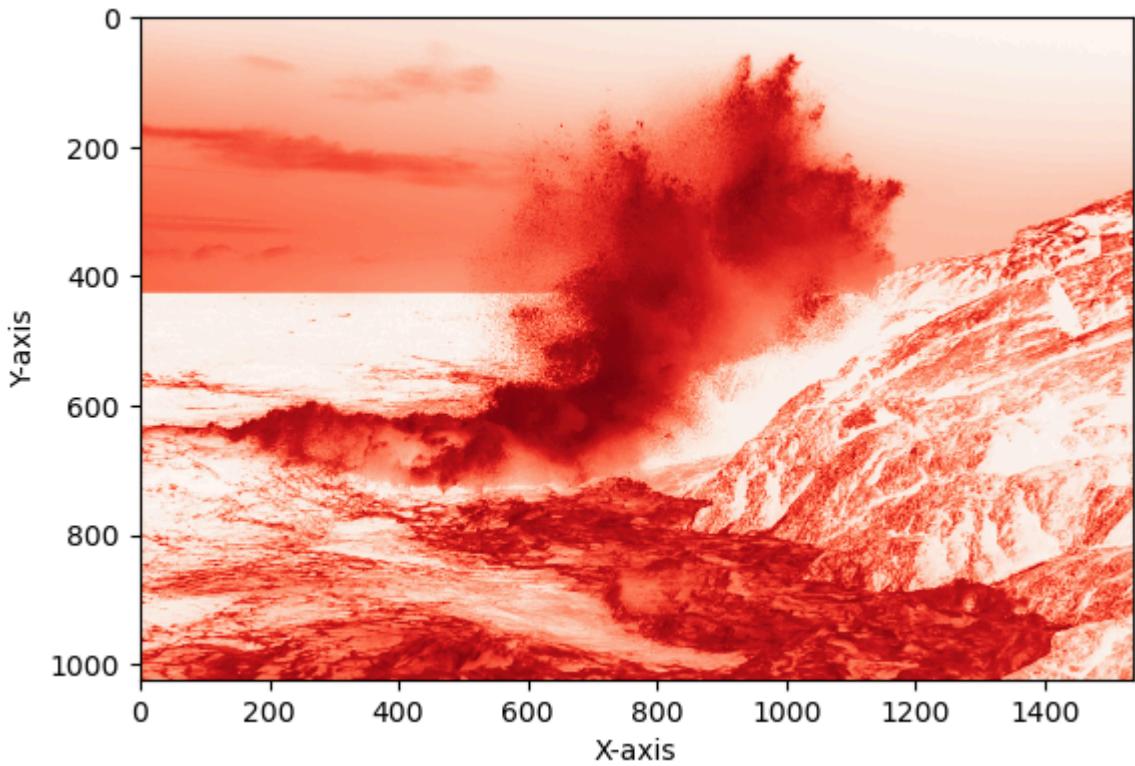
```
Out[407...]: <matplotlib.image.AxesImage at 0x2955b8fd910>
```

```
In [409...]: plt.imshow(ocean_view[:, :, 0], cmap='Blues')
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```

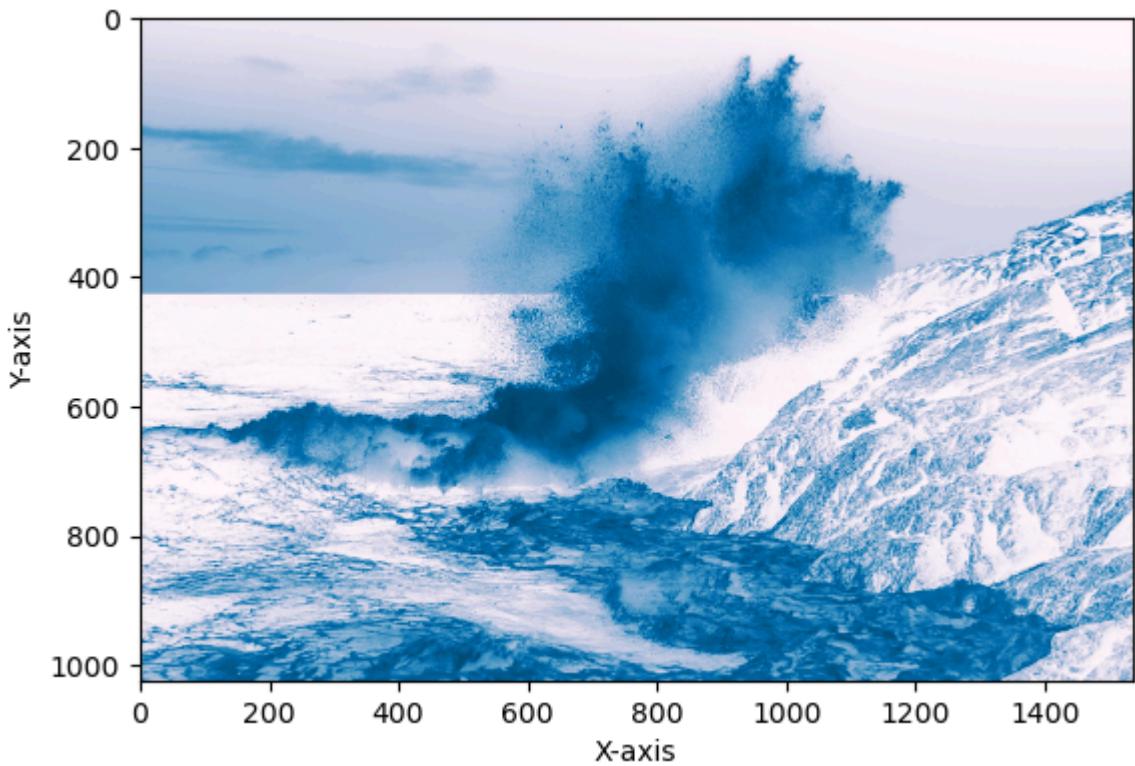


```
In [411...]: plt.imshow(ocean_view[:, :, 0], cmap='Reds')
plt.xlabel("X-axis")
```

```
plt.ylabel("Y-axis")
plt.show()
```



```
In [413... plt.imshow(ocean_view[:, :, 0], cmap='PuBu') #PuBu pure blue
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



```
In [415... ocean_view[:, :, 0]
```

```
Out[415... array([[ 34,  34,  34, ...,  0,  0,  1],
   [ 35,  32,  35, ...,  0,  0,  0],
   [ 34,  34,  33, ...,  0,  0,  1],
   ...,
   [126, 102,  91, ...,  66,  53,  75],
   [213, 219,  214, ..., 106,  64,  63],
   [215, 213,  204, ..., 151, 104,  80]], dtype=uint8)
```

```
In [417... ocean_view[:, :, 1]
```

```
Out[417... array([[130, 132, 131, ..., 90, 89, 90],
   [129, 129, 130, ..., 90, 90, 90],
   [132, 129, 131, ..., 90, 90, 90],
   ...,
   [153, 128, 112, ..., 40, 34, 47],
   [220, 228, 222, ..., 60, 40, 33],
   [218, 217, 212, ..., 85, 69, 46]], dtype=uint8)
```

```
In [419... ocean_view[:, :, 2]
```

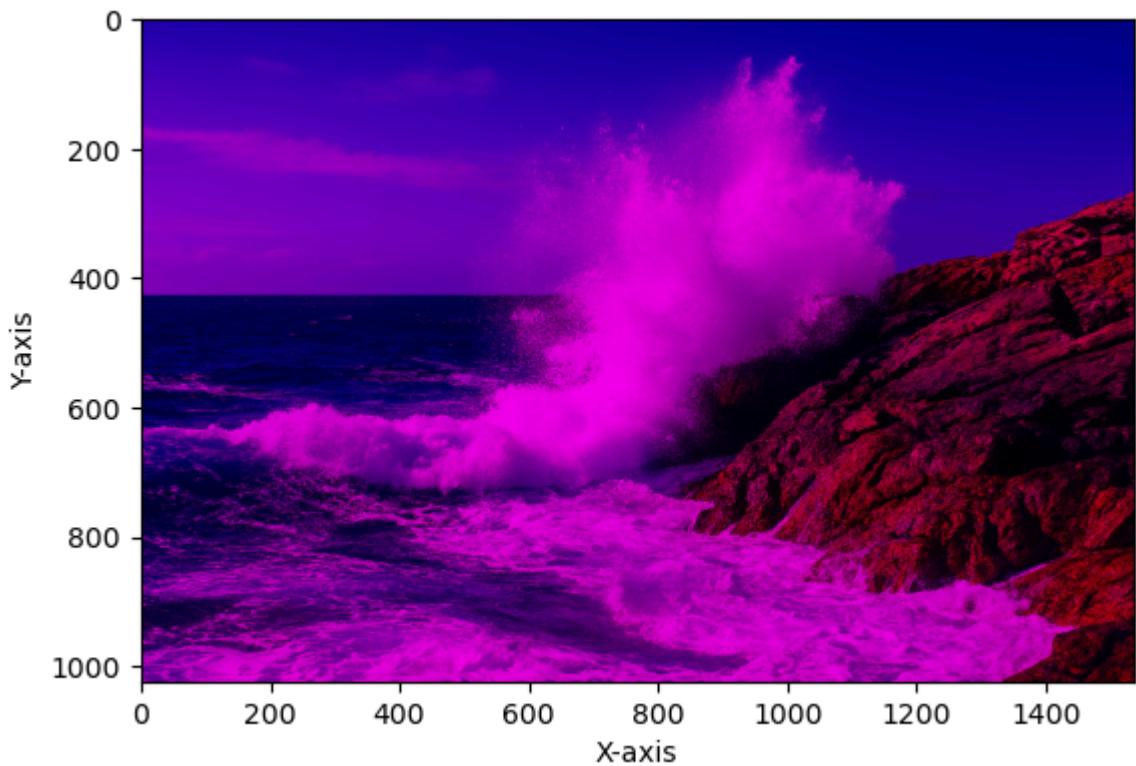
```
Out[419... array([[173, 172, 172, ..., 136, 135, 135],
   [173, 172, 175, ..., 137, 136, 133],
   [174, 174, 173, ..., 137, 135, 134],
   ...,
   [149, 123, 108, ...,  4, 13,  6],
   [218, 226, 216, ...,  0,  8,  0],
   [216, 214, 206, ...,  2, 27,  7]], dtype=uint8)
```

```
In [421... ocean_view[:, :, 1]=0
```

```
In [423... ocean_view[:, :, 1]
```

```
Out[423... array([[0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   ...,
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0]], dtype=uint8)
```

```
In [425... plt.imshow(ocean_view)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```

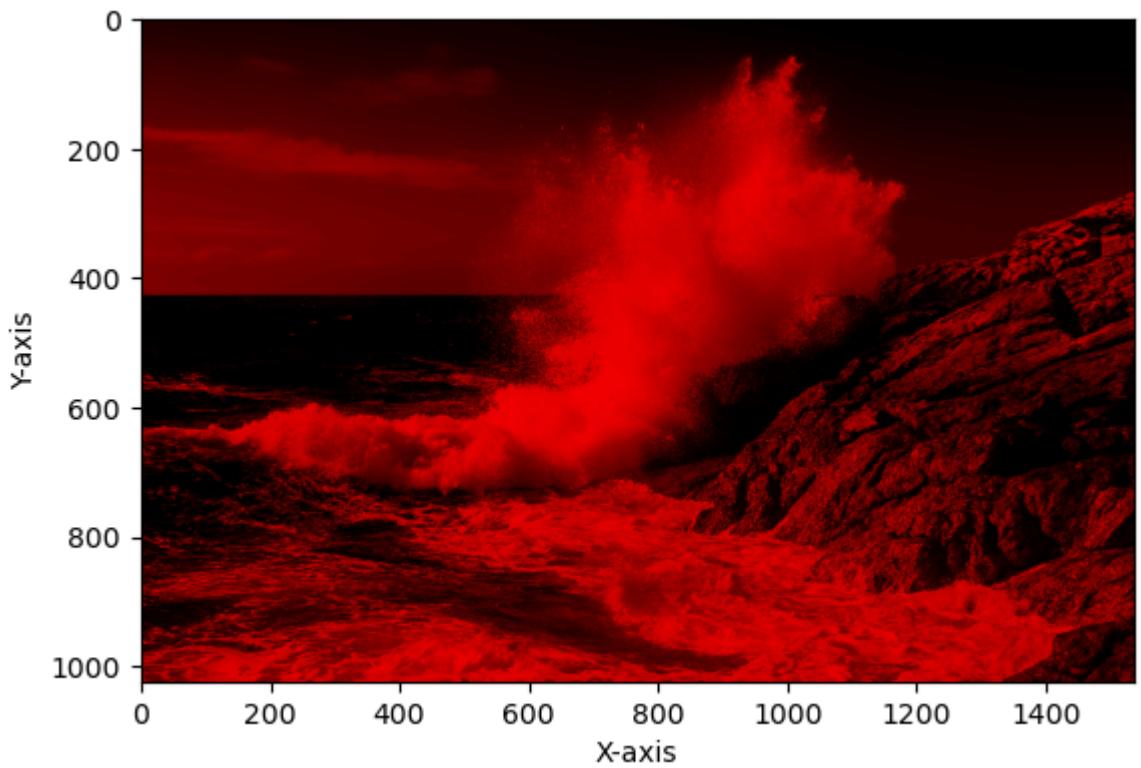


```
In [427...]: ocean_view[:, :, 2]=0
```

```
In [429...]: ocean_view[:, :, 2]
```

```
Out[429...]: array([[0, 0, 0, ..., 0, 0, 0],
 [0, 0, 0, ..., 0, 0, 0],
 [0, 0, 0, ..., 0, 0, 0],
 ...,
 [0, 0, 0, ..., 0, 0, 0],
 [0, 0, 0, ..., 0, 0, 0],
 [0, 0, 0, ..., 0, 0, 0]], dtype=uint8)
```

```
In [431...]: plt.imshow(ocean_view)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



In [433...]

ocean

Out[433...]



In [435...]

arr1=np.asarray(ocean)

In [437...]

arr1

```
Out[437... array([[[ 34, 130, 173],  
   [ 34, 132, 172],  
   [ 34, 131, 172],  
   ...,  
   [  0,   90, 136],  
   [  0,   89, 135],  
   [  1,   90, 135]],  
  
   [[ 35, 129, 173],  
   [ 32, 129, 172],  
   [ 35, 130, 175],  
   ...,  
   [  0,   90, 137],  
   [  0,   90, 136],  
   [  0,   90, 133]],  
  
   [[ 34, 132, 174],  
   [ 34, 129, 174],  
   [ 33, 131, 173],  
   ...,  
   [  0,   90, 137],  
   [  0,   90, 135],  
   [  1,   90, 134]],  
  
   ...,  
  
   [[126, 153, 149],  
   [102, 128, 123],  
   [ 91, 112, 108],  
   ...,  
   [ 66,   40,    4],  
   [ 53,   34,   13],  
   [ 75,   47,    6]],  
  
   [[213, 220, 218],  
   [219, 228, 226],  
   [214, 222, 216],  
   ...,  
   [106,   60,    0],  
   [ 64,   40,    8],  
   [ 63,   33,    0]],  
  
   [[215, 218, 216],  
   [213, 217, 214],  
   [204, 212, 206],  
   ...,  
   [151,   85,    2],  
   [104,   69,   27],  
   [ 80,   46,    7]]], dtype=uint8)
```

```
In [439... type(arr1)
```

```
Out[439... numpy.ndarray
```

```
In [441... arr1.shape
```

```
Out[441... (1024, 1536, 3)
```

```
In [463... plt.show()
```

```
In [465... ocean=arr1.copy()
```

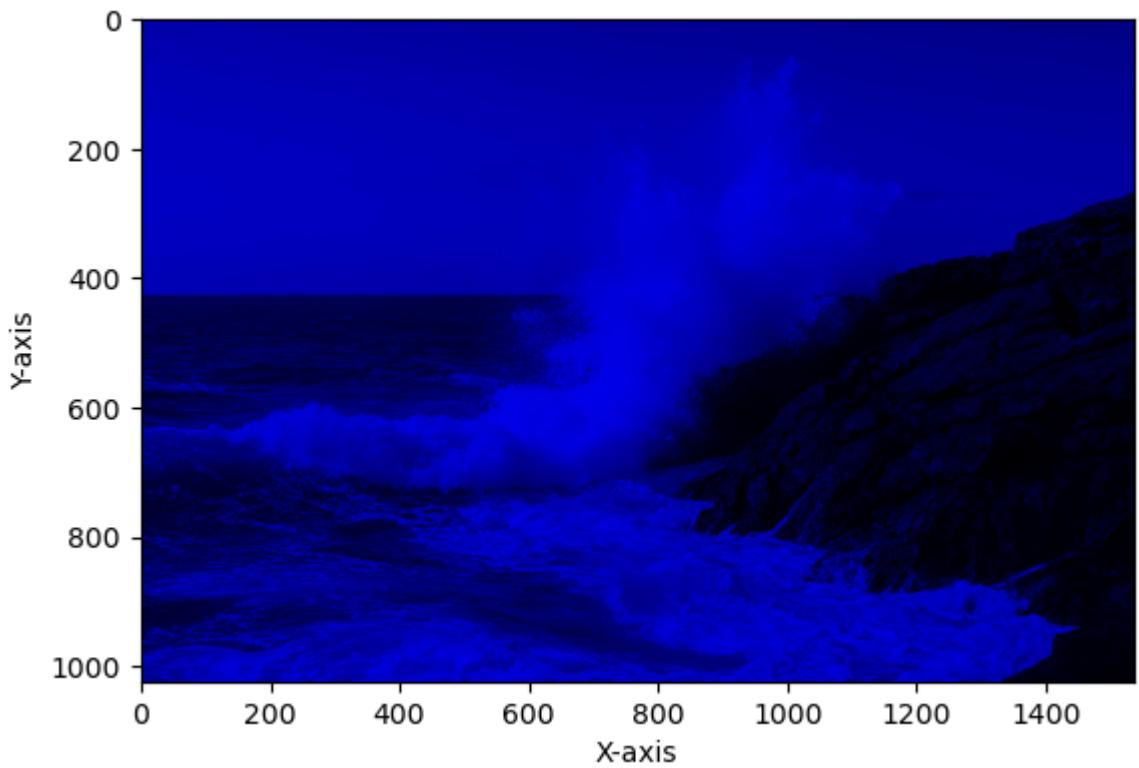
```
In [469... ocean[:, :, 0] =0
```

```
In [473... plt.imshow(ocean)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



```
In [479... ocean[:, :, 1] =0
```

```
In [481... plt.imshow(ocean)
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



In []: