In [29]:

```
import richdem as rd
from rasterio import rasterio
from rasterio import plot
import geopandas as gpd
from shapely.geometry import Point

%matplotlib inline
```

In [30]:

```
aerial_rio_ds = rasterio.open('../input/aerialtif/aerial.tif')
```

In [31]:

```
aerial_rio_ds.crs
```

In [32]:

```
aerial_rio_ds.count
```

Out[32]:

```
3
```

In [33]:

```
aerial_rio_ds.bounds
```

Out[33]:

```
BoundingBox(left=0.0, bottom=554.0, right=763.0, top=0.0)
```

In [34]:

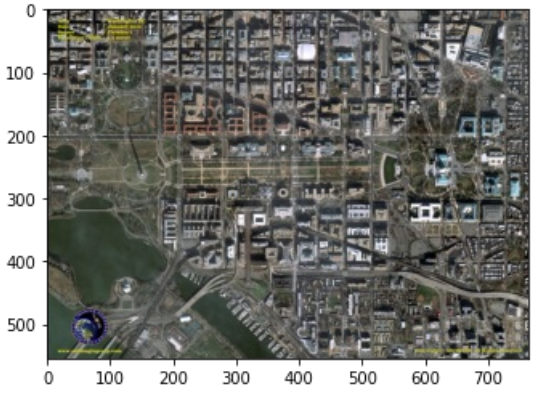
```
raster_width = aerial_rio_ds.width
raster_height = aerial_rio_ds.height

print('width {}, height {}'.format(raster_width, raster_height))
```

```
width 763, height 554
```

In [35]:

```
rasterio.plot.show(aerial_rio_ds,cmap='bone')
```



Out[35]:

```
<AxesSubplot:>
```

In [36]:

```
aerial_rio_band1 = aerial_rio_ds.read(1).astype('float64')
aerial_rio_band1
```

Out[36]:

```
array([[ 43.,   8.,  10., ..., 101., 108., 119.],
       [ 44.,   5.,   7., ...,  92., 126., 123.],
       [ 46.,   6.,   2., ...,  95., 146., 102.],
       ...,
       [ 52.,  56.,  56., ...,  51.,  49.,  47.],
       [ 52.,  58.,  57., ...,  37.,  37.,  39.],
       [ 53.,  59.,  56., ...,  37.,  40.,  39.]])
```

In [37]:

```
aerial_rio_band1[1,5]
```

Out[37]:

```
110.0
```

In [38]:

```
aerial_rio_ds.xy(1,5)
```

Out[38]:

```
(5.5, 1.5)
```

In [39]:

```
aerial_richdem = rd.rdarray(aerial_rio_band1, no_data=-9999)
```

In [40]:

```
aerial_richdem
```

Out[40]:

```
rdarray([[ 43.,   8.,  10., ..., 101., 108., 119.],
         [ 44.,   5.,   7., ...,  92., 126., 123.],
         [ 46.,   6.,   2., ...,  95., 146., 102.],
         ...,
         [ 52.,  56.,  56., ...,  51.,  49.,  47.],
         [ 52.,  58.,  57., ...,  37.,  37.,  39.],
         [ 53.,  59.,  56., ...,  37.,  40.,  39.]])
```

In [41]:

```
rd.rdShow(aerial_richdem, axes=False,cmap='bone',figsize=(10,4))
```

Out[41]:

```
{'vmin': 20.0, 'vmax': 208.0}
```

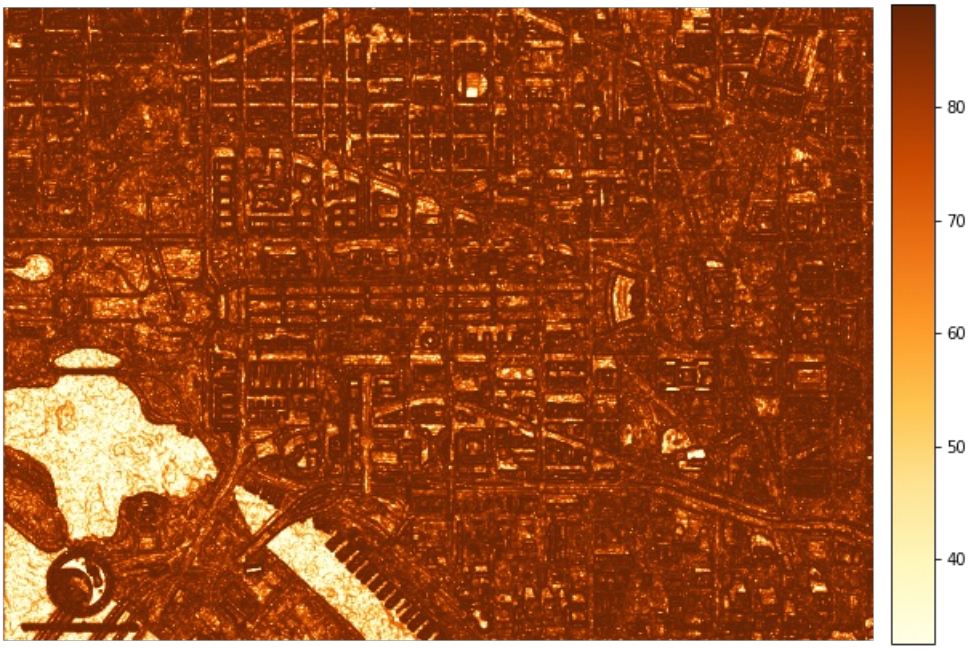
In [42]:

```
aerial_rich_slope = rd.TerrainAttribute(aerial_richdem, attrib='slope_degrees')
```

```
Warning! No geotransform defined. Choosing a standard one! (Top left cell's top let corner at <0,0
>; cells are 1x1.)
Warning! No geotransform defined. Choosing a standard one! (Top left cell's top let corner at <0,0
>; cells are 1x1.)
```

In [43]:

```
rd.rdShow(aerial_rich_slope,axes=False, cmap='YlOrBr', figsize=(9,6))
```



Out[43]:

```
{'vmin': 32.512516021728516, 'vmax': 89.12103958129883}
```

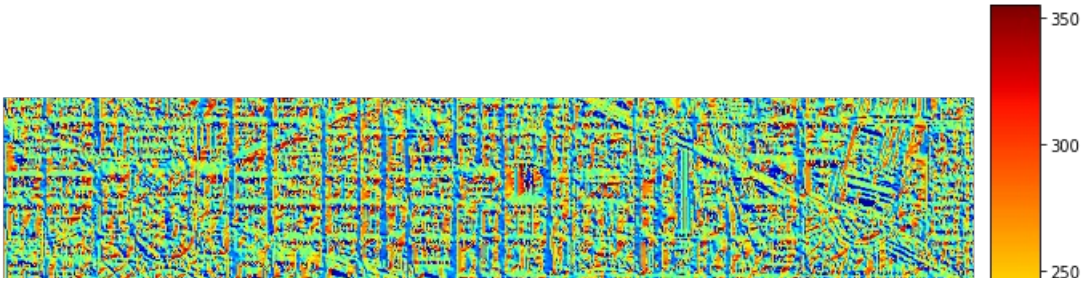
In [44]:

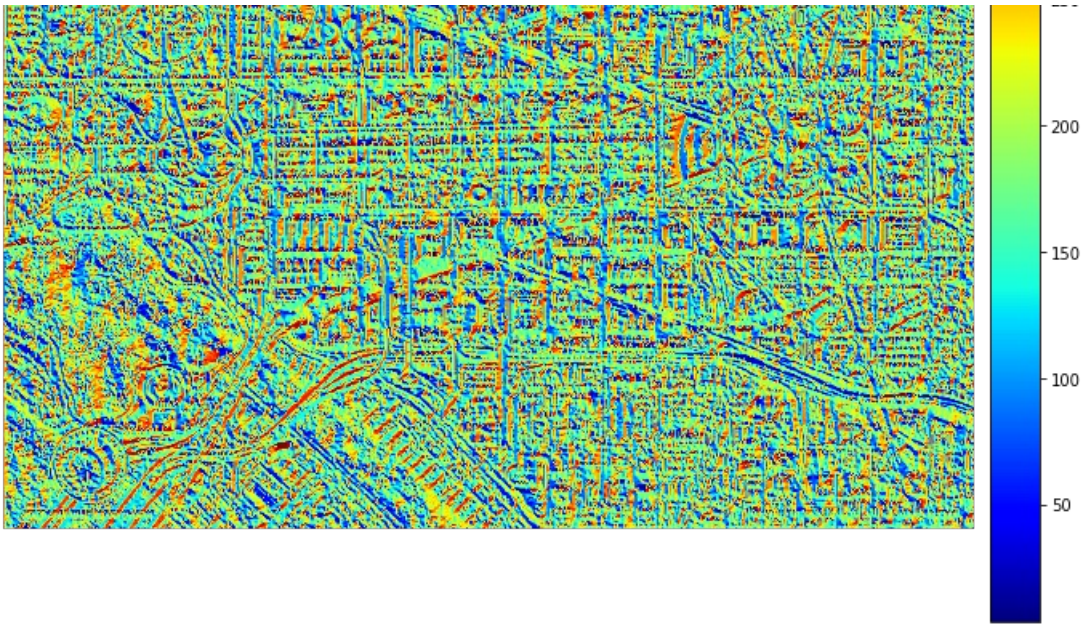
```
aerial_rich_aspect = rd.TerrainAttribute(aerial_richdem,attrib='aspect')
```

```
Warning! No geotransform defined. Choosing a standard one! (Top left cell's top let corner at <0,0
>; cells are 1x1.)
Warning! No geotransform defined. Choosing a standard one! (Top left cell's top let corner at <0,0
>; cells are 1x1.)
```

In [45]:

```
rd.rdShow(aerial_rich_aspect,axes=False,cmap='jet',figsize=(10,8))
```





Out[45]:

```
{'vmin': 3.632950782775879, 'vmax': 355.13006591796875}
```

In [ ]: